THE REPUBLIC OF UZBEKISTAN
MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
NAMANGAN ENGINEERING - CONSTRUCTION INSTITUTE

DEPARTMENT OF "INFORMATION SYSTEMS AND TECHNOLOGIES"

OBJECT-ORIENTED PROGRAMMING LANGUAGES

FROM SCIENCE

EDUCATIONAL COMPLEX

Field of knowledge:	600 000 - Information and communication technologies
Area of study:	610 000 - Information and communication technologies
Subject	60610200-Information systems and technologies (by networks and sectors)

NAMANGAN-2022

THE REPUBLIC OF UZBEKISTAN

MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
NAMANGAN ENGINEERING - CONSTRUCTION INSTITUTE

"I approve"
Vice Rector for Academic Affairs
_____Assoc.K.Inoyatov
"_____»2022.

TOPIC "OBJECT-ORIENTED PROGRAMMING LANGUAGES HEAT"

EDUCATIONAL COMPLEX

Field of knowledge:	**600000 -**	**Information and Communication Technology**
Area of study:	**610000 -**	**Information and Communication Technology**
Area of study:	**60610200-**	**Information systems and technologies (by networks and sectors)**

Namangan 2022

The educational and methodological complex on the subject "Object-oriented programming languages" was created on the basis of the standard curriculum of the subject, approved by order of the Ministry of Education and Culture No. 648 of 10/30/2020.

Developers:

Jakbarov O. - NamMQI, Associate Professor of the Department of Information Systems and Technologies.

Reviewers:

Assoc.prof.A.Imomov - Head of the Department "Applied Mathematics and Information Technology" (NamGU).

The topic was discussed at a meeting of the Department of Information Systems and Technologies of UUM in June 2022 and was recommended for discussion at the Faculty Council.

Head of department: _____ S.Komilov

The topic was discussed and recommended by the Council of the Faculty of Industrial Informatization of UUM.

2022 Minutes of the meeting No. "_____" dated "____" _____.

Faculty Council Chairman: _____ A. Kaxxarov

The educational and methodological complex was discussed and recommended for use by the scientific and methodological council of the Namangan Engineering and Construction institute.

Protocol No. "_____" dated "___" _____ 2022

Registration number:_____

TABLE OF CONTENTS

The educational and methodological complex offered at your disposal is designed to organize your independent work in the process of studying the subject "Object-oriented programming languages".

The set consists of two parts: "Introduction to the subject" and "Plan-tasks and teaching materials".

The first section contains materials that give an initial idea of the training course: the relevance, goals and objectives of the training course, the requirements of the State Educational Standards for the required level of knowledge in the subject, subject and types of education. distribution of study hours, a list of recommended literature, topics for independent work and questions of the final control of knowledge.

In the second part, a task plan and training materials for each exercise are given. Timely completion of assignments ensures a high level of knowledge in the subject and constant self-control.

As in any other subject, when learning object-oriented programming languages, you must follow a logical sequence. Therefore, after an in-depth study of the topic, it will be possible to move on to a new topic.

THE REPUBLIC OF UZBEKISTAN

MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION

NAMANGAN ENGINEERING - CONSTRUCTION INSTITUTE

Information systems and technologies
department

"Object-Oriented Programming Languages"
from science

Undergraduate: 60610200 - Information systems and technologies (by branches and branches)

60610200 - Information systems and technologies (by branches and branches)

Working programm

Namangan - 2022.

THE REPUBLIC OF UZBEKISTAN
MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
REGARDLESS OF ENGINEERING AND CONSTRUCTION INSTITUTE

"I APPROVE"
Chairman of the Scientific and Methodological Council

_____
"___" _____2022

60610200 - Information systems and technologies (by networks and industries) from the subject "Object-oriented programming languages" of the faculty "Informatization of industry".

TYPE OF TRAINING AND OBSERVATION

Season (semester)	Content of training						Control type (rating)	study hour
	Lecture	Amal puree	Taj. puree.	Course work (project)	Must. Work	Naz. Work		
DAYTIME								
AT	36	eighteen	eighteen	-	36	-	rating	54

Working programm "Object Oriented Programming Languages" was created on the basis of a standard program.

Developers:
O. Jakbarov - Department of Information Systems and Technologies (NamMQI)

Reviewers:
Assoc. Mahmudov Z. - Head of the Department of Computer Science (NamMQI)
Assoc.prof.A.Imomov - Head of the Department "Applied Mathematics and Information Technologies" (NamSU)

WORKING PROGRAMM

Approved at the meeting of the department
Head of department
S. Komilov
"_____" _____2022

Department of Specialization
Head of Department:
S. Komilov
"____" _____2022

The work program was discussed at the methodological council of the faculty "Informatization of industry" (report No. ___) and recommended for consideration by the scientific and methodological council of the institute. (_____)

The work program was reviewed by the NamMQI Scientific and Methodological Council (2022 "__" _____, protocol No. __, registration number ___) and recommended for use in the educational process.

BEGINNING OF A WORD

In order to ensure its independence, Uzbekistan is developing and improving in all spheres of the national economy, including in the system of higher education on the basis of harmonization with world standards. This is confirmed by the adoption of the Law "On Education" and the National Personnel Training Program (August 29, 1997) and their phased implementation, making an important turn in the implementation of educational reforms. At the second stage of the quality of this program, certain results are achieved in terms of improving the quality of trained personnel.

Istiklal brought about great changes and great revolutions in the field of public education, as well as in all other fields. In his speech at the opening ceremony of the Academy of State and Social Development, President I.Karimov said not in vain: "Highly qualified specialists are a development factor."

In particular, special attention was paid to improving the quality of lessons. Undoubtedly, the importance of educational documents in improving the quality of the lesson and conducting it in accordance with the requirements of the time. The reflection of modern techniques, technologies and teaching methods in educational documents and their implementation is considered one of the important factors in the preparation of modern competitive personnel.

Efficient use of modern computing tools is important in all spheres of human activity.

Therefore, an urgent task is to train mature specialists who widely use modern computers in their practical activities, including engineering teachers according to world standards.

The strategy of independent development of Uzbekistan requires the rational use of various forms of education in instilling in students the essence of the ideology of national independence.

In order to be able to meet the demands of modern students, it is necessary not only to know how to use computers effectively, but also to be able to create programs for various fields.

At this point, it is necessary to urgently improve the system of personnel training on the basis of the resolution of the Cabinet of Ministers "On the further development of computerization and the introduction of information and communication technologies" and the "State Program for the Development of Informatization and Information and Communication Technologies for 2002". -2022" is considered one of the tasks and requires solving the issue of creating regulatory documents at the level of high requirements. That is why one of the most important issues is the improvement of educational programs based on the requirements of the time.

In preparing the program, a standard program in science, current policy documents on higher and secondary specialized education of the Republic of Uzbekistan, many years of scientific and pedagogical experience accumulated in our republic and abroad, and new pedagogical developments based on new advanced teachings about technologies were used.

1. Purpose of teaching science and its undergraduate degree role in preparing

1.1. The purpose of teaching science.

Based on the main goal of training qualified programmers who create software necessary for the rational use of personal computers in various areas of the national economy, students and future specialists are preparing to study the subject software of a personal computer. help them become teachers.

It is known that at present Internet technologies are developing at a rapid pace, which requires students to know the technology of creating a package of practical programs in various programming languages. Also, a student studying in this direction and aimed at mastering this subject will improve his knowledge and skills in various fields, including in the field of education, with the Delphi object, he will have great opportunities to further improve his knowledge based on the programming language. . As a result of mastering the subject, he will have the opportunity to further expand and apply various practical programs or language capabilities in the subject he has passed. Also,

1.2. Requirements for the knowledge and skills of students

"OThe following requirements are imposed on the knowledge and skills that students will acquire as a result of studying object-oriented programming languages:

- Delphistudies an object-oriented programming language;
- understands properties and events and uses components;
- can create programs for solving mathematical expressions using standard functions;
- creates programs for various processes;
- can create and edit various tables;
- uses the standard libraries for the program and can create a new library;
- can work with all known file types;
- can depict an object moving in all directions using a graphical method;
- you can create a disc to install the created program on other computers.
- Can create programs for linear, branching and repetitive processes;
- can work with arrays;
- Obwill have an understanding of the concept of "one";
- Can work with components;
- Able to create and manage graphic images;
- Learn to work with files;
- He knows how to organize a database.

1.3. Communication of science with other sciences

The science of "object-oriented programming languages" is inextricably linked with a number of concrete and natural sciences. In particular, the subjects "Information systems and technologies", "Algorithmic languages", "Programming technology", "System programming languages" serve as a base and support for studying the subject "Object-oriented programming languages". In turn, the knowledge gained in the subject "Object-oriented programming languages" will become the theoretical basis for teaching other subjects of the direction "Computer Science and Information Technology".

1.4. Application of new pedagogical technologies in pedagogical science

The use of new pedagogical technologies in teaching science is to further strengthen and improve students' independent work on themselves. As a result, students increase their computer literacy, they enrich their knowledge by working more with literature, the world of imagination expands, they learn to promote their ideas by thinking independently.

The teaching of "object-oriented programming languages" consists of lectures, experiments, practical exercises and extracurricular activities and is carried out in several stages, namely:

Stage 1.DelphiEnvironment. Installing and using Delphi. Command menu.Delphiinitial steps in

Stage 2.Delphicomponents in Features and Events. Standard components. Standard features.

Stage 3. Teams. (If Case, For, Bye, Repeat, Jump)

Step 4: Passed Types, Intermediate Types, and Records.

Step 5. Modules. standard modules. Modular programs and methods of their organization. Polymorphism and virtual methods.

Step 6: Delphi graphics capabilities. Component installation. Check the component.

Step 7. Working with the database in Delphi.

Step 9. Creating installation discs for programs created in Delphi.

Lecture classes provide basic theoretical concepts, explain general laws, the general structure of object-oriented programming, properties and events of objects, the relationship between disciplines, and outline the ideas necessary for experience and practical learning. explained., technologies and methods are given.

In practical classes, theoretical laws are tested and ideas are formed that experience is the basis of knowledge.

In practical classes, in order to test the theoretically acquired knowledge in practice, on the basis of small tasks, students learn the language in a practical way and master various types of problem solving technologies.

Independent extracurricular work is organized in the sense of consolidating the knowledge gained in the classroom, deepening it and shaping creative thinking.

The possibilities of using new pedagogical technologies in the process of teaching "Object-oriented programming languages" include:

- full development of technology is provided;
- learning goals are transformed into control (test) and practical tasks;
- the problematic method is used (problem, task, task, question, discussion, etc.) and the basis of simulation modeling of reality;
- use of a system for conducting control work through written work on key phrases;
- effective use of interactive methods.

For example, when creating problematic lecture texts and conducting lectures based on them, using one of the interactive methods of the new pedagogical technology (Venn diagram, BBB, Cluster, Semantic feature analysis, Conceptual table, etc.), it is desirable to create and improve web pages based on various tasks.

Technical means used in the educational process.

The use of computerized, information and other modern technological means (various animations, virtual laboratories, electronic guidelines, etc.) in the process of teaching the sciences is one of the main development requirements today.

For practical classes, laboratory stands, electronic textbooks, electronic manuals, auxiliary programs in Delphi and software tools are used.

In addition, when performing experimental work, solving problems using one of the modern object-oriented programming languages, bringing each task to the required level in terms of design and perfection, preparing methodological recommendations for further use.

2. Main body

2.1. Content of lecture materials (36 hours)

1. Work in Delphi environment. (two hours)

- To come in.
- Stages of program processing.
- Delphiand stages of its development.
- Algorithms and programs.
- Programming language Object Pascal.

2.Delficharacterization of the environment (2 hours).

- Delphi**Environment.**
- Installing and using Delphi.
- Command menu.
- Component Palette.
- Object inspector window, application form, and application code.

3.Delphiinitial activities at (2 hours).

- Basic activities and projects in Delphi.
- Review of the text of the program.
- Run the program.
- Errors that occur during program execution.

four.Delphiproperties of components (2 hours).

- Component concept.
- Standard components.
- Form features.
- Form events.
- Common features and events.

5. Basic operations in Delphi (2 hours).

- Variables.
- Data type.
- Variables, constants, operations and their notation.
- Standard features.

6.Delphiorders (2 hours).

- Teams. (If Case, For, Bye, Repeat, Jump)
- Symbols and lines.

7. The concept of the array (2 hours).

- Declare an array.
- Inserting and deleting array elements.

8. Performing operations on arrays (2 hours).

- Locate the input element in the array.
- Sort array elements.

9. Procedures-functions (2 hours).

- Passed types, intermediate types, and records.
- Parameterless and parameterized procedures.
- Parameter - value and parameters - variables.
- Procedure declaration and application to it.
- The principle of parameter localization.
- Function procedure declaration.
- Function reference
- recursive functions.
- The principle of parameter localization.
- Function parameters and procedure parameters.

10. Modules (2 hours).

- Modules.
- standard modules.
- Modular programs and methods of their organization.
- Custom modules and how to create them.

11. Files. (two hours).

- Create a file.
- Open file for input.
- Open the file for input and reading.
- Error opening file.

12. Writing and reading data to a file (2 hours).

- Write, read, save and close data to a file.
- Class, object, method, encapsulation and inheritance.
- Polymorphism and virtual methods.

13.Delphigraphic capabilities (2 hours).

- Graphical capabilities of Delphi.
- Tail, finger and handle.
- Straight line.
- Circle and ellipse.
- Correct rectangle.
- Polygon.
- Multiplication.

14. Processing of digital images, taking into account graphic capabilities (2 hours).

- Features and operation of the image component
- Digital Image Processing
- Open, store and share digital images.

15. Installation and use of additional (non-standard) components (2 hours).

- Installing additional (non-standard) components
- Using additional (non-standard) components

16. Creation of a developer component (2 hours).

- Examining the state of the component and choosing a class from the base.
- Creating a module component.
- Component installation.
- Check the component.
- Customizing component palettes.

17. Working with a database in Delphi (2 hours).

- Data store.
- Database structure.
- Database creation.
- Viewing and editing the database.

eighteen.Delphidatabase management in SQL language (2 hours).

- Understanding the SQL language and its commands.
- SQL database management.

2.2. Themes of practical classes. (18 hours)

Conducted in small groups using interactive methods.

Not	Lecture topic ordinal number	Subject and content of practice	Books	hour
1.	one	Delphi Wednesday. Basic steps in Delphi.	{1,2,4,5,6}	2
2.	2	Components in Delphi. Familiarize yourself with the capabilities of form controls. Features and events.	{1,2,4,5,6}	2
3.	3	Variables. Teams.	{2,3,4,7,8}	2
4.	four	Symbols and lines. Arrays. Performing operations on arrays.	{2,3,4,7,8}	2
5.	5	Procedures. Function procedure declaration Calling and using a function.	{2,3,7,8}	2
6.	6	Modules. Files. Commands for working with files. Commands for opening a file for writing and reading. A command to end a file operation.	{1,2,4,5,6}	2
7.	7.8	Graphical capabilities of Delphi. Commands and options for creating geometric shapes. Create a developer component.	{1,2,4,5,6,7,8}	2
8.	9	Data store. Creating and editing a database.	{1,2,4,5,6,7,8}	2
9.	ten	Creating a help system for the created program. Create an installation disk.	{1,2,3,4,5,6,7,8}	2

2.3. Topics of practical classes (18 hours)

Not	Lecture topic ordinal number	Theme and content of the experimental work	Books	hour
1	1.3	Installing Delphi and working in its environment. Installation methods. Creation of the first project in Delphi. View program text. Examining the properties of form objects. Acquaintance with the events and methods of the created program.	{1,2,4,5,6}	2
2	3	Familiarize yourself with the capabilities of form controls. Studying the types of variables and their creation in the program. Declaration of variables and their use. Constants, their creation and use in the program.	{1,2,4,5,6}	2
3	3	Terms. Creation of programs using commands of selection methods (If, Select Case). loop statements (for, do...The loop) to create various software.	{2,3,4,7,8}	2
4	four	Commands for working with character sizes. Creation of programs for working with strings. Type conversion operators and their formats. Commands for declaring arrays. Declaration of one-dimensional and multidimensional arrays. Place for declaring arrays and their use in the program	{2,3,4,5,6,7, 8}	2
5	5	Creation of a program for parameterized and parameterless procedures. See and use the procedure. Commands for declaring procedures-functions, creating accompanying programs. Calling and using a function.	{2,3,7,8}	2
6	6	Commands for working with files. Public commands for writing to a file and reading from a file. A command to end a file operation. Software testing	{1,2,4,5,6}	2
7	7	User interface processing paths. Creating software based on interface types, elements (menus, toolbar, dialog boxes), CommonDialog commands	{1,2,4,5,6,7, 8}	2
8	7.8	DELPHIgraphical capabilities Commands and capabilities for creating geometric shapes. Creation of animation programs.	{1,2,4,5,6,7, 8}	2
9	9	DELPHI Multimedia SoftwaresupplyCreate. Creating a help system for the created program.	{1,2,3,4,5,6, 7,8}	2

2.4. Tasks for independent work.

1) Passed types, intermediate types, and records.

2) Sort array elements.
3) Parameterless and parameterized procedures.
4) Parameter - value and parameters - variables.
5) Procedure declaration and application to it.
6) The principle of parameter localization.
7) Function procedure declaration.
8) Function reference.
9) recursive functions.
10) Modules.
11) standard modules.
12) Modular programs and methods of their organization.
13) Custom modules and how to create them.
14) Files.
15) Writing and reading data to a file.
16) Create a file.
17) Open file for input.
18) Open the file for input and reading.
19) Error opening file.
20) Close the file.
21) Introduction to the object-oriented programming language.
22) Class, object, method, encapsulation and inheritance.
23) Polymorphism and virtual methods.

2.5. Basic words and phrases

1. Object or component.
2. Delphicommands (operators).
3. Delphiworking windows.
4. Properties of components and their modification.
5. Delphitop menus.
6. Delphicomponents.
7. Functions and procedures.
8. repetition operators.
9. dialog boxes.
10. Static and dynamic arrays.
11. Modules.
12. Files, file types.

13.Working with files and folders.

14.Graphics mode commands.

15.Working with databases.

Criteria for evaluating the subject "Object-oriented programming".

Topic 60610200 - Information systems and technologies (by networks and sectors)**The direction of study is carried out in 3-4 semesters according to the working curriculum.**

Lecture (including problemoli, based on handouts) and experience (including computer-based) of study hours, it is recommended that the total scores of JN, ON and YaN be as follows,

Distribution of rating points by types of management

DN		ON THE		UB
Total 40 points		Total 30 points		5 points
1-IN	2nd	one-OH	2-ON	
5 points	5 points	5 points	5 points	

current control

Each student can verbally answer the current control tasks in the process of submitting reports on experiments and practical exercises or during communication during the experiment. Independent work assignments assigned for each current control are carried out in writing along with the corresponding training report. Practical exercises and independent work on each current control and the distribution of rating points by type of control are presented in the table.

1-IN	Experiment 1. Installing Delphi and working in its environment. Installation methods. Creation of the first project in Delphi. View program text. Examining the properties of form objects. Acquaintance with the events and methods of the created program. Practice 1.DelphiEnvironment.Delphiinitial steps in	2
	Experiment 2. Familiarize yourself with the capabilities of form controls. Studying the types of variables and their creation in the program. Declaration of variables and their use. Constants, their creation and use in the program. 2nd practice. Components in Delphi. Familiarize yourself with the capabilities of form controls. Features and events.	2
	Experiment 3. Conditions. Creation of programs using commands of selection methods (If, Select Case). loop statements (for, do...The loop) to create various software. 3rd practical. Variables. Teams.	3

	Experiment 4. Commands for working with character sizes. Creation of programs for working with strings. Type conversion operators and their formats. Commands for declaring arrays. Declaration of one-dimensional and multidimensional arrays. Place for declaring arrays and their use in the program 4th practice. Symbols and lines. Arrays. Performing operations on arrays.	2
	Experiment 5. Creation of a program for parameterized and parameterless procedures. See and use the procedure. Commands for declaring procedures-functions, creating accompanying programs. Calling and using a function. 5th practical. Procedures. Function procedure declaration. Calling and using a function.	3
	1st MI. Passed types, intermediate types, and records. Sort array elements. Parameterless and parameterized procedures.	2
	2-MI. Parameter - value and parameters - variables. Procedure declaration and application to it. The principle of parameter localization. Function procedure declaration.	3
	Student participation in classes, activity, creative thinking, decision making, ability to draw conclusions	3
	General	20 r
2nd	Experiment 6. Commands for working with files. Public commands for writing to a file and reading from a file. A command to end a file operation. Software testing 6th practice. Modules. Files. Commands for working with files. Commands for opening a file for writing and reading. A command to end a file operation.	2
	Experiment 7. Ways of processing the user interface. Creating software based on interface types, elements (menus, toolbar, dialog boxes), CommonDialog commands 7th practice. Graphical capabilities of Delphi. Commands and options for creating geometric shapes. Create a developer component.	3
	Experiment 8. Graphic possibilities of DELPHI. Commands and features for creating geometric shapes. Creation of animation programs. 8th practice. Data store. Creating and editing a database.	3
	Experiment 9: DELPHI Multimedia SoftwaresupplyCreate. Creating a help system for the created program. 9 practice. Creating a help system for the created program. Create an installation disk.	3
	3-MI. Modules. standard modules. Modular programs and methods of their organization. Custom modules and how to create them.	3
	4-MI. Files. Writing and reading data to a file. Create a file. Open file for input. Open the file for input and reading.	3
	Student participation in classes, activity, creative thinking, decision making, ability to draw conclusions	3
	general	20 r
ALL		40 r

intermediate control

It is supposed to perform intermediate control tasks in writing. Independent training tasks set for each boundary control are carried out in the form established for boundary control. At the same time, the student's participation in classes, activity, creative thinking, decision-making, and the ability to draw conclusions are taken into account in the intermediate control.

1st intermediate control

Written work on the topics covered (up to 5 questions will be asked)	ten
1st MI. Working with procedures-functions.	3
Student participation in classes, activity, creative thinking, decision making, ability to draw conclusions	2
General	15 r

2nd intermediate control

Written work on the topics covered (up to 5 questions will be asked)	ten
2-MI. Working with components.	3
Student participation in classes, activity, creative thinking, decision making, ability to draw conclusions	2
General	15 r

1st and 2nd intermediate control written work based on the following questions

one. Delphiexplain the main windows of the environment.
2. Explain the functions StrToInt(S), IntToStr(N), StrToFloat(S), FloatToStr(K) and write some code using them.
3. Edit, explain the properties of the Label components.
four.Explain the properties of the Button, Memo components.
5. Explain the properties of the components StringGrid, DBGrid.
6. Explain the If and Case statements (commands) and explain their difference.
7. Distinguish between variables and constants.
eight. Explain three different recursive operators.
9. Components into which data can be entered.
ten. Components that can display information.
eleven. QuestionIn such cases, use the while or Repeat?
12.Explain about static and dynamic arrays. Explain the difference between them.
13.Write a program to sort the elements of a one-dimensional dynamic array in ascending order.
fourteen. Explain the procedure and functions.
fifteen. Create a procedure that determines the root of a quadratic equation and activate it.
16. Create functions Ctg, Tg and create software that uses them.

17. Explain the AssignFile(f, s), Reset(f), Rewrite(f), and CloseFile(f) commands.
eighteen. Create a program to organize a text file and write (save) information from the Memo component to it.
19. Create a program to output data from a text file to a Memo component.
twenty. Explain the dialog components you use to open and save files.
21. Which property is used to switch to graphics mode. Explain drawing commands (procedures) in graphics mode.
22. Delphiworking with colors (in normal and graphics mode).
23. Delphidatabase creation methods
24. Delphidatabase mapping methods in .
25. Delphiwork with image files

Ultimate control

In total, 30 points are assigned for the final control, which is carried out in writing. There are 30 options for written working questions, each option consists of 3 questions, each of which is evaluated in the amount of 30 points out of 10 possible. The final control is carried out in writing for the following keywords.

Object or component; Delphi commands (operators); working windows Delphi; Properties of components and their modification; Delphi top menus; Delphi components; Functions and procedures; repetition operators; dialog boxes; Static and dynamic arrays; modules; Files, file types; Working with files and folders; Graphics mode commands; Working with databases; Working with colors in Delphi (in normal and graphics mode); database in Delphi; creation methods; Ways to display a database in Delphi; Working with image files in Delphi; Data entry components; Components that can display information.

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additional literature

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Websites where you can get information on the Internet

www.referat.ru, vlibrary.freenet.uz,www.intuit.ru, bankreferatov.ru,www.izone.com.ua,www.osp.ru,www.w3.org,www.borland.com,www.intuit.ru

The Republic of Uzbekistan
Ministry of Higher and Secondary Specialized Education

Namangan Civil Engineering Institute

Department of Information Systems and Technologies

From the topic "Object-Oriented Programming Languages".

CALENDAR PLAN

2022 departments
"_____" in _____
Decision No. 10
approved
head of department
Komilov S.

Ready: Assoc. O. Jakbarov

Namangan 2022

I APPROVE

Head of Department_____

"___" _____ 2022

PROGRAM IMPLEMENTATION CALENDAR

Faculty: "Information systems and technologies" Course ____ Study group _____

Topic title: "Object-oriented programming languages"

Speaker: _____. Practitioner: _____

5 semester

Not	**Type of exercise**	**Title of lecture topic**	Hour	**Made**		**Signature**
				Day	**Hour**	
one	Lecture	Working in Delphi environment.	2			
2	Lecture	Delphienvironmental characteristics	2			
3	Lecture	Delphiinitial steps in	2			
four	Lecture	Delphicomponent properties	2			
5	Lecture	Basic operations in Delphi.	2			
6	Lecture	Delphicommands	2			
7	Lecture	Array concept	2			
eight	Lecture	Performing operations on arrays	2			
9	Lecture	Function Procedures	2			
ten	Lecture	Modules	2			
eleven	Lecture	Files	2			
12	Lecture	Writing and reading data to a file	2			
13	Lecture	Delphigraphics capabilities	2			
fourteen	Lecture	Digital image processing based on graphics capabilities	2			
fifteen	Lecture	Installing and Using Additional (Non-Standard) Components	2			
16	Lecture	Create a Developer Component	2			
17	Lecture	Working with a database in Delphi.	2			

eighteen	Lecture	SQL database management in Delphi	2			
		General:	**36 hours**			

Not	**Type of exercise**	**Name of practice topics**	**Hour**	**Made**		**Signature**
				Day	**Hour**	
one	Practical	Delphi Wednesday. Basic steps in Delphi.	2			
2	Practical	Components in Delphi. Familiarize yourself with the capabilities of form controls. Features and events.	2			
3	Practical	Variables. Teams.	2			
four	Practical	Symbols and lines. Arrays. Performing operations on arrays.	2			
5	Practical	Procedures. Function procedure declaration Calling and using a function.	2			
6	Practical	Modules. Files. Commands for working with files. Commands for opening a file for writing and reading. A command to end a file operation.	2			
7	Practical	Graphical capabilities of Delphi. Commands and options for creating geometric shapes. Create a developer component.	2			
eight	Practical	Data store. Creating and editing a database.	2			
9	Practical	Creating a help system for the created program. Create an installation disk.	2			
		General:	**18 hours**			

Not	Type of exercise	Theme and content of the experimental work	Hour	Made		Signature
				Day	Hour	
one	An experience	Installing Delphi and working in its environment. Installation methods. Creation of the first project in Delphi. View program text. Examining the properties of form objects. Acquaintance with the events and methods of the created program.	2			
2	An experience	Familiarize yourself with the capabilities of form controls. Studying the types of variables and their creation in the program. Declaration of variables and their use. Constants, their creation and use in the program.	2			
3	An experience	Terms. Creation of programs using commands of selection methods (If, Select Case). loop statements (for, do...The loop) to create various software.	2			
four	An experience	Commands for working with character sizes. Creation of programs for working with strings. Type conversion operators and their formats. Commands for declaring arrays. Declaration of one-dimensional and multidimensional arrays. Place for declaring arrays and their use in the program	2			
5	An experience	Creation of a program for parameterized and parameterless procedures. See and use the procedure. Commands for declaring procedures-functions, creating accompanying programs. Calling and using a function.	2			
6	An experience	Commands for working with files. Public commands for writing to a file and reading from a file. A command to end a file operation. Software testing	2			
7	An experience	User interface processing paths. Creating software based on interface types, elements (menus, toolbar, dialog boxes), CommonDialog commands	2			
eight	An experience	DELPHIgraphical capabilities Commands and capabilities for creating geometric shapes. Creation of animation programs.	2			
9	An experience	DELPHI Multimedia SoftwaresupplyCreate. Creating a help system for the created program.	2			
		General:	**18 hours**			

The Republic of Uzbekistan
Ministry of Higher and Secondary Specialized Education

Namangan Civil Engineering Institute

Department of Information Systems and Technologies

From the topic "Object-Oriented Programming Languages".

Link List

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head of department
Assoc.S.Komilov

Ready: Assoc. O. Jakbarov

Namangan 2022

LIST OF LINKS

I. Proceedings of the President of the Republic of Uzbekistan

1. Karimov I.A. Our main task is to further improve the development of our country and the well-being of our people - T .: Uzbekistan, 2010, 80 p.
2. Karimov I. A. Uzbekistan towards a great future. - Tashkent: "Uzbekistan", 1998. - 528 p.
3. Karimov I.A. The consistent continuation of the modernization and renewal of our country is the call of the times. Narodnoe slovo., February 14, 2009
4. Karimov I.A. 16-year path of independent development of Uzbekistan. - T .: "Uzbekistan", 2015. 48 p.
5. Karimov I. A. Our main task is to move more consistently along the path of renewal and sustainable development, to create comfortable living conditions for our people. Voice of Uzbekistan, February 13, 2015

II. Normative documents on the development of the field "Computer science and information technologies" were adopted.

Not	Document type	Document's name	Receivedthe date
one	Decree of the President of the Republic of Uzbekistan	On measures to restore and improve the management of information systems	July 23, 1997 No. PF-1823
2	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On measures to implement the development of a program for the development of computer technology and information technology for 2001-2005, to ensure broad access to international information systems on the Internet	May 23, 2001 No. 230
3	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On measures to improve the system of teacher training for specialized secondary schools	October 4, 2001 No. 400
four	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On measures for the further development of computerization and the introduction of information and communication technologies	June 6, 2002
5	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	State program for 2002-2022 on measures for the further development of computerization and the introduction of information and communication technologies	2002
6	Law	On the principles and guarantees of freedom of information	December 12, 2002 No. 439-II
7	Law of the President of the Republic of Uzbekistan	On the further development of computerization and the introduction of information and communication technologies	May 30, 2002 No. PF-3080
eight	Law	About Information	December 11, 2003 No. 560-II
9	Law	About electronic digital signature	December 11, 2003 No. 562-II

ten	Law	About electronic document management	April 29, 2004 No. 611-II
eleven	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	About e-commerce	April 29, 2004
12	Order of the Minister of Justice of the Republic of Uzbekistan	On the removal from the state register of the provision on the examination of the technical and economic foundations of projects for the creation of information and computer networks	May 12, 2004 No. 109-MH
13	Order of the Director General of the Uzbek Agency for Communications and Informatization	On approval of the rules for the provision of data transmission networks, including INTERNET services	October 5, 2004 No. 1417
fourteen	Order of the Director General of the Uzbek Agency for Communications and Informatization	On approval of the regulation on the procedure for regulating the interconnection of Internet providers in data transmission networks	November 18, 2004 No. 1423
fifteen	Law of the President of the Republic of Uzbekistan	On measures to improve the reorganization and management in the field of information systems	January 24, 2005 No. PF-3557
16	Decree of the President of the Republic of Uzbekistan	On additional measures for the further development of information and communication technologies	July 8, 2005 No. PQ-117
17	Decree of the President of the Republic of Uzbekistan	On improving the system of personnel training in the field of information technology	June 2, 2005 PQ-91
eighteen	Decree of the President of the Republic of Uzbekistan	On the creation of the state educational information network of the Republic of Uzbekistan	18 September 2005 PQ-191
19	Law of the President of the Republic of Uzbekistan	On improving the system of personnel training in the field of information technology	June 2, 2005 PQ-91
twenty	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On improving the regulatory framework in the field of information	November 22, 2005 No. 256
21	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On the further development of the ZiyoNet information network	December 28, 2005 No. 282
22	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On measures for the further development of the Government portal of the Republic of Uzbekistan on the Internet	
23	Resolution of the Cabinet of Ministers of	On approval of the list of state information resources and bodies responsible for their formation, use and support	February 20, 2006 No. 27

	the Republic of Uzbekistan		
24	Law of the Republic of Uzbekistan	On the protection of the automated banking system	April 4, 2006
25	Order of the Director General of the Uzbek Agency for Communications and Informatization	On approval of the regulation on the procedure for documenting information, accounting and registration of state information resources	2006
26	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On measures to create a center for the development of multimedia general educational programs under the Ministry of Public Education of the Republic of Uzbekistan	June 7, 2006 No. 110
27	Decree of the President of the Republic of Uzbekistan	On the organization of providing the population of the republic with an information library	dated 20.06.2006 No. PQ-381
28	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On approval of the regulation on the Interdepartmental Council for Coordinating the Activities of the Republican Information and Library System	July 27, 2006 No. 150
29	Order of the Director General of the Uzbek Agency for Communications and Informatization	On approval of the regulation on the procedure for accounting and registration of information systems of state bodies	December 21, 2006 No. 1646
thirty	Decision of the Director General of the Uzbek Agency for Communications and Informatization	On approval of the regulation on the procedure for documenting information, accounting and registration of state information resources	February 10, 2006 No. 42
31	Decision of the Director General of the Uzbek Agency for Communications and Informatization	On approval of the regulation on the procedure for accounting and registration of information systems of state bodies	November 17, 2006 No. 355
32	Law of the Republic of Uzbekistan	On the introduction of amendments to some legislative acts of the Republic of Uzbekistan in order to increase the efficiency of operational-search activities in the telecommunications networks of the Republic of Uzbekistan	July 12, 2015 No. 101
33	Decree of the President of the Republic of Uzbekistan	On measures to organize cryptographic protection of information in the Republic of Uzbekistan	April 3, 2015 PQ-614
34	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	On approval of the regulation "On licensing activities for the design, manufacture, production, implementation, repair and use of means of cryptographic information protection"	November 21, 2015 No. 242
35	Ministry of Justice of the Republic of Uzbekistan	On amendments and additions to the regulation on the procedure for documenting information,	June 2, 2015 No. 1558-1

		accounting and registration of state information resources	

III. Textbooks and study guides

1. A. Anunev, A. Fedorov. "Delphi 6.0 Tutorial". "BHV-St. Petersburg"2001.
2. Markov B. Visual programming, Moscow, 2003
3. M. McKelvey "Delphi-5" St. Petersburg, 1998
4. DELPHINET Complete Publication, New Delhi, 2002
5. Greenzow Lou Programming Philosophy for WINDOWS 95-NT Symbol-Plus, 2002
6. Bazhenov I. Delphni 7. Self-instruction manual about., KUDIC,2003.
7. Faronov V. Delphi: Programming in the high-level market, St. Petersburg,2003.
8. Points and others. 128 tips for a beginner programmer, Moscow,1991.
9. Tyukachev N., Sviridov Yu. Delphi 5. Creation of a multimedia application. Training course. - St. Petersburg: Peter, 2001. - 400 p.
10. Bucknell Julian M. Basic Algorithms and Structures in Dannyx and Delphi. - St. Petersburg: LLC "DiaSoftUP", 2003. - 560 p.

IV. Internet sites

1. http:G`G`www.uz
2. http:G`G`www.edu.uz
3. www.referat.ru
4. www.delphikongdom.ru
5. vlibrary.freenet.uz
6. www.intuit.ru
7. www.bankreferato.ru
8. www.izone.com.ua
9. www.osp.ru
10. www.w3.org
11. www.borland.com
12. www.intuit.ru

The Republic of Uzbekistan
Ministry of Higher and Secondary Specialized Education

Namangan Civil Engineering Institute

Department of Information Systems and Technologies

From the topic "Object-Oriented Programming Languages".

Basic words, phrases and questions

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Namangan 2022

General control QUESTIONS, KEYWORDS AND PHRASES from the topic "Object-oriented programming languages"

1. Questions

1. Delphiexplain the main windows of the environment.
2. Explain the functions StrToInt(S), IntToStr(N), StrToFloat(S), FloatToStr(K) and write some code using them.
3. Edit, explain the properties of the Label components.
4. Explain the properties of the Button, Memo components.
5. Explain the properties of the components StringGrid, DBGrid.
6. Explain the If and Case statements (commands) and explain their difference.
7. Distinguish between variables and constants.
8. Explain three different recursive operators.
9. Components into which information can be entered.
10. Components that can display information.
11. When are Bye or Repeat commands used?
12. Explain about static and dynamic arrays. Explain the difference between them.
13. Write a program to sort the elements of a one-dimensional dynamic array in ascending order.
14. Explain the procedure and functions.
15. Create a procedure that determines the root of a quadratic equation and activate it.
16. Create functions Ctg, Tg and create software that uses them.
17. Explain the AssignFile(f, s), Reset(f), Rewrite(f), and CloseFile(f) commands.
18. Create a program to create a text file and write (save) the information of the Memo component to it.
19. Create a program to output data from a text file to a Memo component.
20. Explain the dialog components you use to open and save files.
21. Which property is used to switch to graphics mode. Explain drawing commands (procedures) in graphics mode.
22. Delphiworking with colors (in normal and graphics mode).
23. Delphidatabase creation methods.
24. Delphidatabase mapping methods.
25. Database components in Delphi.
26. DBNavigator buttons and their functions.
27. Delphiwork with image files
28. What do you mean by component?
29. Which of the standard components do you know?
30. What components are included in the dialog page?
31. What are the components on the System page for?

2. Basic words and phrases

Object or component; Delphi commands (operators); working windows Delphi; component properties; Delphi top menus; Delphi components; Functions and procedures; repetition operators; dialog boxes; Static and dynamic arrays; modules; Files, file types; Working with files and folders; Graphics mode commands; Working with databases; the form; Edit; TLable; TSpinEdit; Temo; TRichEdit; DatabaseDesktop; Timer; Paintbox; Teader; TMediaPlayer; TbitBtn; Startdoc; New page; Final document; AssignFile; close the file; Text file; Data store; Table; Request; reports; TTable; data source; TDBgrid; DBNavigator; StrToInt(S); IntToStr(N); StrToFloat(S); FloatToStr(K); Edith; Label; button; memo; StringGrid; dbgrid; variable; unaltered; If .. then; Per; Bye; Repetition; dynamic array; procedure; function; AssignFile(f,s); reset(f); Rewrite (f); CloseFile(f); TImage; Canvas.

Ministry of Higher and Secondary Specialized Education of the Republic of Uzbekistan

Namangan Civil Engineering Institute

Department of Information Systems and Technologies

Subject "Object-oriented programming languages"

SET OF EXAMPLES AND TASKS

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Namangan 2022

EXAMPLES AND TASKS

Examples of writing arithmetic expressions in Delphi

one. $Z = \dfrac{x+1}{1+\dfrac{x}{1+x}}$

2. $y = -2\sqrt{x^2 + \dfrac{4x^2}{3}} - \dfrac{e^{4+x}}{x+1}$

3. $R = \dfrac{1}{e^{x+3}-1} + \left|1 - \dfrac{x}{2}\right| + \dfrac{1+x}{1-x}$

four. $Z = -\dfrac{x-1}{\sqrt{x^2 - A^2}} - \dfrac{2A^2}{3(\sqrt{x^2 - A^2})^3}$

5. $z(x,y) = x\dfrac{e^{x^2-y^2} - 1}{\sqrt{\left|x^2 + y^2\right|}}$

6. $W = 1 - \dfrac{\dfrac{1}{1+\left(\dfrac{RG}{K}\right)^2}}{\dfrac{e^2}{S^2\left(1+\dfrac{RG}{L}\right)^2}} + Ln\left(\dfrac{RG}{K}\right)$

7. $V = (2p)^{1/2} x^{x+1} e^{-x} e^{-\sqrt{\frac{W}{2px}}}$

eight. $R = \dfrac{1}{Cosx} + \ln\left|tg\dfrac{x}{2}\right| + \dfrac{A+Bx}{C+Dx}$

9. $y = 2{,}5\sqrt[3]{x^4} + \log_4^2 x$

ten. $y = \sec x + \sqrt[4]{e^3} + \dfrac{x}{2}$

eleven. $u = \sqrt{e^x}\sqrt{ctg^2(\dfrac{x}{4})} + 2\ln x$

12. $u = \sqrt{\ln x} + 2\,|\,e^{x+2} - 5x\,|$

13. $u = \sqrt{tg^2(\dfrac{x}{5})} + 2e^x$

fourteen. $u = \sqrt{e^x}\sqrt{Sin(\dfrac{x}{2})} + 2\,|\,x-1\,|$

fifteen. $u = \sqrt{\ln x}\sqrt{Sin(\dfrac{x}{2})} + 2\,|\,e^x - 1\,|$

16. $u = \sqrt{tg^2(\dfrac{x}{2})} + |\,2e^x\,|$

17. $u = \sqrt{Cos^2(\dfrac{x}{|\,2-x\,|})} + 2e$

eighteen. $z = 15{,}2\sqrt[5]{x^3} + 2x^{-1} + \lg\left|x-5\right|$

19. $a = \left|4-13x\right| + e^{-x}$

twenty. $a = \dfrac{\left|4-13x\right| + e^x}{1+\ln x}$

21. $u = \sqrt{|\,18-x\,|} + e^{x+2} - 5x$

22. $u = \sqrt{Sin\,|\,x-8\,|} + e^{x+5} + x^4$

23. $u = \sqrt{\ln x} + 2\,|\,e^{x+2} - 5x\,|$

24. $u = \sqrt{e^x}\sqrt{Sin(\dfrac{x}{2})} + 2\,|\,x-1\,|$

25. $y = e^{\sin x^2} + \frac{x}{2e^{x-1}}$

26. $y = 2{,}5\sqrt{x^4} + Sin\frac{4}{x}$

27. $u = \sqrt{\ln x} + 2\,|\,e^{x+2} - 15\,|$

28. $u = \sqrt{\ln x} + 2\,|\,e^{x+2} - 5x\,|$

29. $y = \sec x + \sqrt[4]{e^3} + \frac{x}{2}$

thirty. $y = \log_4 x + \sqrt{e^3} + \cos\frac{x}{2}$

31. $u = \sqrt{e^x}\sqrt{\cos^2(\frac{x}{4})} + 2\ln x$

32. $u = \sqrt{tg^2(\frac{x}{5})} + 2e^x$

MantisQuestionexpression examples

1. Write a logical expression so that the value of variable S is greater than the value of variables A and B at the same time.

2. Write a logical expression in which the value of the variable B lies in the range of numbers from L to M (L<M).

3. If the variable Month specifies the number of months, write a Conditional Boolean expression that specifies the winter months.

4. If the Month variable specifies the number of months, write a conditional Boolean expression that specifies the summer months.

5. Write a conditional boolean expression that determines whether the value of x is between 0 and 1.

6. Which of the following statements is true?

A="The sum of the interior angles of a triangle is 180°"

B = "The sum of the external angles of a triangle is 320°"

Determine the result of the following operations.

one)A and B

2) A OR B

3) A OR (not B)

4) A I (Not B)

5) Not (A) OR Not (B)

7. D=5; If E=4 and A="true", B="FALSE", what is the result of the following operations?

1) (E>8) AND (G>8) AND(Note B)

2) (E=D) AND A AND B

3) (E<D) AND A AND (NotB)

8. A = "In a right triangle, the square of the sum of the legs is equal to the square of the hypotenuse" B \u003d "In a right triangle, the angle between the legs is not equal to 90 °"

Determine the value of this feedback and the result of the following actions on it.

one)A and B

2) A OR B

3) A OR (Not B)

4) A I (Not B)

5) Not (A) OR Not (B)

9. A="8 bits equals 1 byte" B="1024 bytes equals 1 KB"
Determine the value of this feedback and the result of the following actions on it.

one)A and B
2) A OR B
3) A OR (Not B)
4) A I (Not B)
5) Not (A) OR Not (B)

10. D=3.2; If E=-2.4 and A="true", B="FALSE", what is the result of the following operations?

1) (E>D) AND A AND NOT B
2) (E<D) AND A AND B
3) (E>D) AND A OR B
4) Not ((E>D) AND A OR B)

11. Determine the meaning of the following logical expressions. A=1; B=4; C=5;

1) (A<B) OR (A>S)
2) (A<S) AND (B>S);

12. At what values of the variable A the following logical expressions take on a true value.

1) (A>=100) AND (A<=150)
2) (A<=100) ANO (A<25)
3) (A=5)OR ((A>10) AND (A<1))

13. Prove the following relations.

1) Not(A OR B)=(Not A) OR (Not B)
2) Not (A AND C) = (Not A) AND (Not B)
3) Not (NeB) \u003d B

14. Determine the order and cost of actions on the following examples:

1) A AND B OR (NotD)
2) A OR B OR D AND E
3) (A OR B) = Not (A AND B)
4) (A OR C) AND (Not B)) AND B AND (Not D)

15. Find the value of the following logical expressions:

a) (5<1) OR (2=1)
b) NOT(100>3)
c) (3.45=3.45) AND (3.45<2)

16. The following expressions evaluate to FALSE for which values of variable A?

a) (A>=100) AND (A<=150)
b) (A<=100) AND (A<25)
c) (A=5) OR ((A>5 AND (A<1))
g) (A=5.37) AND (A=-10.0)

Examples of simple calculation programs

Write an algorithm and a program for the following calculations. Organize the input of unknown values in the dialog mode.

1. The sides of the square are a. Find its perimeter $P=4 \cdot a$.

2. The sides of the square are a. Find its surface P=a2.

3. The sides of the rectangle are a and b. Its perimeter is P=2.*(a+b)*and find the surface P=a*b*.

4. Given the diameter of the circle d. Find its length L=π*G*.

5. The sides of a cube are a. Find its volume V=a3 and surface area P=6.*a2*.

6. Given sides a, b, s of a rectangular parallelepiped. Find its volume and surface area: V=a*b*With; *C=2*(a*b + b*c+a*in)*.

7. The radius of the circle R. Find the circumference L and its internal area S: L=2$\cdot\pi\cdot$*P*, *C=*$\pi\cdot$*R2*. Hereπ make the number equal to 3.14.

8. Two real numbers a and b are given. Find their arithmetic mean: (a+b)/2.

9. Two real positive numbers a and b are given. Find their geometric mean: $\sqrt{a \cdot b}$.

10. Two non-zero numbers a and b are given. Find their sum, difference, multiplication and division.

11. The legs of a right triangle are a and b. Find its hypotenuse s and perimeter P:

$$c = \sqrt{a^2 + b^2}, \quad P = a + b + c.$$

12. Given the circumference L. Find its radius R and the area bounded by the circle S: $L = 2 \cdot \pi \cdot R, \quad S = \pi \cdot R^2$.

13. Given a face of a circle S. Its diameter is D, and the circumference is L. $L = 2 \cdot \pi \cdot R, \quad S = \pi \cdot R^2$ find by formulas.

14. Find the distance between two points x1 and x2 located on the coordinate axis of numbers: d=|x2 - x1|.

15. Three points A, B, S are given on the numerical axis of coordinates. Find the lengths of the segments AS and BS and their sum.

16. Three points A, B, S are given on the numerical axis of coordinates. Point C is located between points A and B. Find the product of the lengths of the segments AS and BS.

17. Find the distance between two points (x1,y1) and (x2,y2) on the plane. Use the following formula to find the distance

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} .$$

18. Given the coordinates of the three ends of the triangle: (x1,y1), (x2,y2), (x3,y3). Draw its perimeter and area. Use Heron's formula to find the area of a triangle

$$S = \sqrt{p \cdot (p - a) \cdot (p - b) \cdot (p - c)} .$$

Here a, b, s are the sides of the triangle, p=(a+b+s)/2 is the semiperimeter.

19. Calculate the speed of the body, knowing the distance and time, using the formula for calculating the speed V=S/T.

20. Swap the values of the three variables a, b, s one after the other (the value of a to b, the value of b to s and the value of s to a).

21. Swap the values of three variables a, b, s sequentially (the value of a to s, the value of s to b and the value of b to a).

22. Calculate the value of the function y=3x6-6x2-7 given the value of the given variable x.

23. Calculate the value of the function y=4(x-3)6-7(x-3)3+2 given the value of the given variable x.

24. Angleαin degrees ($0<\alpha<360$). Calculate the value of this angle in radians.

25. Angleαin radians ($0<\alpha<2\pi$). Calculate the value of this angle in degrees.

Operations on integers

1. Distance L is in centimeters. Find the integer number of meters using integer division (1 meter = 100 centimeters).

2. Weight M is indicated in kilograms. Determine the number of whole tons using whole division (1 ton \u003d 1000 kg.).

3. The file size is in bytes. Determine integer number of kilobytes using integer division (1 kilobyte = 1024 bytes)

4. A two-digit number is given. Find the sum and product of the first and second digits of this number.

5. A two-digit number is given. Swap this number.

6. A three-digit number is given. Find the sum and product of the digits of this number.

7. A three-digit number is given. Change this number to its opposite (for example, change 123 to 321).

8. A three-digit number is given. Shift this number from left to right. The last with the first (for example, change the number 123 to 312).

9. Days of the week are indicated by numbers: 1st Monday; 2nd Tuesday; ... Saturday the 6th. Given an integer k between 1 and 365. If January 1 of this year falls on a Monday, find the day of the week corresponding to integer k.

10. Days of the week are given in numbers: 1st Monday; 2nd Tuesday; ... Saturday the 6th, Sunday the 7th. Given an integer k between 1 and 365. If January 1 of this year is Tuesday, find the day of the week corresponding to integer k.

11. Days of the week are given in numbers: 1st Monday; 2nd Tuesday; ... Saturday the 6th. Given an integer k between 1 and 365. If January 1 falls on a Saturday this year, find the day of the week corresponding to integer k.

Conditional Jump Operator Examples

1. If the given integer is positive, add 1 to it, otherwise do not change. Output the result.

2. If the given integer is positive, add 1 to it, otherwise subtract 2. Print the result.

3. If the given integer is positive, add 1 to it, if negative, subtract 2, if it is zero, change it to 10 and get the result.

4. Three integers a, b, s are given. Determine the largest of their sums a+b, a+s, b+s.

5. Extract the smallest ordinal of the two given numbers.

6. From the given two numbers, first subtract the larger, then the smaller.

7. Determine and subtract the smallest of the three given numbers.

8. From these three numbers, subtract the smallest first, and then the largest.

9. Determine the sum of the 2 largest of the 3 given numbers.

10. A and V are integer variables. If their values are not equal, each variable should be assigned the value of the larger one, otherwise the variables should be equal to 0. Print the new values of variables A and V.

11. Find the middle among these 3 numbers, that is, between the smallest and largest.

12. Given real variables A, V, S. Multiply by 2 if their values are in ascending order, otherwise divide the value of each variable by 2. Output the new values of variables A, V, S.

13. Given real variables A, V, S. If their values are in ascending or descending order, multiply by 2, otherwise swap the value of each variable. Output new values of variables A, V, S.

14. Three points are given on the number line: A, V, S. Determine which of the two points V and C is closer to point A. Print this point and the distances to point A.

15. Given a point on a plane. If the point coincides with the origin of the coordinate axis, print 0. If the point lies on the 0x or 0y axis and does not coincide with the origin of the coordinate axis, print 1 or 2, respectively. Print 3 if the point is not on the coordinate axis.

16. A point is given that does not lie on the coordinate axis of the axis and the Moon. Determine which quarter the point is in.

17. Compute a function that takes a real value given the value of the real variable X.

$$f(x)=\begin{cases}2\sin x, & агар\ \ x>0,\\ 6-x, & агар\ \ x\le 0.\end{cases}$$

18. Compute a function that takes a real value for a given value of the real variable X.

$$f(x)=\begin{cases}2x, & агар\ \ x<-2\ ёки\ x>2,\\ -3x, & акс\ \ холда.\end{cases}$$

19. Integers are given. Output it as a string in a word as "negative even number", "zero number", "positive odd number", etc.

20. You are given an integer in the range from 1 to 999. Print "even number" if it is even, "odd number" if it is odd.

21. Calculate a function

$$D=\begin{cases} x_1-x_2, & \text{агар } \lg 16 > x_3, \\ (x_1-x_2)^2, & \text{агар } \lg 16 \le x_3. \end{cases} \quad x_1=-19.54;\ x_2=-1.938;\ x_3 \in R.$$

22. Calculate a function

$$F=\begin{cases} \sqrt{|x_1+x_2|}, & \text{агар } 2^{x_1}<1, \\ x_3-x_4^2, & \text{агар } 2^{x_1}\ge 1. \end{cases} \quad x_1=-19.54;\ x_2=-1.938;\ x_3=18.11;\ x_4=2.804.$$

23. Calculate a function

$$I=\begin{cases} \sqrt{|x_1-x_2|}, & \text{агар } e^{x_3}>1, \\ \lg|x2|, & \text{агар } e^{x_3}\le 1. \end{cases} \quad x_1=-19.54;\ x_2=-1.938;\ x_3=18.11.$$

24. Calculate a function

$$J=\begin{cases} \sqrt{|x_1-x_2|}, & \text{агар } -\ln|x_1|<2, \\ e^{x_3-1}, & \text{агар } -\ln|x_1|\ge 2. \end{cases} \quad x_1=-19.54;\ x_2=-1.938;\ x_3=18.11.$$

25. Calculate a function

$$F=\begin{cases} f_1; a>x; \\ f_2; a\le x<b; \\ f_3; x\ge b; \end{cases} f_1=\frac{x-a}{3+x^2};\ f_2=x^3-(a+b)x^2;\ f_3=\frac{b-x}{5+3x^2};\ a=1;\ b=2{,}6;\ x\in R$$

Examples of Select and Unconditional Jump Operators

1. Given an integer in the range from 1 to 7. Output the days of the week from the given number. (1 - "Monday", 2 - "Tuesday", etc.).

2. K is given as an integer. Print the score in the line according to the number K (1-bad, 2-unsatisfactory, 3-satisfactory, 4-good, 5-excellent). If K is not in the range 1-5, then print an error.

3. Given an integer in the range 1-12 that specifies the number of months (January 1, February 2, etc.). Extract the name of the season corresponding to the name of the given month ("winter", "spring", "summer", "autumn").

4. Arithmetic operations on numbers are numbered as follows: 1-addition, 2-subtraction, 3-multiplication, 4-division. Given a number K (an integer in the range 1-4) and real numbers A and V (V is not equal to 0). Do the operation on the numbers A and V and release.

5. Measures of length are numbered as follows: 1 kilometer, 2 meters, 3 decimeters, 4 centimeters, 5 millimeters. Given the number of the length dimension (an integer in the range 1-5) and the length of the section in that dimension (a real number). Determine the length of the section in meters.

6. The weight scale is numbered as follows: 1st kilogram, 2nd milligram, 3rd gram, 4th ton, 5th centner. Given the number of weights (an integer in the range 1-5) and the body weight in these measurements (real number). Determine the body weight in kilograms.

7.Write a program that answers the following test question.

Define the unit of measure for information:

A) kg; B) feet; c) bar; D) bit.

If the answer is correct, then "Answer is correct", otherwise "Answer is incorrect".

8. Use the select statement in the program to solve the quadratic equation. In the program, the number K takes the numbers 0, 1, 2: K=0 - discriminant small zero, K=1 - discriminant equal to zero, K=2 - discriminant large zero. Equation coefficients a, b, c ($a \neq 0$).

9. The following car brands are given: MAZ; GAS; UAZ; DAMASCUS; AZLK. Create a program that names moss-producing cities (Minsk, Nizhny Novgorod, Ulyanovsk, Andijan, Moscow).

10. NextDomain countries Internet address: Uz, Us, Ru, Kz, Fr. Create a program that names suitable countries (Uzbekistan, America, Russia, Kazakhstan, France).

11. Create an algorithm and a program to calculate the sum of numbers from 1 to 20. Do not use the loop statement in the program.

12. Create an algorithm and a program for calculating the multiplication of numbers from 1 to 10. Do not use the loop statement in the program.

13. Create an algorithm and program to calculate the sum of even numbers from 1 to 50. Do not use the loop statement in the program.

14. Create an algorithm and program to calculate the multiplication of odd numbers from 1 to 50. Do not use the loop statement in the program.

15. Create an algorithm and program to calculate multiples of 3 from 1 to 50. Do not use a loop statement in your program.

Parameter Loop Examples

1. Given integers K and N (N>0). Display the number of KN times.

2. Given two integers A and V (A<V). Display the numbers between A and V in ascending order (including A and V) and count them.

3. Given two integers A and V (A<V). Display the numbers between A and V in descending order (including A and V) and count them.

4. Given a real number representing the price of one kilogram of sweets.1 kg,2 kg,...Calculate the price of 10 kg of sweets.

A) 0.1, 0.2, ... 1 kg. calculate the price of candy.

B) Calculate the prices for 1.2, 1.4, ...2 kg of sweets.

5. Two integers A and V (A<V) are given. Find the sum of all integers between A and V (including A and V).

6. Given two integers A and V (A<V). Find the sum of the squares of all integers between A and V (including A and V).

7. Given integers N and K. Find the sum of the following
N2 + (N+1)2 + (N+2)2+……+ (N+K)2

8. An integer N>0 is given. Find the product of the next N factors.

1.1*1.2*1.3*.....

9. An integer N>0 is given. Find the value of an expression consisting of n sums with alternating signs (do not use the conditional jump operator).

1.1-1.2+1.3-...

10. Given an odd integer N>0. Find the square of the number calculated using the formula below.

1+3+5+……C

Print the current value of each sum (resulting in squares of odd integers from 1 to N).

11. Real numbers A and integers N>0 are given. Find the power N of A (multiply A by N times)
A H \u003d A * A * ... .. * A

12. An integer N>0 is given. Calculate the next amount. Use only one cycle.
1+A+A2+A3+….+AN

13. An integer N>0 is given. Find the value of an expression that does not use a conditional operator.
1-A+A2-A3+....+(-1)H*AH

14. An integer N>0 is given. Find the product (N-factorial). Let the variables have a real type.
N!=1*2*…. *H

15. An integer N>0 is given. Find the sum using one loop. Let the variables have a real type.
1!+2!+3!+…+ N!

16. An integer N>0 is given. Find the sum using one loop.

1+1/(1!)+1/(2!)+1/(3!)+….+1/(N!)

Let the variables have a real type. (N!-factorial. N!=1*2*.. N.)

The found sum is an approximation of the constant e=exr(1).

17. Real numbers X and integers N>0 are given. Find the value of the expression.
1+X+X^2/(2)+…XN/(N!)
The value of the calculated expression (N!=1*2*.. N) will be the approximate value of the function u=ex at the point x.

18. Real numbers X and integers N>0 are given. Find the value of the expression.
X-X3/(3!)+X5/(5!)-.....+(-1) N*X2*N+1/((2* N)!)
The value of the calculated expression (N!=1*2*.. N) will be the approximate value of the sinx function at the point x.

19. Real numbers X (|X|<1) and integers N>0 are given. Find the value of the expression.
1-X2/(2!)+X4/(4!)-.....+(-1) N*X2*N+1/((2* N)!)
The value of the calculated expression (N!=1*2*.. N) will be the approximate value of the sos(x) function at the point x.

20. Real numbers X (|X|<1) and integers N>0 are given. Find the value of the expression.
X-X2/2+X3/4-.....+(-1) N-1*XN+1/N
The value of the calculated expression (N!=1*2*.. N) will be the approximate value of the ln(x) function at the point x.

21. Real numbers X (|X|<1) and integers N>0 are given. Find the value of the expression.
X-X3/3+X5/5-.....+(-1) N*X2*N+1/ (2*N+1)
The value of the calculated expression (N!=1*2*.. N) will be the approximate value of the function arstg(x) at the point x.

22. Real numbers X (|X|<1) and integers N>0 are given. Find the value of the expression.
X+1*X3/(2*3)+1*3*X5/(2*4*5)+.....+1*3*….*(2*N-1)*X2*N +1/(2*4*….*(2*N)*(2*N+1))
(N!=1*2*.. N) the value of the calculated expression will be the approximate value of the function arsin(x) at the point x.

23. Real numbers X (|X|<1) and integers N>0 are given. Find the value of the expression.
1+X/2-1*X2/(2*4)+1*3*X3/(2*4*6)-.....+(-1)N-1*1*3*…(2*H-3)*XH/ (2*4*…*(2*H))
(N!=1*2*.. N) — value of the expression being evaluated $\sqrt{1+x}$ is the approximate value of the function at the point x.

24. Given an integer N>0 and two real numbers A,V (A<B). Divide the interval [A,V] into N equal parts. Extract the N-length of each segment and the sequence of points.
A, A+H, A+2*H, A+3*H,....., B

25. On the real axis [A,V], an integer N>0 and 2 real numbers A and V (A<B) are given. Divide it into N equal parts. Calculate the N-length of each segment and the value of the function F(X)=1-sin(X) on the interval [A,V]
F(A), F(A+N), F(A+2*N),....., F(V)

26. An integer N>0 is given. The sequence of real numbers AK is defined as follows:
A0 \u003d 2, AK \u003d (AK-1 + 1) / K, K \u003d 1.2, ...
Extract items A1, A2, ... AN -.

27. An integer N>0 is given. The sequence of real numbers AK is defined as follows:
A1=1, AK = (AK-1+1)/K, K=1.2,….

Extract elements AN A1, A2, ...

28. An integer N>1 is given. The sequence of real numbers AK is defined as follows:
A1 \u003d 1, A2 \u003d 2, AK \u003d (AK-2 + 2 * AK-1) / 3, K \u003d 3.4, ...
Extract elements AN A1, A2, ...

29. An integer N>2 is given. The sequence of real numbers AK is defined as follows:
A1 = 1, A2 = 2, A3 = 3
AK \u003d AK-1 + AK-2-2 * AK-3, K \u003d 4.5, ...
Extract elements AN A1, A2, ...

30. Given natural numbers N and K. Find the sum of the following:
1K+2K+....+NK

31. An integer N>0 is given. Find the sum of the following:
11+22+....+NN

32. An integer N>0 is given. Find the sum of the following:
1H+2H-1+....+H1

33. Given integers A and V (A<B). Subtract the numbers between A and V, where each number is subtracted equal to its value (for example, 3 is subtracted 3 times).

34. Given positive integers A and V (A<B). Extract the numbers between A and V where A is 1 times A+1 times 2, hk.

Examples of loops containing a condition

1. Positive numbers A and B are given (A>B). Within the length segment A, the maximum possible segments of length B are placed. Find the length of the unoccupied part of the section A without using multiplication and division.

2. Positive numbers A and B are given (A>B). The maximum possible cross sections of length B fit inside the section of length A. Find the number of parts B in A without using multiplication and division.

3. Given two natural numbers N and K. Find the integer division of N by K and the remainder of the division using only addition and subtraction.

4. An integer N>0 is given. Print TRUE if this number is a power of 3, otherwise FALSE.

5. Given an integer N>0, equal to the power of two numbers. N=2K. Find the integer exponent K of the exponent.

6. An integer N>0 is given. Find the double factorial of N:
N!!= N*(N-2)*(N-4)…..
(If N is even, then the last term is 2; if N is odd, then it is 1).
To avoid integer "overflow", multiplications must be calculated using floating point variables and output as a real number.

7. An integer N>0 is given. Find the smallest natural number K whose square is greater than N such that K2>N. Don't use the square root function.

8. An integer N>0 is given. Find the largest natural number K whose square is at most N such that K2 ≤ N. Don't use the square root function.

9. An integer N>1 is given. Find the smallest natural number K for which the inequality 3K>N holds.

10. An integer N>1 is given. Find the largest natural number K for which the inequality 3K>N holds.

11. An integer N>1 is given. 1+2+.....+K Extract the least and sum of K integers whose sum is greater than or equal to N.

12. An integer N>1 is given. 1+2+.....+K Find the largest and sum of K integers whose sum is less than or equal to N.

13. An integer A>1 is given. 1+1/2+.....+1/K Find the least and sum of K integers whose sum is greater than A.

14. An integer A>1 is given. 1+1/2+.....+1/K is the largest of K integers whose sum is less than A, and the sum

15. The deposit in the bank is $1,000. Every month the amount of the deposit increases by R% (R is a real number, 0<P<25). For a given value of R, the amount of the deposit will exceed $1,100 in how many months. Extract the found number K (K is an integer) and the final amount of the deposit S.

16. A skier has started training. on the 1st day10 kmran. On each subsequent day, he increased the distance traveled by R% compared to the previous days (R real, 0<P<25). How many days does a skier run for a given value of R?200 kmdetermine if exceeds . Calculate the number of days K and the final distance (S).

17. An integer N>0 is given. Extract all the digits of this number, starting from the right (ones), using the division and remainder operations.

18. An integer N>0 is given. Find the number of digits and the sum of that number using the division and remainder operations.

19. An integer N>0 is given. Find the number formed by reading N from right to left using the division and remainder operations.

20. An integer N>0 is given. Let's determine that there are 2 digits in the record of the number N, using the operations of division and obtaining the remainder of the division. Print TRUE if it exists, and FALSE otherwise.

21. An integer N>0 is given. Determine if there is an odd number in the record of the number N, using the operations of dividing by an integer and getting the remainder of the division. Print TRUE if it exists, and FALSE otherwise.

22. An integer N>1 is given. If this number is prime, that is, if it is divisible by 1 and itself, then print TRUE, otherwise print FALSE.

23. Given positive numbers A and V. Find their greatest common divisor using Euclid's algorithm.
EKUB(A,V)=EKUB(V,A MOD V) if V≠0:ECUB(A,0)=A

Here is the procedure for determining the rest of the MOD block.

24. Positive numbers A, B, C are given. Find the maximum number of squares with sides C inside a rectangle with sides A and B. Do not use multiplication and division.

25. Number and sum of terms of an infinite seriesεCalculate with precision =10-5

$$\sum_{n=0}^{\infty}\frac{1}{2^n}=1+\frac{1}{2}+\frac{1}{4}+...$$

26. Number and sum of terms of an infinite seriesεCalculate with precision =10-4

$$Cos(x)=\sum_{n=0}^{\infty}(-1)^n\frac{x^{2n}}{(2n)!}=1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+...$$

27. Number and sum of terms of an infinite seriesεCalculate with precision =10-5

$$\sum_{n=0}^{\infty}(-1)^i\frac{i}{2i+1}=1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+...$$

Examples of using loops in sequences

1. Given 10 real numbers, find their sum.

2. Given 10 real numbers, find their product.

3. Given 10 real numbers. Find their arithmetic mean.

4. Given an integer N and a set of N real numbers. Extract the sum and product of the given numbers.

5. Given an integer N and a set of N real numbers. Extract the integers of the set in the given order and the sum of those numbers.

6. Given an integer N and a set of N real numbers. Extract the fractional parts of the given numbers (as real numbers less than 1) and the product of all fractional parts.

7. Given an integer N and a set of N real numbers. Print the rounded values of the given numbers (as integers), as well as the sum of the rounded values.

8. Given an integer N and a set of N real numbers. Given a set of numbers, extract all even numbers and their K numbers.

9. Given an integer N and a set of N real numbers. Given given numbers, extract all odd numbers and their K numbers.

10. Given an integer N and a set of N real numbers. Returns TRUE if the set contains positive numbers, FALSE otherwise.

11. Given integers K and N and a set N of integers. Returns TRUE if the set contains numbers less than K, FALSE otherwise.

12. The set of non-zero integers is not specified, and the input of numbers ends with the number 0. Print the number of elements in the set.

13. The set of non-zero integers is not given. Digit input ends with 0. Extract the sum of the positive numbers in the set. Print zero if there are no positive numbers in the set.

14. Given an integer K and a set of nonzero integers. Digit input ends with 0. Subtract numbers less than K from the set.

15. Given an integer K and a set of nonzero integers. Input of digits ends with digit 0. Print the number of the first number less than K in the set, zero if there is no such number.

16. Given an integer K and a set of nonzero integers. Input of digits ends with digit 0. Print the last number greater than K in the set, zero if there is no such number.

17. Given a set of real numbers V, integers N and real numbers, sorted by N increments. Subtract the elements of the set and the number V together, preserving the ascending order.

18. Given an integer N and a set of integers sorted by N increments. A set can contain the same elements. Extract all the different elements of a set in the given order.

19. Given an integer N>1 and a set of N integers. Extract all subelements of the left neighbor in the set and their number K.

20. Given an integer N>1 and a set of N integers. Extract all right adjacent subelements in the set and their number K.

21. Given an integer N>1 and a set of N real numbers. Make sure the collection forms an ascending sequence. Returns TRUE if so, otherwise returns FALSE.

22. Given an integer N>1 and a set of N real numbers. Print zero if the set is a decreasing sequence, otherwise print the first number that breaks the regularity.

23. Given an integer N>2 and a set of N real numbers. A set is called jagged if each of its elements is greater or less than its neighboring neighbors. Print "True" if the given set is sawtooth, "False" otherwise.

24. Given an integer N and a set of N integers containing at least two zeros. Print the sum of elements between the last two zeros in the set (print zero if the last zeros are in a row).

25. Given an integer N and a set of N integers containing at least two zeros. Print the product of elements between the first and last zeros in the set (print zero if the last zeros are consecutive).

26. Write algorithms and programs to calculate the following lines for n=6:

a) $1 + x + \frac{1}{2}x^2 + \frac{1}{6}x^3 + ...$

b) $1 - 2x + 2x^2 - \frac{4}{3}x^3 + \frac{2}{3}x^4 + ...$

in) $1 - x + \frac{1}{2}x^2 - \frac{1}{6}x^3 + ...$

G) $x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + ...$

e) $x + \frac{1}{2}x^2 + \frac{1}{6}x^3 + \frac{1}{24}x^4 + ...$

e) $C_k^i = \frac{k(k-1)...(k-i+1}{k!}$

27. Count the number of prime numbers up to 713 and the sum of their sequences.

28. Determine the number of three-, four- and five-digit natural numbers whose consecutive sum of numbers is equal to their consecutive product.

29. Calculate how many times x amounts can be paid with coins of 1, 3, 5, 10, 25, 50 and 100 soums.

30. Calculate the nth term of an arithmetic progression using the first term a and the difference d.

31. Calculate the x20 value using the following formula

$$x_{n+1} = x_n^2 - 2.3x_n + 1.$$

Let x0 be 0.25.

Nested loop examples

1. Given integers K, N and a set N of real numbers. A1, A2,..., AN. Extract the K-ranks of a set of numbers: (A1)k, (A2)k,...., (AN)k

2. Given integers K, N and a set N of real numbers. A1, A2,..., AN. Extract the following numbers: A1 ,(A2)2, ,...., (AN-1)N-1, ,(AN)N

3. Given an integer N and a set of N real numbers. A1, A2,..., AN. Extract the following numbers: (A1)N, (A2)N-1,….. ,(AN-1)2 ,AN

4. Given integers K, N and sets K of N elements each. Add up all the numbers in these sets.

5. Given integers K, N and sets K of N elements each. Extract the sums of the elements of each set.

6. Given integers K, N and sets K of N elements each. Find the number of sets containing two numbers. Print null if there are no such sets.

7. Given integers K, N and sets K of N elements each. For each set print the number of the first element equal to two, otherwise zero.

8. Given N integers and K sets of N elements each. For each set print the number of the last element equal to two, otherwise zero.

9. Given integers K, N and sets K with N elements each. For each set print the sum of the elements of the set if there are two of them, and zero otherwise.

10. Given K sets of K integers and non-zero integers. Each set is terminated with a null insertion. For each set, extract the number of its elements. Also print the number of elements of all sets.

11. Given K sets of K integers and non-zero integers. Each set consists of at least two elements and is terminated by a null entry. Print the number of sets of increasing elements.

12. Given K sets of K integers and non-zero integers. Each set consists of at least two elements and is terminated by a null entry. Extract the number of sets with increasing or decreasing elements.

13. Perform the following calculations.

a) $\prod_{R=1}^{15}\prod_{i=1}^{10}\frac{R^{i}+1}{R^{4}+3^{i}*R+e^{-R}}$

b) $\sum_{R=1}^{14}\sum_{m=1}^{4}\frac{R\cdot m+\left|R^{-m}+2\right|}{\ln R+3m}$

in) $\prod_{R=1}^{16}\sum_{i=1}^{6}\frac{R+3}{R^{3}+3R+i^{3}}$

G) $\sum_{R=1}^{10}\prod_{i=1}^{10}\frac{(R+1)^{i}+4}{(-1)^{R}+3(-1)^{i}+i^{R}}$

e) $\prod_{R=1}^{8}\prod_{i=1}^{14}(-1)^{i}\frac{\sqrt{5i^{4}+e^{-R}+6}}{\cos(i+1)^{3}-R^{-i}}$

e) $\sum_{R=1}^{17}\prod_{m=1}^{5}\sqrt{\frac{R+m^{3}+e^{-m}+9}{Log_{m}R+(mR)^{3}}}$

Procedure examples

1. Create a procedure Power(A,B) that calculates the third power of A and returns the result in variable V (A is the output, V is the real inputs). Use this procedure to calculate the third powers of 5 given numbers.

2. Create a procedure that calculates the second, third and fourth levels of the number A and forms the results in the variables V, S and D (A is the output, V, S, D are input real parameters). Using this procedure, calculate the second, third, and fourth powers of the five given numbers.

3. X and U are positive numbers with arithmetic mean AMean= (X+Y)/2 and geometric mean GMean= $\sqrt{X*Y}$ Create a procedure Mean(X,U,Amean,Gmean) that calculates the values. (X and U are inputs, Amean and Gmean are output real parameters). Using this procedure, find the arithmetic mean and geometric mean of the pairs (A, V), (A, S), (A, D).

4. The perimeter of a regular triangle with a side equal to a is equal to R=3*a, and the side is equal to S=a2*. $\sqrt{3/4}$ Create a procedure Triangl PS (a, P, S) that calculates (a - outputs, P and S - real inputs). Calculate the perimeters and areas of 3 equilateral triangles using this procedure.

5. The procedure for resetting PS (X1,U1, X2,U2,P,S) must be organized. (X1,U1, X2,U2 - input, R and S - output real parameters). Find the perimeters and surfaces of 3 rectangles, given the coordinates of their opposite ends, using this R-procedure.

6. Create a procedure DigitSountSum(K,S,S) that calculates a natural number K, the number of digits S, and the sum of S digits (K are input, S and S are output integer parameters). Let this procedure calculate the number and sum of the given 5 integer digits.

7. Create a procedure InvertDigims(K) that flips K positive integers (K are both input and output integer parameters). Reverse the digits of the 5 given integers using this procedure.

8. Create a procedure AddRightDigit(D, K) that places D to the right of a positive integer K (K is an integer input and output parameter). Using this procedure, the numbers D1 and D2 are sequentially placed to the right of the number K, and the result is printed.

9. Create a procedure AddLeftDigit(D, K) that places the digit D to the left of a positive integer K (D is an input integer parameter in the range 1-9, K is an input and output integer parameters). Using this procedure, the numbers D1 and D2 are sequentially placed to the left of the number K, and the result is printed.

10. Create a procedure Swap(X,Y) that swaps the values of variables X and U. (X and U are real input and output parameters). Using this procedure, we swap the values of the variables (A and V), (A and C), (A and D) and find new values \u200b\u200bof A, V, S, D.

11. Create a procedure Minmax(X, Y) that writes the smallest value of X and U to X and the largest to U (X and U are input and output real parameters). Find the maximum and minimum values of the given numbers A, B, S, D by referring to this procedure four times.

12. Create a procedure SortIns3(A, B, S) that arranges the variables A, V, S in ascending order (A, B, S are incoming and outgoing real parameters). Arrange (A1, B1, S1) and (A2, B2, S2) in ascending order.

13. Create a procedure SortDes3(A, B, S) that arranges the variables A, V, S in descending order (A, B, S are incoming and outgoing real parameters). Arrange (A1, B1, S1) and (A2, B2, S2) in descending order.

14. Shift the loop by ten: create a procedure ShiftRight3(A, B, S) that passes the value of A to V, the value of V to S, and the value of S to A (A, B, S are the inputs and outputs of the real parameters). Let this procedure perform a right cyclic shift for given (A1, B1, S1) and (A2, B2, S2).

15. Shift the loop to the left: create a procedure ShiftLeft3(A, B, S) that passes the value of A to S, the value of S to V, and the value of V to A (A, B, S input and output real parameters). Let this procedure perform a left cyclic shift for given (A1, B1, S1) and (A2, B2, S2).

Function examples

1. Below

$$Sign(X) = \begin{cases} -1, & агарX < 0; \\ 0, & агарX = 0; \\ 1, & агарX > 0; \end{cases}$$

form a visible function. Use this function to find the value of the expression Sing(A)+Sing(B) given real numbers A and V.

2. A*X2+V*X+S=0 (A, B, S are real parameters of A $\neq 0$) form a function. Use this function to quantify the roots of given 3 quadratic equations. The number of roots is determined by the value of the discriminant D=B2-4*A*S.

3. Create a Sirsle(R) function that computes the face of a circle with radius R. Calculate the surfaces of three given circles using this function. Circular face S=$\pi R2$calculated by formula.π=3.14perceived as

4. Create a function RingS(R1, R2) that calculates the ring surface between two concentric circles with a common center of radii R1 and R2 (R1 and R2 are real parameters). Calculate the 3 faces of the ring using this function.

5. Create a function TrangleP(a,h) that calculates the perimeter of an equilateral triangle with base a and height h. Use this function to calculate the perimeters of three triangles. To calculate the sides of a triangle, use the Pythagorean theorem b2=(a/2)2 + h2.

6. SumRange(A, B) is an integer function that calculates the sum of integers from A to V. If A>V, the value of the function is assumed to be 0. Calculate the sums of numbers from A to V and from V to C for the given integers numbers A, V using this function.

7. Coordinates (X, U) (X≠0, Y≠0)create a function Quarter(X, Y) of integer type that determines the number of the quarter of the coordinate in which the point is located. Use this function to determine the given 3 quadrant coordinates of a point.

8. Boolean type

$$Even(K) = \begin{cases} TRUE, \ агар\ K\ жуфт.бўлса; \\ FALSE, \ акс\ холда. \end{cases}$$

Let this function determine the number of given 10 pairs of numbers.

9. Boolean type

$$Is\,\Pr ime(N) = \begin{cases} TRUE, \ агар\ N - туб\ сон; \\ FALSE, \ агар\ N - мураккаб\ сон \end{cases}.$$

Let's create such a function.
Determine the number of roots of 10 integers using this function.

10. N! Create a Fast(N) function that calculates the (factorial) value. Calculate the factorials of 5 given numbers using this function.

11. F1=1, F2=1, FK= FK-2+ FK-1, K=3,4,... Let FK=1, which is calculated by the recursive formula - Fib(N) is a function of integer type, which calculates Fibonacci numbers. Calculate 5 Fibonacci numbers using this function.

12. The length of the AB section in the plane $|AB| = \sqrt{(X_A - X_B)^2 + (Y_A - Y_B)^2}$ Let Leng (XA ,YA ,XV ,YV) be a function of real type calculated by a formula. Using this function, calculate the lengths of segments AV, AS, AD for points A, V, S, D given by their coordinates.

13. Create a function Power(A, V) that calculates the value of the AV level using the formula AV =exp(B*ln(A)) (A, B are real parameters). Calculate the powers of RR, AR, VR, SR for given numbers R, A, V, S using this function.

14. AN degree value

$$A^n = \begin{cases} 1 = 0, \ агар\ N = 0\ бўлса; \\ A * A * ... * A\,(N - та\ кўпайтувчи), агар\ \ N > 0; \\ 1/(A * A * ... * A)\,(|N| - та\ кўпайтувчи), агар\ \ N < 0. \end{cases}$$

Create a Power2(A, N) function that evaluates to a formula. Use this function to calculate the powers AK, AL, AM for the given numbers A, K, L, M.

15. Create a function named ASIN(X) that calculates the value of the arcsin(x) function.

16. Create a function named ACOS(X) that calculates the value of the arcsos(x) function.

17. Create a function named ASEC(X) that calculates the value of the arcses(x) function.

18. Create a function named ACOSEC(X) that calculates the value of the arcsosec(x) function.

19. Create a function named AB(A,B) that calculates the degree of AB.

20. Create a function named LOG(A,X) that calculates the logarithm of logaB.

One-dimensional arrays and their analysis

Creating arrays and extracting their elements.
Create an algorithm and a program for the examples below. Let's assume that the size of the array is 10 in given assignments.

1. An integer N (>0) is given. Create an array of positive odd numbers whose elements start with one and output it: 1, 3, 5, ...

2. An integer N (>0) is given. Create and output an array of positive even numbers whose elements start with two: 2, 4, 8, 16,…

3. An array of size N is given. Remove its elements in reverse order.

4. Given an array of integers of size N. Print all odd numbers in the array in ascending order of indices, and their number is equal to k.

5. Given an array of integers of size N. Print all even numbers in the array in descending index order, and their number is equal to k.

6. Given an array of integers of size N. First extract all odd numbers in the array in ascending order, then all even numbers in descending order.

7. Given an array A of size N (N is an even number). Print the values of all even array elements in ascending order: A2, A4, A6, … , AN. (Don't use the conditional operator).

8. Given an array A of size N (N is an odd number). Print the values of all odd array elements in descending order: AN, AN-2, AN-4, … , A1. (Don't use the conditional operator).

9. Given an array A of size N. First print the values of all even-numbered array elements, then the odd-numbered elements in ascending order: A2, A4, A6, … , A1, A3, A5,.... (Do not use a conditional operator).

10. An array A of size N (even number) is given. First print the values of all elements of the array with odd numbers, and then the elements with even numbers in descending order. (Don't use the conditional operator).

11. Given a 10-dimensional array of integers A. Extract the value of all elements of the array that satisfy the condition AK<A10.

12. Given a 10-dimensional array of integers A. Extract the value of all elements of the array that satisfy the condition A1<AK<A10.

13. Given an array A of size N and integers K and L (1<=K<=L<=N). Calculate the sum of all elements from K to L in the array.

14. Given an array A of size N and integers K and L (1<=K<=L<=N). Calculate the arithmetic mean of all elements from K to L in the array.

15. Given an array A of size N and integers K and L (1<=K<=L<=N). Calculate the sum of all elements from 1 to K and from L to N in an array.

16. Given an array A of size N and integers K and L (1<=K<=L<=N). Calculate the arithmetic mean of all elements from 1 to K and all elements from L to N in the array.

17. Given an array A of size N. Find the smallest even elements in the array A2, A4, A6, ...

18. Given an array A of size N. Find the largest of the odd elements in the array A1, A3, A5, ...

19. Given an array A of size N. Determine the number and number of the largest adjacent element in the array on the right. Print the found elements in ascending order.

20. Given an array A of size N. Determine the number of the largest of the elements adjacent to the left in the array and their number. Sort the found items in descending order.

21. Given an array A of size N. Find the number of increments in the array and their elements.

22. Given an array A of size N. Find the number of decreasing intervals in the array and their elements.

23. Given an array A of size N and a number K. Find the element closest to the number K in the array (you need to find an element Ak such that |Ak – R| is minimal).

24. N-dimensional array A. Find the largest sum of two adjacent elements of the array.

25. Given an array A of size N and a number R. Find the sum of two adjacent elements in the array closest to the number R.

26. Given an array A of size N and a number R. Find two elements in the array that are closest to the number R, and determine the numbers of the elements.

27. An integer array of size N is given. Determine the number of different elements in the array and the largest number of identical elements.

28. Given two arrays A and B of the same size. Replace the values of their elements. First extract the elements of array A, then B.

29. Given an array A. Create a new array B. Define its elements as follows: Bk=2ak if ak<5, otherwise ak/2.

30. Two arrays A and B of the same size are given. Create a new array S of this size. Let the index element corresponding to it be equal to the corresponding largest element of the array A and B, that is, si=max(ai,bi).

31. Given an N-dimensional array of integers A. Move all even numbers from this array to an array of integers S. Extract the size of array S and its elements.

32. Given an N-dimensional array of integers A. Copy all the odd (1,3,5,...) elements of this array into an integer array S. Extract the size of array S and its elements. Do not use the conditional jump operator.

33. Given an N-dimensional array of integers A. Copy all even (2,4,6,...) elements of this array into an integer array S. Output the size of array S and its contents. Do not use the conditional jump operator.

34. Given an N-dimensional array of integers A. First move all the even (2,4,6,...) elements of this array, and then the odd elements into an integer array S: A2, A4,…, A1, A3. Retrieve the elements of array S. Do not use a conditional jump operator.

35. Given an N-dimensional array A. Create a new array S. Let its elements be defined as follows. Let Sk elements be the sum of elements of array A, numbered from 1 to k.

36. Given an N-dimensional array A. Create a new array S. Let its elements be defined as follows. Let Sk elements be the arithmetic mean of the sum of elements with numbers from 1 to k of array A.

37. Given an N-dimensional array A. Create a new array S. Let its elements be defined as follows. Let Sk elements be the sum of elements numbered from k to N of array A.

38. Given an N-dimensional array A. Create a new array S. Let its elements be defined as follows. Let Sk elements be the arithmetic mean of the sum of elements numbered from k to N of array A.

39. Given an N-dimensional array A. Create new arrays B and C. Write positive elements to array B before array A, then write negative elements to array C. First print the size of array B and its elements, then the size and elements of array C.

40. Given two N=5-dimensional ordered arrays of elements A and B. Create a new array S from these arrays. Let its elements also be sorted in ascending order.

41. Given an N-dimensional array A. Find the one that comes before the largest element in the array. Don't use an auxiliary array.

42. Given an N-dimensional array A. Find the previous two largest elements of the array. Do not use another auxiliary array.

43. Given an N-dimensional array A. Find the smallest element of the array that is one less than the smallest element. Don't use an auxiliary array.

44. Given an N-dimensional array A. Find the previous two smallest elements of the array. Do not use another auxiliary array.

Replacing, adding and removing array elements

Do not use an auxiliary array when making assignments.

1. An N-dimensional array A and an integer K (1<K<N) are given. Increment each element of the array by the value of the initial element AK.

2. Given an N-dimensional array of integers A. Increment each even element of the array by the first even element encountered. If the array contains no odd elements, do not modify the array.

3. Given an N-dimensional array of integers A. Increment each odd element of the array by the first odd element encountered. If the array does not contain even elements, do not modify the array.

4. Given an N-dimensional array A. Swap the maximum and minimum values of the array.

5. Given an array A of dimension N (N is an even number). Swap the first element of the array with the second, the third with the fourth, and so on.

6. Given an array A of dimension N (N is an even number). Replace the elements of the first half of the array with the elements of the second half.

7. Given an N-dimensional array A. Flip the elements of the array.

8. An N-dimensional array A and integers K, L (1<K<L<N) are given. Swap array elements between elements AK and AL. The elements AK and AL should also be taken into account.

9. An N-dimensional array A and integers K, L (1<K<L<N) are given. Swap array elements between elements AK and AL. Elements AK and AL are also not taken into account.

10. Given an N-dimensional array A. Let all elements between the maximum and minimum values of the array be converted to zero. Consider both the maximum and minimum elements.

11. Given an N-dimensional array A. Let all elements between the maximum and minimum values of the array be converted to zero. The maximum and minimum elements are also not taken into account.

12. Given an N-dimensional array A. Move the elements of the array from one to ten (in this case A1 to A2, A2 to A3, ..., AN-1 to AN, the last element is lost). Let the first element of the array be zero.

13. Given an N-dimensional array A. Shift the elements of the array to the left by one (in which the first element is lost on AN - AN-1, AN-1 - AN-2,..., A2 - A1). Let the last element of the array be zero.

14. Given an N-dimensional array A. Cycle through the array elements from one to ten (where A1 goes to A2, A2 to A3, ... , AN-1 to AN, AN to A1).

15. Given an N-dimensional array A. Shift the elements of the array cyclically to the left by one (where AN goes to AN-1, AN-1 goes to AN-2, ... , A2 goes to A1, A1 goes to AN).

16. An N-dimensional array A is given. All elements of the array, except for the first one, are incremented. Arrange the array incrementally by moving the first element to a new position.

17. An N-dimensional array A is given. All elements of the array, except for the last one, are incremented. Arrange the array incrementally by moving the last element to a new position.

18. An N-dimensional array A and integers K (1<K<N) are given. Remove the Kth element from the array and move back one, starting from the removed element. Give zero to the last element. Output the result of the new array.

19. An N-dimensional array A and integers K, L (1<K<L<N) are given. Remove elements K through L from the array (including elements K and L) and shift all elements from the Lth element to the left. Output the result of the new array.

20. Given an integer N-dimensional array A. Remove all odd numbers from the array and output the new dimension of the array and its elements.

21. Given an integer N-dimensional array A. Remove all even elements (2,4,...) of the array. Do not use the conditional jump operator.

22. Given an integer N-dimensional array A. Remove all odd elements (1,3,...) of the array. Do not use the conditional jump operator.

23. Given an integer N-dimensional array A. Delete all identical elements of the array, leaving only one. Print the number of the removed array element. Let the elements of the array be shifted to the left.

2D arrays

Matrix organization and extraction of its elements.

1. Given positive integers M and N. Let an MxN-dimensional integer matrix be formed. In this case, all elements of the i-th row are equal to 10.·i takes the value (i=1,2,…M).

2. Given positive integers M and N. Let an MxN-dimensional integer matrix be formed. In this case, all elements of the j-column are 5·j (j=1,2,…N) takes on a value.

3. Given positive integers M and N and a set of M numbers. In this case, each column of the matrix contains the elements of the given set (in the given order).

4. Given positive integers M and N and given a set of N numbers. In this case, each row of the matrix contains the numbers of the given set (in the given order).

5. Given positive integers M and N, a number D and a set M of numbers. In this case, the first column of the array consists of the corresponding elements of the previous column and the sum of D numbers, the remaining elements of the column correspond to a given set of numbers (as a result, the elements of each row of the matrix form arithmetic elements).

6. Given positive integers M and N, a number D and a set N of numbers. In this case, the first line of the array corresponds to a given set of numbers, and the elements of the next line consist of multiplying the sum of the corresponding elements of the previous line by the number D (as a result, each column forms elements of a geometric progression).

7. Given a matrix MxN and an integer K (1≤K≤M). Display the K-row elements of this matrix.

8. Given a matrix MxN and an integer K (1≤K≤N). Display the K-column elements of this matrix.

9. Given an MxN matrix. Display the elements of this matrix in even (2,4,…) rows.

10. Given an MxN matrix. Display the elements of this matrix in odd (1,3,…) rows.

11. Given an MxN matrix. Extract the matrix elements in the following order: first row from left to right, second row from right to left, third row from left to right, fourth row from right to left, and so on.

12. Given an MxN matrix. Extract the matrix elements in the following order: first column from top to bottom, second column from bottom to top, third column from top to bottom, fourth column from bottom to top, and so on.

13. Given a square matrix A of order M. Starting at element A11, extract its elements as follows (triangle): all elements of the first row, all elements of the last column except the first (extracted), the remaining elements of the second row, the remaining elements of the column before end and ho, last element of AMN.

14. Given a square matrix A of order M. Starting from element A11, extract its elements as follows (in the form of a triangle): elements of the first column, all elements of the last row except the first (extracted), the remaining elements of the second column, the remaining elements of the penultimate row, and xo is the last element of A1N.

15. Given a square matrix A of order M (M is an odd number). Starting at element A11, extract its elements in a clockwise spiral: first row, last column, last row in reverse order, first column in reverse order, the remaining elements of the second row, and the center element of the last matrix.

Matrix element analysis

1. Given a matrix MxN and an integer K ($1 \le K \le N$). Find the sum and product of the elements of the K-rows of the matrix.

2. Given a matrix MxN and an integer K ($1 \le K \le N$). Find the sum and product of the elements of the K-column of the matrix.

3. Given a matrix MxN and an integer K ($1 \le K \le N$). Find the sum of the elements for each row of the matrix.

4. Given a matrix MxN and an integer K ($1 \le K \le N$). Find the product of the elements for each column of the matrix.

5. Given an MxN matrix. Find the arithmetic mean of the matrix elements for each odd (1,3,...) row. Don't use a conditional operator.

6. Given an MxN matrix. Find the arithmetic mean of the matrix elements for each even (2,4,...) column. Don't use a conditional operator.

7. Given an MxN matrix. Find the corresponding element in each row of the matrix.

8. Given an MxN matrix. Find the maximum element in each column of the matrix.

9. Given an MxN matrix. Find the row with the largest matrix element and extract the row number and the largest value.

10. Given an MxN matrix. Find the matrix column with the smallest element and extract the column number and the smallest value.

11. Given an MxN matrix. Find the largest of the smallest elements of the matrix rows.

12. Given an MxN matrix. Find the smallest of the largest matrix column elements.

13. Given an MxN matrix. Find the number of elements less than the arithmetic mean of the elements in each row of the matrix.

14. Given an MxN matrix. Find the number of elements greater than the arithmetic mean of the elements in each column of the matrix.

15. Given an MxN matrix. Find the row and column number closest to the average of all matrix elements.

Changing the shape of the matrix

1. Given a matrix MxN and integers K1, K2 ($1 \le K1 < K2 \le M$). Swap rows with numbers K1 and K2 of the matrix.

2. Given a matrix MxN and integers K1, K2 ($1 \le K1 < K2 \le N$). Replace the matrix columns with numbers K1 and K2.

3. Given an MxN matrix. In each row of the matrix, the smallest and largest elements should be swapped.

4. Given an MxN matrix. In each column of the matrix, the smallest and largest elements should be swapped.

5. Given an MxN matrix. Replace the row positions with the minimum and maximum elements of the matrix.

6. Given an MxN matrix. Swap the columns that contain the minimum and maximum elements of the matrix.

7. Given an MxN matrix. Let the first column of the matrix and the last column with all positive elements be swapped. If there is no such column, then print the matrix without changes.

8. Given an MxN matrix. Let the first column of the matrix and the last column, where all elements are negative, be swapped. If there is no such column, then print the matrix without changes.

9. Given an MxN matrix (M-even number). Swap the top and bottom halves of the matrix.

10. Given an MxN matrix (N-even number). Let the left and right halves of the matrix be reversed.

11. Given an MxN matrix (M and N are even numbers). Swap the top left and bottom left quarters of the matrix.

12. Given an MxN matrix (M and N are odd numbers). Swap the bottom left and top right quarters of the matrix.

13. Given a matrix MxN and an integer K ($1 \le K \le M$). Delete row number K of the matrix.

14. Given a matrix MxN and an integer K ($1 \le K \le N$). Delete column K of the matrix.

15. Given an MxN matrix. Delete the column with the maximum matrix element.

Square matrices

1. Given a matrix A of order M. A1,1 matrices; A2.2; A3.3; . . . ; Find the sum of the elements of the main diagonal containing the elements AM,M.

2.Given a matrix A of order M. A1,M matrices; A2, M-1; A3, M-2; . . . ; Find the arithmetic mean of the elements of the side diagonal on which the elements of AM,1 are located.

3.Given a matrix A of order M. Find the sum of the elements of the diagonals of the matrix parallel to the main diagonal (starting from the one-element diagonal A1,M).

4. Given a matrix A of order M. Find the sum of the largest elements in the columns of the matrix.

5. Given a matrix A of order M. Find the product of the least elements in the rows of the matrix.

6. Given a matrix A of order M. Find the arithmetic mean of the smallest elements in the columns of the matrix.

7. Given a matrix A of order M. Find the average geometry of the largest elements in the rows of the matrix.

8. Given a matrix A of order M. Find the average value of the elements of the matrix. Find the number of elements in the array less than and greater than the average.

9. Given a matrix A of order M. Determine if there is an element in the columns of the matrix that is a multiple of 4. If so, then the element of the array S(n) corresponding to the column is assigned the value 1, otherwise it is assigned the value 0, i.e., must be found the value of the elements of the array S(n).

10. Given a matrix A of order M. Let the sum of multiples of 2 in the columns of the matrix be placed in the corresponding element of the array B(n).

11. Given a square matrix with real elements A={aij}. Let b1,b2,...,bn be a sequence of zeros and ones, where bi=1 if the matrix rows contain at least one element from 1 to 10.

12. Given a square matrix with real elements A={aij}. Let b1,b2,...,bn be a sequence of zeros and ones, where bi=1 if the matrix columns contain at least one element that is a multiple of 2.

13. Find the arithmetic mean of the elements of the main diagonal of the square matrix A={aij}. Here aij=(5I-3j)/n; ij=1,2,...n.

14. Find a multiple of 4 among the column elements of the square matrix A={aij}. Here aij=4i if i=j, aij=2i+j if i≠if j; ij=1,2,...n.

15. Given a square matrix A={aij}. Find the number of multiples of 2 and 4 among the even elements of the matrix column.

16. Find the number of multiples of 2 among the row elements of the square matrix A={aij}. Here aij=2i+j if i+j>3, aij=5 if i+j≤if there are 3; i=1,2,...,n; j=1,2,...,n.

17. Given a square matrix A={aij}. Find the arithmetic mean of multiples of 3 among the odd row elements of the matrix.

18. Given a number X and a square matrix A={aij}. Find the number of matrix elements greater than X and square those elements.

19. Given a number X and a square matrix A={aij}. Find the number of matrix elements greater than X and determine if among these elements there is an element greater than X2.

20. For a square matrix A={aij} calculate the following: xi=max{aij}; yj=min{aij}.

21. For a square matrix A={aij} calculate the following: xi=max{aij}; y = min{xi}; z=max{xi}.

22. Given a square matrix A={aij}. Find the arithmetic mean of the main diagonal of the matrix and the elements of the 1st column and determine the largest among them.

23. Given a square matrix A={aij}. Find the sum of the main diagonal of the matrix and the elements of the nth row and determine the largest among them.

24. Given square matrices A={aij} and B={bij}. Calculate the arithmetic mean of the matrix elements and determine their largest.

25. Given square matrices A={aij} and B={bij}. Find the smallest elements of this matrix and determine the largest of them, i.e. maxAB=max(min{a[I,j]}, min{b[I,j]}).

26. Given a square matrix A={aij}, the elements of which are integers. Determine the multiplicity of 2 elements of the matrix and their number.

27. Given a square matrix A={aij}, the elements of which are integers. Determine the multiples of 3 matrix elements and their number.

28. Construct a square matrix A={aij} whose main diagonal entries are 1, the bottom diagonal entries are 2, and the top diagonal entries are 3 integers.

29. Given a square matrix A={aij}, the elements of which are integers. Find the number of multiples of 2 matrix elements and their sum.

30. Given a square matrix A={aij}, the elements of which are integers. Find the number of multiples of 3 matrix elements and their product.

Character and string examples

1. The symbols "D" and "E" are given. Extract their corresponding codes from the table.

2. Given an integer N (32<N<126). Extract all characters with code N.

3. Create and display the word "Tashkent" using character codes.

4. Given a letter (Latin or Cyrillic) or the symbol S. If S represents a number, "NUMBER" is displayed, if the Latin letter is "LATINA", if the Russian letter is "KIRIL".

5. A non-empty string is given. Decipher the first and last character in it

6. Given an integer N (N>0) and a character S. Extract a string of length N from S.

7. A row is given. Print the characters of this string in reverse order.

8. A row is given. Extract the number of digits in this string.

9. A row is given. Extract the number of latin letters in this string.

10. A row is given. Extract the number of Latin and Cyrillic letters in this string.

11. Series S and S0 are given. Does S have a string similar to S0? Returns True if yes, False otherwise.

12. Series S and S0 are given. Determine the number of rows like S0 that fall into row S.

13. Series S and S0 are given. Remove from S the lines similar to S0 that are in S.

14. Series S and S0 are given. Swap lines like S0 in S series with another S1 series.

15. Given a string S containing Russian (space separated) words. Find out how many words are in this line.

16. Given a string S containing Russian (space separated) words. Find the shortest word in this line.

17. Given a string S, containing Russian (space-separated) words. Extract the longest word in this string and the number of characters in it.

18. Create a recursive program that writes the given word in reverse order.

19. Find the number of occurrences of the letter "a" in the given text.

20. Given an arbitrary text, find how many words are included in this text.

21. The Uzbek text is given in 5 rows of krill letters of length 80. Write a program that translates this text into Latin.

22. The Uzbek text is given in 5 lines in Latin letters of length 80. Write a program that converts this text into Krill.

23. The Uzbek text is given in 2 lines in krill letters of length 80. Find out if there are any repeated words in this text. Output the words "True", if any, otherwise "False" and a repeating word.

Examples of simple recursive formulas

Write an algorithm and a program for the following recursive calculations.

1. Calculate xn with the following recursive formula

$$x_k = b_0 x_{k-1} + b_1, \quad k = 1,2,...$$
$$x_0 = a$$

2. Calculate xn using the following recursive formula

$$x_k = q x_{k-1} + r x_{k-2} + b, \quad k = 2,3,...$$
$$x_0 = c, \ \ x_1 = d$$

3. Determine the first Fibonacci number greater than h in the following formula to calculate the Fibonacci number

$$x_k = x_{k-1} + x_{k-2}, \quad k = 3,4,...$$
$$x_1 = x_2 = 1$$

4. Determine the closest Fibonacci number to h using the following formula to calculate the Fibonacci number.

$$x_k = x_{k-1} + x_{k-2}, \quad k = 3,4,...$$
$$x_1 = x_2 = 1$$

5. Given the following recurrent sequence, calculate u11

$$u_{k+1} = \ln \frac{e^{u_k} - 1}{u_k}, \ \ u_1 = x, \ \ (x \neq 0) \ \ \ (k = 1,2,3,...,10).$$

6. Calculate all xk and yk values using the following recursive formula

$$x_{k+1} = \frac{1}{2}(x_k + y_k), \quad y_{k+1} = \sqrt{x_k y_k}$$
$$x_1 = a, \ y_1 = b \ \ \ (a > b > 0) \ \ k = 0,1,2,3,...,10).$$

7. Given the following recurrent sequence, calculate the sum of all values uk

$$u_{k+1} = \log_5 \frac{e^{u_k} - 1}{u_k}, \ \ u_1 = x, \ \ (x \neq 0) \ \ \ (k = 1,2,3,...,10)$$
$$S = 1 + u_1 + u_2 + ... + u_{10}$$

8. Given the following recurrent sequence

$$u_k = \frac{u_{k-1} + 1}{u_{k-1} + 2}, \ \ u_0 = 0, \ \ (k = 1,2,3,...)$$
$$\left| u_k + u_{k-1} \right| < \varepsilon$$

Find the first value uk that satisfies the condition

9. Calculate the values of the following recurrent sequence

$$v_k = Cosv_{k-1}, \quad k = 1,2,...,10$$
$$v_0 = 0$$

10. Calculate the values of the following recurrent sequence

$$x_k = \sqrt{2 + \sqrt{2 + .. + \sqrt{2}}}$$

11. The elements of a triangular matrix are calculated by the following recurrent formula. Calculate its values

$$C_{ik} = C_{i-1k} + C_{i-1k-1}, \quad i = \overline{2,n} \quad k = \overline{1,i-1}$$
$$C_{i0} = C_{ii} = 1 \quad i = 0,1,2,3,...,n).$$

12. Matrix elements are calculated by the following recurrent formula. Calculate its values

$$C_{ij+1} = \frac{1}{2}(C_{i+1j} + C_{i-1j}), \quad i = \overline{1,n} \quad j = \overline{0,n}$$
$$C_{0j} = C_{nj} = 0.$$

13. Write a recursive part program that creates the following sequence of lines. There are 26 rows in total.

```
A
BB
CCC
DDDD
.....
```

14. Write a recursive part program that creates the following sequence of lines. There are 10 rows in total.

```
1
22
333
4444
.....
```

15. An integer N>1 is given. The Fibonacci number sequence FC is defined as follows:
F1=1, F2=1, FK= FK-2+ FK-1 ,K=3,4…..
Print TRUE if N is a Fibonacci number, otherwise FALSE.

16. An integer N>1 is given. The Fibonacci number sequence FC is defined as follows:
F1=1, F2=1, FK= FK-2+ FK-1 ,K=3,4…..
Find the first Fibonacci number greater than n.

17. Given an integer N>1 with Fibonacci number N=FK:
F_{one}=1, F2=1, FK= FK-2+ FK-1, K=3,4...
Find the integers FK-1 and FK+1 — the previous and next Fibonacci numbers.

18. Given an integer N>1 with Fibonacci number N=FK:
F_{one}=1, F2=1, FK= FK-2+ FK-1, K=3,4...

Find an integer K - the ordinal number of the Fibonacci number.

19.ε>0 is a real number. The sequence of real numbers AK is defined as follows: A1 \u003d 2, AK \u003d 2 + 1 / AK-1, K \u003d 2, 3, ..

BUT$_{To}$- AK-1|<εFind the first number K that satisfies the condition.

twenty.ε>0 is a real number. The sequence of real numbers AK is defined as follows:

BUT$_{one}$= 1, A2 = 2, AK = (AK-2 + 2 AK-1)/3, K=3, 4, ..

|AK-AK-1|<εFind the first number K for which the condition is satisfied, and extract this number, the numbers AK-1 and AK.

21. Create a recursive program that writes the elements of a one-dimensional array in reverse order.

22. Create a recursive program that writes the given word in reverse order.

Examples of creating simple applications in Delphi

1. Given real numbers A, B, C and D. Calculate the arithmetic mean of these numbers. Create a calculation form application. Use the Edit1, Edit2, Edit3, and Edit4 components to enter real numbers A, B, C, and D into the form, respectively. Use Button1 in Calculation and set its property to the word "Calculation". Output the result to the Label1 component.

2. Develop a form application that calculates the speed at which an athlete runs a distance given distance and time using the speed calculation formula V=S/T. Use the Label1 and Edit2 components to display the word Athlete Speed Calculation on the form, Label2 to display the result, and Edit1 and Edit2 to enter the distance and time covered. When calculating the speed, use the Button1 button and set its property to the word "Calculation".

3. $Z = \frac{4 + x^2}{1 - x^2}$ Create a form app that calculates from a formula. Use the components Label1 to enter the word "Calculation" into the form, Label2 to display the result, and Edit1 to enter the unknown x value. Using the Button1 button in the calculation, set the word "Calculation" in its property and enter the program code.

4. Create a simple calculator app that calculates the sum, subtraction, multiplication and division of two numbers. Use Label1 for the word "Calculator" in the form and Label2 to display the result, Edit1 and Edit2 to enter two numbers. Use Button1, Button2, Button3, Button4 respectively to create "+", "-", "*", "/" buttons in the calculation. Enter programming codes into them.

5. Create a calculator-type application to calculate the values of trigonometric functions. Enter the values of the function arguments in degrees. Use buttons Buttun1, Buttun2, Buttun3, Buttun4 respectively to create buttons "Sin", "Cos", "Tg", "Ctg" in the calculation. Enter programming codes into them.

6. Given the diameter of the circle d. Find its length L=$\pi \cdot G$create an application form. Use Label1 to enter the word "Find the circumference" into the form and Label2 to display the result, Edit1 to enter the value of the diameter d. Using the Button1 button in the calculation, set the word "Calculation" in its property and enter the program code.

7. The sides of a cube are a. Find its volume V=a3 and surface area P=6.·*a*. Use Label1 to enter the word "Find the volume and surface area of a cube" into the form, Label2 to display the result, and Edit1 to enter the side of the cube. Using the Button1 button in the calculation, set the word "Calculation" in its property and enter the program code.

8. Given sides a, b, c of a rectangular parallelepiped. Its volume V=a·*b*·*With*and find the surface area S=2·*(a*·*b*+*b*·*c*+*a*·*in)*. Use the word "Finding the volume and surface area of a box" in the form Label1 and Label2 when displaying the result, components Edit1, Edit1, Edit1 when entering the value of the sides of the box a, b, c. Using the Button1 button in the calculation, set the word "Calculation" in its property and enter the program code.

9. Create an application of the form of solving a system of two unknown equations by the Cramer method. Label1 the word "Solve the system of equations" in the form and Memo1 when displaying the result, use the components Edit1, Edit2, ... Edit6 respectively when entering the coefficients of the equation. Using the Button1 button in the calculation, set its property with the word "Solve" and enter the program code.

10. Create a character code discovery form application. Use the InputBox dialog box to enter letters, numbers, or symbols from the keyboard. Display the results in the window of the Memo component.

11. Create an application form for calculating the values of the functions Sin, Cos, Tg and Ctg. Use the InputBox to enter values for the function arguments (in degrees). Display the results in the window of the Memo component.

12. Create an application form for calculating the arithmetic and geometric mean of numbers from 1 to N numbers. Use the InputBox dialog when entering the number N. Display the result in the window of the Memo component.

13. Three real numbers a, b, c are given. Create a shape application to find the largest of these numbers. When entering numbers a, b, c, use the InputBox dialog box. Output the result to the Label component.

14. Given an array of integers of size N. Print all odd numbers in the array in ascending order of index and number k. Use ListBox, ComboBox components when entering and displaying array elements.

15. Given an array of integers of size N. Print all even numbers in the array in descending index order, and their number is equal to k. Use ListBox, ComboBox components when entering and displaying array elements.

16. Given an array of integers of size N. First extract all odd numbers in the array in ascending order, then extract all even numbers in descending order. Use ListBox, ComboBox components when entering and displaying array elements.

17. Given an array A of size N (N is an even number). Replace the element values in the array like this: A1↔AN, A2↔AN-1, A3↔AN-3, ... (The conditional operator cannot be used). Use ListBox, ComboBox components when entering and displaying array elements.

18. Given an array A of size N (N is an even number). Replace the element values in the array like this: A1↔A2, A2↔A3, A3↔A4,… (Do not use the conditional operator). Use ListBox, ComboBox components when entering and displaying array elements.

19. Given an array A of size N (N is an even number). Replace the element values in the array like this: A1→A2, A2→A3, A3→A4,…,AN→A1 (Do not use a conditional statement). Use ListBox, ComboBox components when entering and displaying array elements.

20. Given an array A of size N (N is an odd number). Print the values of all odd array elements in descending order: AN, AN-2, AN-4, … , A1. (Don't use the conditional operator). Use ListBox, ComboBox components when entering and displaying array elements.

21.Given a matrix A={aij}. Find the arithmetic mean of the main diagonal of the matrix and the elements of the 1st column and determine the largest among them. Use the StringGrid component to enter array elements and the Memo component to display the result.

22. Given a matrix A={aij}. Find the sum of the main diagonal of the matrix and the elements of the nth row and determine the largest among them. Use the StringGrid component to enter array elements and the Memo component to display the result.

23. Matrices A={aij} and B={bij} are given. Calculate the arithmetic mean of the matrix elements and determine their largest. Use a StringGrid to enter array elements and a Memo component to display the result.

24. Matrices A={aij} and B={bij} are given. Find the smallest elements of this matrix and determine the largest of them. Use a StringGrid to enter array elements and a Memo component to display the result.

25. Given the elements of the entire matrix A={aij}. Determine the multiples of 2 elements of the matrix and their numbers. Use a StringGrid to enter array elements and a Memo component to display the result.

MIXED EXAMPLES AND PROBLEMS

Create an algorithm and a program for the following examples and tasks.

Problem 1. From degrees to radians.α the angle is given in degrees, minutes and seconds or radians. Find its value in radians or degrees, minutes and seconds. (with the highest possible accuracy).
Testing:it is proposed to check the performance of the program at angles greater than the total angle, as well as at negative angles.

Problem 2. Inches to meters. Cut lengths are in inches (1 inch = 2.54 cm). Convert the length value to the metric system, that is, express it in meters, centimeters and millimeters. For example, as follows: 21 inches = 0m 53cm 3.4mm. Solve the reverse problem as well.

Task 3. Time interval. The start and end moments of a certain time interval are specified in hours, minutes and seconds (interval is 1 day). Find the distance in these units.

Issue 4. Average annual labor productivity. The firm's productivity increased by R1% in the first year and R2 and R3% in the second and third years, respectively. Find the average annual productivity gain (in percent).

Task 5. The price of milk. The farmer raises the price of milk by R% at the beginning of each winter and lowers it by the same percentage each summer. Will the price of milk change? If it changes, in what direction and after how many years?

Problem 6. Bad winter. The cow's daily ration consists of u kg of hay, v kg of fermented hay and w kg of silage. In a farm consisting of a herd, s q of hay, t tons of fermented hay and fta50 kgThere was food left in the bag. How many more days can the farm feed the cows with a full ration? Which food runs out first?

Question 7. The bank offers 3 types of quick deposits: for 3 months p_1% under, for 6 months p_2% up to and for 1 year p_3% under. Which of these benefits the investor the most?

Problem 8. From miles to kilometers. Make a table to convert miles to kilometers and vice versa (1 mile = 1.609344) for distances less than k km:

miles km
0.6214 1.0000
1.0000 1.6093
1.2428 2.0000
1.8641 3.0000
2.0000 3.2187

Problem 9. $\prod_{k=1}^{\infty}\left(1+\frac{(-1)^k}{2k+1}\right)=\frac{\sqrt{2}}{2}$, when multiplying equality to six digits, i.e. 10^{-6} How many multipliers do you need to get to do this with an error of no more than ?

Problem 10. Next $\prod_{k=2}^{\infty}\left(1-\frac{1}{k^2}\right)=\frac{1}{2}$ equality is known. How many factors must be taken when multiplying so that the equality is fulfilled with an accuracy of five digits, that is, with an error of no more than 10-5?

Problem 11. The *a* and the following for p $x_{n+1}=\frac{1}{p}\left[(p-1)x_n+\frac{a}{x_n^{p-1}}\right]$; $x_0=a.$ According to Newton's recurrence relation $x=\sqrt[p]{a}$ calculate Given ε in error $\left|x_{n+1}-x_n\right|\le\varepsilon$ how many iterations must be done for the relation to be valid?

Problem 12. *a* for set value $x_{n+1}=\frac{1}{3}\left(x_n+2\sqrt{\frac{a}{x_n}}\right)$; $x_0=a.$ using the recurrence relation, $x=\sqrt[3]{a}$ calculate $\left|x_{n+1}-x_n\right|\le\varepsilon$ provided by applying the condition ε how many iterations do you need to do to reach the error?

Problem 13. For a given x>1 $y_i=\frac{1}{2}\left(y_{i-1}+\frac{x}{y_{i-1}}\right)$ according to the iterative formula, taking into account ε by mistake $y_0=x.$ in the initial approximation $y=\sqrt{x}$ calculate Compare the result of using the built-in function. How many iterations do you need to do?

Problem 14. Call schedule. The beginning of the school day in any educational institution, the duration of the “pair” or the continuation of the lesson, the duration of a simple and big break (their “place” in the table), the number of pairs are given. Bell schedule for the entire school day.

Release 15. Array centering. Considering m $x_1, x_2, ..., x_m$ from each of the numbers their arithmetic mean

$$x_{yp} = \frac{1}{m}\sum_{i=1}^{m} x_i;\ \ \tilde{x}_i = x_i - x_{yp},\ \ i = 1,\ 2, ..., m.$$

subtract Place the results instead of the original data.

Task 16. Dispersion-1. The $X(k)$ array $x_{cp} = \frac{1}{k}\sum_{i=1}^{k} x_i;\ \ d_x = \frac{1}{k-1}\sum_{i=1}^{k}(x_i - x_{cp})^2$. for their observations x_{yp} mean value and d_x find the variance.

Task 17. Dispersion-2. $X(k)$ for tracking array x_{yp} mean value and d_x compute the variance in a more efficient (than the previous problem) way in a single array pass:

$$s_i = \sum_{i=1}^{k} x_i;\ \ s_2 = \sum_{i=1}^{k} x_i^2;\ \ \ x_{yp} = \frac{s_i}{k};\ \ \ d_x = \frac{s_2}{k-1} - \frac{s_1^2}{k(k-1)}.$$

Task 18. Session. The results of a session consisting of 3 exams are represented by a matrix K(n,3) for a group of n students. Evaluation is made on a 4-point system. Count the number of absent students, failing, passing, good and excellent grades for each exam.

Issue 19. Tournament schedule. The matrix K(n,n) describes the standings of football competitions between n participants. (each element of the matrix aij is a ball thrown by the i-th participant to the j-th participant); all elements of the main diagonal are equal to zero. For each diagonal element, we write the difference between goals scored and conceded by the corresponding participant, that is, the difference between the sums of the elements of the corresponding row and the corresponding column.

Problem 20. The work of the combine. Fill in the K(m,n) matrix as follows: assign 1 value to the outliers (by the matrix parameter), 2 values to the rest of the matrix perimeter, and so on until the matrix is filled.

Release 21. Polishing. BUT(Replace each element of vector n) (except edge 2) with the following expression: $a_i' = \frac{a_{i-1} + 2a_i + a_{i+1}}{4},\ i = 2, 3, ..., n-1$, and edge elements $a_1' = \frac{a_1 + a_2}{2};\ \ a_n' = \frac{a_{n-1} + a_n}{2}$ with expressions.

Problem 22. Latin square. Fill the matrix K(n,n) with the numbers 1,2,...,n randomly so that each row and each column does not contain the same numbers.

Problem 23. The text of the poem (no more than 80 characters per line) has a 4-line stanza. Write it in the form of a "ladder" (one word per line), leaving a blank line after every four lines.

Problem 24. Words with different letters. Choose the longest word from the available dictionary with different letters.

Problem 25. An unordered array of order k(n) contains homogeneous elements. Compressing an array by removing one element from a set of homogeneous elements.

Problem 26. Arrays are given in which the elements A(n) and B(m) are arranged in ascending order. Create an incrementing array C by concatenating arrays. Let the elements in array C be different.

Problem 27. A pair of functions. This function y=f(x) is given $-a \le x \le a$ determine numerically whether the cross section is even or odd. Calculation error and possible function breakpoints must be taken into account. For example, $y = x^4,\ y = tgx,\ y = e^x$ functions [-5; 5] is checked by calculation with a step of 0.1 in the section.

Problem 28. The input file kir.in contains arbitrary n integers. Write only two-digit numbers from the numbers in the input file to the output file shiq.in. Write a program that solves this problem.

Problem 29. The sum of the first three digits of how many numbers from 100000 to 999999 is equal to the sum of the next three digits. Write a program that solves this problem.

Task 30. Write a program that converts a given number into a binary number system.

Problem 31. Write a program that converts a number from a given binary number system to a decimal number system.

Task 32. Create a module. Create a function that finds solutions to a quadratic equation in a module, and write a program that uses that module.

Task 33. Create a module. Let the module contain a program that multiplies and calculates the sum of two matrices, and write a program that uses this module.

Task 34. Write a program that checks the division of a given number by 4 while observing the division by 4 rule. (The rule of division by 4: if the last two digits of a number are divisible by 4 without a remainder, then this number is also divisible by 4 without a remainder).

Problem 35. What is the minimum radius of a circle to cut a rectangle from a circle with sides equal to a, b and s, d. Create a program that solves this problem.

The Republic of Uzbekistan
Ministry of Higher and Secondary Specialized Education

Namangan Civil Engineering Institute

Department of Information Systems and Technologies

Subject "Object-oriented programming languages"

TOPICS OF INDEPENDENT WORK

2022 departments
"_____" in _____
Decision No. 1
approved
head of department
Assoc.S.Komilov

Ready: Assoc. O. Jakbarov

Namangan 2022

TOPICS OF INDEPENDENT WORK

1) Passed types, intermediate types, and records.
2) Sort array elements.
3) Parameterless and parameterized procedures.
4) Parameter - value and parameters - variables.
5) Procedure declaration and application to it.
6) The principle of parameter localization.
7) Function procedure declaration.
8) Function reference.
9) recursive functions.
10) Modules.
11) standard modules.
12) Modular programs and methods of their organization.
13) Custom modules and how to create them.
14) Files.
15) Writing and reading data to a file.
16) Create a file.
17) Open file for input.
18) Open the file for input and reading.
19) Error opening file.
20) Close the file.
21) Introduction to the object-oriented programming language.
22) Class, object, method, encapsulation and inheritance.
23) Polymorphism and virtual methods.
24) Tools for creating multimedia programs.
25) Text and graphic printing.
26) Fundamentals of OLE.
27) Work with data warehouse (HD).
28) Managing MO in SQL.
29) Installing and using new components.
30) Fundamentals of working with digital images.

The Republic of Uzbekistan
Ministry of Higher and Secondary Specialized Education

Namangan Civil Engineering Institute

Department of Information Systems and Technologies

From the topic "Object-Oriented Programming Languages".

TEST SET

2022 departments
"_____" in _____
Decision No. 1
approved
head of department
Assoc.S.Komilov

Ready: Assoc. O. Jakbarov

Namangan 2022

VERIFICATION QUESTIONS

What is the function of the Animate component?	*Allows you to display simple moving images (for example, display images when the user copies a file);	allows you to solve more complex tasks, for example, produces sound-moving images, such as video and multifilm.	Creates still images	Correct answer not specified
One of the properties of the Animate component is FileName.peculiaritywhich line has the correct function?	The name of the component. Used to access and manipulate the properties of a component.	*Name of the AVI file containing the motion picture displayed by the component	Frame number where the image should start	Frame number on which the image should end
One of the properties of the Animate component is StartFrame.peculiaritywhich line has the correct function?	The name of the component. Used to access and manipulate the properties of a component.	The name of the AVI file containing the animation rendered by the component	*Frame number from which the image should start	Frame number on which the image should end
One of the properties of the Animate component is StopFrame.peculiaritywhich line has the correct function?	The name of the component. Used to access and manipulate the properties of a component.	The name of the AVI file containing the animation rendered by the component	Frame number where the image should start	*Frame number on which the image should be completed
Copy function….	returns the length of the string. This function has one parameter, which is a string type expression. Its value (an integer) represents the number of characters in the string.	part of the line can be removed.	determines the position of a part of a string within a string.	* allows you to copy part of a string.
Gremoval procedure….	returns the length of the string. This function has one parameter, which is a string type expression. Its value (an integer) represents the number of characters in the string.	* part of the line can be removed.	determines the position of a part of a string within a string.	allows you to copy part of a string.

Delphiwhich line correctly displays the character types used in the programming language.	shortint, smalint, Longint, Int64, Byte, word, and Longword. Delphi also has a generic Integer type that is equivalent to a Longint.	Real48, single, double, extended, comp, currency. Delphi also has a generic Real type that is equivalent to Double.	* Ansichar and Videchar. Delphi also has a generic Char equivalent to Ansichar.	short string, long string, wide string. Delphi also has a generic string type equivalent to a short string.
DelphiWhich line correctly specifies the Boolean type used in the programming language?	shortint, smalint, Longint, Int64, Byte, word, and Longword. Delphi also has a generic Integer type that is equivalent to a Longint.	Real48, single, double, extended, comp, currency. Delphi also has a generic Real type that is equivalent to Double.	Ansichar and Videchar. Delphi also has a generic Char equivalent to Ansichar.	* boolean value.
DelphiString types used in a programming language are displayed correctly on which line.	shortint, smalint, Longint, Int64, Byte, word, and Longword. Delphi also has a generic Integer type that is equivalent to a Longint.	Real48, single, double, extended, comp, currency. Delphi also has a generic Real type that is equivalent to Double.	Ansichar and Videchar. Delphi also has a generic Char equivalent to Ansichar.	* short string, long string, wide string. Delphi also has a generic string type equivalent to a short string.
Delphiwhich line correctly shows the true types used in the programming language.	shortint, smalint, Longint, Int64, Byte, word, and Longword. Delphi also has a generic Integer type that is equivalent to a Longint.	*Real48, single, double, extended, comp, currency. Delphi also has a generic Real type that is equivalent to Double.	Ansichar and Videchar. Delphi also has a generic Char equivalent to Ansichar.	short string, long string, wide string. Delphi also has a generic string type equivalent to a short string.
Delphiin which row the windows of the working environment are fully and correctly displayed.	form, code environment	Main window, object inspector window	Object TreeView, main window, object inspector window	*Main window, object inspector window, object tree, form, code environment
DelphiHow many types does the language work with?	one	3	*5	four
How many types of repetition operators are there in Delphi?	one	2	*3	four

When installing Delphi, all Delphi components are copied to the hard disk in the installation option .... Installing this option requires a lot of disk space.	**Compact**(Low chance)	***Typical**(ordinary)	**Custom**(choose, user defined)	There is no correct answer
DelphiWhich line correctly represents the integer types used in the programming language?	*shortint, smalint, Longint, Int64, Byte, Word, and Longword. Delphi also has a generic Integer type that is equivalent to a Longint.	Real48, single, double, extended, comp, currency. Delphi also has a generic Real type that is equivalent to Double.	Ansichar and Videchar. Delphi also has a generic Char equivalent to Ansichar.	short string, long string, wide string. Delphi also has a generic string type equivalent to a short string.
How many different part program views are there in Delphi?	one	*2	3	four
Which line correctly displays the InputBox function overview?	InputBox (title, help, value)	* Variable: = InputBox(title, help, value)	InputBox (name, info)	Variable:=InputBox(helper, value, title)
Show a function to convert an integer K to a string type.	StrToFloat(k)	*IntToStr(k)	FloatToStr(k)	StrToInt(k)
Show a function to convert the string type k to an integer type.	StrToFloat(k)	IntToStr(k)	FloatToStr(k)	*StrToInt(k)
Show a function to convert a real number K to a string type.	StrToFloat(k)	IntToStr(k)	*FloatToStr(k)	StrToInt(k)
What is the function of the Label component?	* Annotation feature for objects	Text input task	Used for drawing	Button function
Length function....	*returns the length of the string. This function has one parameter, which is a string type expression. Its value (an integer) represents the number of characters in the string.	part of the line can be removed.	determines the position of a part of a string within a string.	allows you to copy part of a string
What is the function of the MediaPlayer component?	Allows you to display simple moving images	*allows you to perform more complex tasks, such	Creates still images	Correct answer not specified

	(for example, display images when the user copies a file);	as displaying moving images with sound, such as videos and multi-movies.		
Overview of calling the MessageDlg functionwhich line is displayed correctly.	MessageDlg(message, type, buttons, help info)	MessageDlg(message, type, buttons)	*select: qMessageDlg(message, type, buttons, help info)	select q MessageDlg(message, type, helper, buttons)
Show a function that generates an integer by discarding the fractional part of N.	round (noun)	*Trunk (n.)	fraction (n)	Xp(n)
Show a function that discards the integer part of n to get a fractional number.	round (noun)	trunk (n.)	*Fraction(n)	Xp(n)
Show the function of rounding n to an integer.	*Round (n.)	trunk (n.)	fraction (n)	Xp(n)
Object Inspector window...	* is intended for editing object property values.	— the main window of the created application.	this is the window in which the text of the program is written.	allows you to get all the information about programming.
Pos function….	returns the length of the string. This function has one parameter, which is a string type expression. Its value (an integer) represents the number of characters in the string.	part of the line can be removed.	*defines the location of a part of a string within a string.	allows you to copy part of a string.
C Show function to convert string type to actual type	*StrToFloat(s)	IntToStr(s)	floatToStr(s)	StrToInt (c)
Using the ShowMessage procedure in generalwhich line is displayed correctly.	*ShowMessage(message)	Variable := ShowMessage(message)	ShowMessage:='message'	A and B are the answers
The ColCount function, which is one of the properties of the StringGrid component, is to show which string is the correct one..	*Number of table columns	Number of rows in the table	The specified number of columns on the left side of the table. Selected columns are highlighted in a	The specified number of columns at the top of the table. Selected columns

			separate color and do not change their position when cells are moved horizontally.	are highlighted in a separate color and do not change their position when cells are moved vertically.
The FixedCols function, one of the properties of the StringGrid component, determines which row is displayed correctly..	Number of table columns	Number of rows in the table	*Number of specified columns on the left side of the table. Selected columns are highlighted in a separate color and do not change their position when cells are moved horizontally.	The specified number of columns at the top of the table. Selected columns are highlighted in a separate color and do not change their position when cells are moved vertically.
One of the properties of the StringGrid component is the FixedRows function, which row is displayed correctly.	Number of table columns	Number of rows in the table	The specified number of columns on the left side of the table. Selected columns are highlighted in a separate color and do not change their position when cells are moved horizontally.	*Number of specified columns at the top of the table. Selected columns are highlighted in a separate color and do not change their position when cells are moved vertically.
The function of RowCount, one of the properties of the StringGrid component, is to determine which row is displayed correctly..	Number of table columns	*Number of table rows	The specified number of columns on the left side of the table. Selected columns are highlighted in a separate color and do not change their position when cells are moved horizontally.	The specified number of columns at the top of the table. Selected columns are highlighted in a separate color and do not change their position when cells are moved vertically.
One of the properties of the Timer component is enabled.peculiaritywhich line has the correct function?	* Work permit. OnTimer enables (True) or disables (False) the execution of the event.	The interval for repeating the OnTimer event. Specified in milliseconds.	Frame number where the image should start	Frame number on which the image should end

One of the properties of the Timer componentinterval propertywhich line has the correct function?	Work permit. OnTimer enables (True) or disables (False) the execution of the event.	*Interval of repetition of the OnTimer event. given in milliseconds.	Frame number where the image should start	Frame number on which the image should end
Which line correctly shows one of the values of the tpen (pen) property, the Color function?	*Line color	Line thickness	line view	Imaging mode
Which line correctly shows one of the values of the tpen(pen) Mode's function property?	Line color	Line thickness	line view	*Picture mode
Which line correctly specifies one of the tpen (pen) property values, the Style function?	Line color	Line thickness	*Linear view	Imaging mode
Which line correctly describes the Width function, one of the values of the tpen property?	Line color	*Line thickness	line view	Imaging mode
General working form (Form1) ...	is intended for editing object property values.	* — the main window of the application being created.	this is the window in which the text of the program is written.	allows you to get all the information about programming.
It is a library of procedures and functions organized by function in a separate file format.	**P**rottsedura	Function	Ouchsound	* Module
It is a named information structure and all information elements are of the same type. The number of elements in it is practically unlimited.	*File	Module	Lots of	Ouchsound
In this menu you can open a new project, forms and save them. Close the project opened with it,DelphiThere are options for exiting and working with similar files.	Edit	View	* Fillet	run

it's on the menuDelphithe appearance of the working environment can be changed.	Edit	*View	File	run
There are various ways to start the program in this menu.	Edit	View	File	* Rune
In this menu, it is possible to edit codes, perform various actions on the surface of codes as a whole.	*Edit	View	File	run
In this menu you can create a database.	Edit	View	File	*Database
This installation option allows the developer to select the required hardware and components. This installation option is usually used by skilled programmers. In addition, this option can be used in cases where there is not enough space on the computer.	**Compact**(Low chance)	**Typical**(ordinary)	***Custom**(choose, user defined)	There is no correct answer
In this installation option, only the core Delphi components are copied. This option takes up very little disk space. But some Delphi functions cannot be used. Bazan does not copy help systems, some components, utilities, and examples to disk.	***Compact**(Low chance)	**Typical**(ordinary)	**Custom**(choose, user defined)	There is no correct answer
This property determines which window controls the user has access to when using the application. The property value is determined by loading the biSystemMenu, biMinimaze, biMaximaze, and biHelp properties.	Name	Signature	Font	*Border badges

This property is the name of the form. In a program, the form name is used to control the form and refer to its components.	*Name	Signature	BorderStyle	Bordercons
This feature is a kind of border. The border can be variable (bsSizeable), fixed (bsSingle), or borderless (bsNone).	Name	Signature	* border style	Font
Clicking on a command key in a Windows environment…. called	*event	speciality	button press	process
In which window will the command menu, toolbar, and component palette be located?	*In the main window	In the object inspector window	In the code editing window	In the object tree window
Which line correctly shows an overview of using the arc-shaped rectangle drawing style?	Ob`one.Canvas.Ellipse(x1,y1,x2,u2)	Object.Canvas.Arc(x1,y1,x2,y2,x3,y3,x4,y4)	Obsingle.Canvas.Rectangle(x1, y1,x2, y2)	*Obsingle.Canvas.RoundRec(x1,y1,x2, y2,x3,y3)
The TextOut method is used to create text on the surface of graphics objects. An overview of the call to the TextOut method is shown correctly on which line?	*Obsingle.Canvas.TextOut(x,y,text)	Ob`ekt.Canvas.TextOut(text)	Ob`onet.TextOut(x,y,text)	Ob`onet.Canvas.Text(x;y;text)
What procedure is used to switch to graphics mode?	*Canvas	Schedule	discover	Screen
To get information about a function or operator as you type...	*in the code editing window, enter the desired procedure, function or operator and press the <F1> key on this word.	<F2> must be pressed	ctrl+<F1> must be pressed.	Alt+<F1> must be pressed
How many groups of errors can exist in a program?	one	2	*3	four
An overview of using the arc drawing style shows which line is correct?	Ob`one.Canvas.Ellipse(x1,y1,x2,y2)	*Object.Canvas.Arc(x1,y1,x2,y2,x3,y3,x4,y4)	Obsingle.Canvas.Rectangle(x1, y1,x2, y2)	Obsingle.Canvas.RoundRec(x1,y1,x2, y2,x3,y3)

A word that does not fit on the current line is automatically moved to the next line.	left	upper	Height	*Word wrap
Code editing window….	intended for editing object property values	— the main window of the created application.	*window in which the text of the program is written.	allows you to get all the information about programming.
The font of the form in which the component is placed. If the property value is True, it will take on the properties of the font set on the form.	* Parent font	Signature	BorderStyle	Bordercons
Distance from the left border of the component to the left border of the form	* lieutenant	upper	Height	Width
The distance from the top of the component to the top of the form.	left	*Upper	Height	Width
What procedure is used to add new data to an existing file?	write or write	*Add(s)	Rewrite (e)	close (e)
Which line is the correct definition of an array?	* is an ordered set of variables that belong to the same type and have a common name	is an ordered set of variables belonging to several types and having a common name	is an ordered set of variables with multiple names belonging to the same type.	is an unordered set of variables belonging to the same type and having a common name.
Which line gives an invalid example of an array declaration?.	character: array[1..31] of real values;	coefficient: array[0. .2] an integer;	name: array[1..30] strings[25];	*command:= array[1..NT] of string[SN];
The text file declaration is displayed correctly on which line?	Name=TextFile;	*Name: Text file;	Name:=Text file;	Name; Text file;
The function of the DBNavigator component used to organize a database is... 	database activation;	connection of the activated database with other objects (for example, DBEdit);	form a database in the form of a table;	*used to edit the database.
The function of the DBGrid component, which is used to organize a database, is to... 	database activation;	connection of the activated database with other	* the formation of a database in the form of a table;	used to edit the database.

		objects (for example, DBEdit);		
The function of the DataSource component used to organize the data warehouse is to... 	database activation;	*link the activated database with other objects (for example, DBEdit);	form a database in the form of a table;	used to edit the database.
The task of the Table component used to organize a database is to... 	* database activation;	connection of the activated database with other objects (for example, DBEdit);	form a database in the form of a table;	used to edit the database.
What command is used to directly write data to a text file?	* Write or write	Assign file	Rewrite (e)	close (e)
Animation means...	*usually refers to moving and changing images.	usually refers to still images	understand simple images and pictures.	All answers are correct
What procedure is used to close open files?	write or write	add(e)	Rewrite (e)	*Close(s)
Which answer correctly specifies the project file extension?	*.dpr	.dcu	.pass	.hour
Which line correctly shows an overview of the procedure reference command.	Name (parameter list): type;	*Name(list of parameters);	Name := (parameter list);	Name:(parameter list:type);
The mouseover event is called...	On Click	Ondblclick	OnMouseDown	* When moving the mouse
The mouse button release event is called...	On Click	Ondblclick	OnMouseDown	*OnMouseUp
The mouse click event is called...	*On click	Ondblclick	OnMouseDown	OnMouseUp
A quick double-click of the mouse button is called...	On Click	*Ondblclick	OnMouseDown	OnMouseUp
Repeat statement headerswhich line is displayed correctly.	Go repeat	For now, if	If a	*bye, repeat

An overview of the use of the rectangle drawing style is shown in which line is the correct one.?	Ob`one.Canvas.Ellipse(x1,y1,x2,y2)	Object.Canvas.Arc(x1,y1,x2,y2,x3,y3,x4,y4)	*Ob`one.Canvas.Rectangle(x1, y1, x2, y2)	Obsingle.Canvas.RoundRec(x1,y1,x2,y2,x3,y3)
In general, the file declaration in which line is displayed correctly?	Name:=element type file;	Name; element type file;	*Name: item type file;	Name = element type file;
Read from fileperwhat is the procedure?	reset(e)	* Read, read	Rewrite (e)	close (e)
When opening files for readingwhat is the procedure?	*Reset(s)	add(e)	Rewrite (e)	close (e)
Which line correctly shows the function reference overview?	Variable: function (parameters) ;	variable: unction (parameters) ;	*variable:=Function (Parameters) ;	Function (parameters)
Which line correctly shows the difference between a function and a procedure?	*****The resulting value depends on the function name. Therefore, a function can be used as an operand of an expression, for example, in an assignment operator.	The function name and its resulting value are different.	**Function**Declaration is easier than procedure	All answers are correct
A procedure that displays an image at a specified location on a screen is called...	* Place an image	GetImage	Line	Image size
An overview of using the ellipse or circle sector drawing style is shown in which line is correct.?	Ob`one.Canvas.Ellipse(x1,y1,x2,y2)	*Object.Canvas.Pie(x1,y1,x2,y2,x3,y3,x4,y4)	Obsingle.Canvas.Rectangle(x1, y1,x2, y2)	Obsingle.Canvas.RoundRec(x1,y1,x2,y2,x3,y3)
An overview of using the "Ellipse" or "Circle" drawing style is shown in which line is the correct one.?	*Ob`one.Canvas.Ellipse(x1,y1,x2,y2)	Object.Canvas.Arc(x1,y1,x2,y2,x3,y3,x4,y4)	Obsingle.Canvas.Rectangle(x1, y1,x2, y2)	Obsingle.Canvas.RoundRec(x1,y1,x2,y2,x3,y3)
What procedure is used to create a new file or replace an existing file with a new one?	write or write	add(e)	* Rewrite (f)	close (e)
What is the official word for probationers?	*There is	Type of	Label	Constant

In which answer is the general view of variable declaration correct?	*<variable declaration>::=<variable name>:<type>;	<variable declaration>:=<variable name>:<constant>;	<variable declaration>:=<variable name>:<type>;	<variable declaration>=<constant name>:<constant>;
Which answer correctly declares a two-dimensional array?	a:array[1..5;1..10]: real;	a:array[1..5..1..10] of integers;	a:array[1..10;1..5] characters;	*a: array[1..5,1..5] of real numbers;
Which answer correctly declares variables?	*S1, A_1: real; S2,S:String[20];	C1; A@1 : real; S2;S:String[20];	S1, A_1, Real: S2, S, String[20];	S1 A_1: real; S2 S:String[20];

****
Specify integer type variables.

1#) char, longint, cardinal number, byte.
2#) integer, long integer, string, byte.
3@) integer, long, cardinal, byte.
4#) integer, long, cardinal, real.

****
Specify variables of type real.

1@) real, double, extended, single.
2#) real, double, extended, integer.
3#) real, double, string, single.
4#) real, long, extended, single.

****
Show variables of string type.

1#) String, SortString, LongSting, extended.
2#) String, SortString, LongSting, Char.
3#) Line, single line, long line, wide line.
4@) String, Sort, Long String, Wide String.

****
How are variables declared?

1@) available
2#) constant
3#) start
4#) label

****
Are arrays declared with a keyword?

1#) variable
2#) constant
3@) array
4#) label

****

Show the jump operator.

1#) to
2@) go
3#) down
4#) do

****
What is the official name of the signs?

1#) Var
2#) Constant
3@) Label
4#) Usage

****
Specify a conditional (branching) operator.

1@) if S, then S1, otherwise S2;
2#) for k:= from k1 to k2 execute S;
3#) for k: = k2 to k1 do S;
4#) repeat S1; C2; ... CH to B;

****
Show iterative (looping) statement.

1#) if S, then S1, otherwise S2;
2@) for k:= k1 to k2 make S;
3#) case <selector> of <options> end;

****
*Length (s)*What does the function do?

1@) indicates the number of characters in a C string variable.
2#) Copy to C string variable.
3#) Remove the C string variable.

****
*Copy(S, Index, Counter)*What does the function do?

1#) Copy the index character starting from the Count character in the C string variable.
2@) Copy the Count characters from the Index character to the string variable S.
3#) Copy from the Index character to the Count character in the string variable S.
4#) There is no correct answer.

****
*IntToStr(N)*What does the function do?

1#) Converts a string type variable to an integer type variable.
2#) Converts a character type variable to a string type variable.
3#) Converts a variable of type real to a variable of type string.
4@) Converts an integer variable to a string variable.

****
*StrToInt(N)*What does the function do?

1@) Converts a string type variable to an integer type variable.
2#) Converts a character type variable to an integer type variable.
3#) Converts a real type variable to an integer type variable.
4#) Converts a variable of type string to a variable of type real.

****

*FloatToStr(N)*What does the function do?

1#) Converts a string type variable to an integer type variable.
2#) Converts a character type variable to a string type variable.
3@) Converts a variable of type real to a variable of type string.
4#) Converts an integer type variable to a string type variable.

*****
What is the output of the following program fragment:

```
a:=5;
b:=4;
Label1.Caption:=FloatToStr(Sqrt(a+b));
```

1@) 3
2#) 4
3#) 5
4#) 9
5#) 81

****
What is the result when the block is executed in the following program:

```
C:=0;
For i:= from 1 to 5 do
S:=S+i;
Label1.Caption:=IntToStr(S);
```

fifteen
twenty
3@) 15
4#) 10

****
Here is what the output would look like in the following program:

```
C:=0;
i:=0;
While I <5 do
Start off
S:=S+i;
i:=i+1;
End;
Label1.Caption:=IntToStr(S);
```

1#) 15
twenty
3@) 10
4#) 5

****

Here is the output of the following program fragment:

```
B:='Tashkent';
Label1.caption:=IntToStr(Length(S));
```

1@) 8
2#) 7
3#) Tashkent
4#) Stone

****
Here is the output of the following program fragment:

```
B:='Tashkent';
S:=Copy(S,1,4);
Label1.caption:=S;
```

eighteen
2#) 7
3#) kent
4@) Stone

****
Here is the output of the following program fragment:

```
B:='Tashkent';
k:=Pos('s', S);
Label1.caption:=IntToStr(k);
```

1@) 3
2#) 4
3#) p
4#) Stone

****
*Object.Canvas.Rectangle(x1,y1,x2,y2)*What graph does the - function draw?

1#) Generates text.
2@) Draws a rectangle.
3#) Draws a straight line.
4#) Draws an ellipse.
5#) Draws an arc.

****
Object.Canvas.TextOut(x,y,text);- what is the graph of the function painting a picture?

1#) Draws a circle.
2#) Draws a rectangle.
3#) Draws a straight line.
4@) Generates text.

5#) Draws an arc.

****

*Object.Canvas.LineTo(x,y)*What graph does the - function draw?

1#) Outputs text.
2#) Draws a rectangle.
3@) Draws a straight line.
4#) Draws an ellipse.
5#) Draws an arc.

****

*Object.Canvas.Ellipse(x1,y1,x2,y2)*What graph does the - function draw?

1@) Draws a circle or ellipse.
2#) Draws a rectangle.
3#) Draws a straight line.
4#) Draws an arc.
5#) Draws a sector.

****

*Object.Canvas.Arc(x1,y1,x2,y2,x3,y3,x4,y4)*What graph does the - function draw?

1#) Draws a circle or ellipse.
2#) Draws a rectangle.
3#) Draws a straight line.
4@) Draws an arc.
5#) Draws a sector.

****

*Object.Canvas.Pie(x1,y1,x2,y2,x3,y3,x4,y4)*What graph does the - function draw?

1#) Draws a circle or ellipse.
2#) Draws a rectangle.
3#) Draws a straight line.
4#) Draws an arc.
5@) Draws a sector.

****

What graphic image appears on the screen when the following program fragment is executed?

```
image1.Canvas.Pen.Color:=clBlue;
image1.Canvas.Brush.Color:=clRed;
image1.Canvas.Rectangle(10,10,50,50);
```

1@)

2#)

3#)

four#)

****

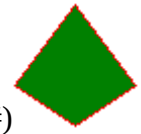
What graph does the following procedure give?

```
procedure TForm1.BitBtn1Click(Sender: TObject);
there is
floor: array [1..3] TPoint;
Start off
Gender[1].x:=10;
Gender[1].y:=50;
Gender[2].x:=40;
Gender[2].y:=10;
Gender[3].x:=70;
Gender[3].y:=50;
Image1.Canvas.Pen.Color:=clRed;
Image1.Canvas.Brush.Color:=clGreen;
Image1.Canvas.Polygon(floor);
the end
```

one#) 

2@) 

3#) 

four#) 

****

What does the following program fragment do?

```
if OpenDialog1.Execute then
RichEdit1.Lines.LoadFromFile(OpenDialog1.FileName);
```

1#) The information in the RichEdit window is saved to a file.
2#) The RichEdit window is cleared.
3@) The data of the selected file is loaded into the RichEdit window.

****

What does the following program fragment do?

```
if OpenPictureDialog1.Execute then
Image1.Picture.LoadFromFile(OpenPictureDialog1.FileName);
```

1#) The image in the Image component is saved to a file.
2#) The image in the Image component is cleared.
3@) The selected image is loaded into the Image component.

THE REPUBLIC OF UZBEKISTAN

MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION

NAMANGAN ENGINEERING - CONSTRUCTION INSTITUTE

Department of Information Systems and Technologies

"Object-Oriented Programming Languages"

in science

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Namangan 2022

Handouts and presentation materials

Dastur va dasturlash tillari

Ma'lumki, kompyuter texnikasidan samarali foydalanish ikki qism – texnik va dasturiy ta'minotning uzviyligini talab etadi. Bu uzviylik kompyuter texnik ta'minotining jadal sur'atlar bilan takomillashib borishiga mos dasturiy ta'minotni ham keskin sur'atlar bilan rivojlanishiga sabab bo'ladi, va aksincha. Buning sababi ma'lum, mos dasturiy ta'minotsiz har qanday kompyuter «qimmatbaho o'yinchoq» bo'lib qolaveradi.

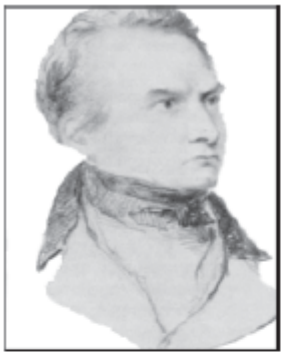
Ma'lumki, kompyuterda biror masalani hal qilish uchun avval uning qandaydir nusxasi olinadi va algoritmi tuziladi, so'ng mazkur algoritm ma'lum bir qonun-qoidalar asosida kompyuter tushunadigan ko'rsatma va buyruqlar shaklida yoziladi. Hosil bo'lgan matn kompyuter tilida yozilgach, **dastur** deb ataladi. Demak, **dastur** – biror masalani yechish uchun kompyuter bajarishi mumkin bo'lgan ko'rsatmalarning izchil tartibi ekan.

Kompyuter uchun dastur tuzish jarayoni **dasturlash** va dastur tuzadigan kishi **dasturchi** deyiladi. Kompyuter tushunadigan «til» esa **dasturlash tili** deb ataladi.

Dasturlash tillarini shartli ravishda quyidagi uch guruhga ajratish mumkin:

Dasturlash tillari tarixidan. Dasturlash tillari, asosan, ikkinchi jahon urushidan keyin yaratila boshlandi. Ammo uning boshlanish tarixi ancha olis yillarga borib taqaladi.

Arxeologik qazilmalarda topilgan sopol taxtachada bundan 3800 yil oldin (eramizdan avvalgi 1800 yillar) Bobilda foiz bilan bog'liq murakkab amallar algoritmi keltirilgan. Unda aniq masala ishlangan bo'lib, agar bug'doy hosili yiliga 20% dan oshib borsa, uning miqdori ikki marta o'sishi uchun necha yil va oy kerak bo'lish algoritmi tuzilgan.



Charlz Bebbij

XIX asr fransuz kashfiyotchisi **Jozef Mari Jakkard** 1804 yilda yupqa mato ishlab chiqish jarayonida to‘quv dastgohlari uchun perfokartani eslatuvchi tasma ishlatgan va shu bilan perfokartaga asos solgan edi.

1836 yilda ingliz olimi **Charlz Bebbij** hozirgi kompyuterlarning bevosita ajdodi bo‘lmish analitik mashina ishlab chiqishga kirishdi va bu masalani nazariy hal qildi. Bu mashinaning asosiy xususiyati uning dastur asosida ishlashi va hisob-kitob natijalarini «eslab» qolishida edi.

1843 yilda ingliz matematigi Ogasta **Ada Bayron** (Lavleys) – shoir lord Bayronning qizi analitik mashina buyruqlar asosida ishlashi lozimligini ta’kidladi. U berilgan shartlar bajarilmagunga qadar qadamlar ketma-ketligini ta’minlovchi buyruqlarni yozdi. Ana shu holat bilan u dasturlash tiliga asos soldi. Mazkur va boshqa kashfiyotlar kompyuter yaratilgach, ularni ishlatish uchun zarur bo‘lgan til yaratilishini talab etdi.

Ada Bayron

Quyi darajadagi dasturlash tillari kompyuter qurilmalari bilan bevosita bog‘liq bo‘lib, buyruqlar maxsus raqamlar (kodlar) yordamida yoziladi. Bu kabi buyruqlardan tashkil topgan dasturlar katta hajmli bo‘lib, ularni tahrir qilish ancha mushkul ish hisoblanadi. Dastlabki elektron hisoblash mashinalarida («ENIAK», «MESM» va boshqalar) masalalarni yechish uchun ana shunday buyruqlar yordamida dasturlar tuzilgan.

Misol tariqasida M-20 rusumidagi elektron hisoblash mashinasida qo‘llanilgan tilda tuzilgan dasturni (dastur doira yuzini hisoblash amallarini o‘z ichiga olgan) izoh bilan keltiramiz:

Buyruqning kodi	Buyruqqa izoh
01 022	R radiusning qiymati jamlagichga yuboriladi
20 000	Jamlagichdagi qiymat (R)ni bosmaga chiqarish
05 022	Jamlagichdagi R ning qiymati o‘z-o‘ziga ko‘paytiriladi va natija yana jamlagichga yoziladi
05 020	020—021-yacheykalardagi π soniga jamlagichdagi qiymat (R^2) ko‘paytiriladi
20 000	Olingan natija, ya’ni doira yuzasining qiymati bosmaga chiqariladi
045 00 000	Tamom (Stop)

Yuqori darajali dasturlash tillaridagi ko‘rsatmalar **inson tiliga** yaqin bo‘lgan so‘zlar majmuidan iborat. Ular yordamida amallarni bajarish quyi darajadagilaridan ko‘ra yengil bo‘lib, biror maxsus ko‘rsatma bo‘lmasa, dasturchidan adreslar, qurilmalar bilan bevosita bog‘liq axborotlarni bilish talab etilmaydi. Bu tilda tuzilgan dasturlarni **translyatorlar** deb nomlanuvchi maxsus dasturlar kompyuterlar bajara olishi uchun raqamli ko‘rinishga o‘tkazib beradi.

Keyingi yillarda juda ko‘p yuqori darajadagi dasturlash tillari yaratilgan bo‘lib, ular qatoriga **Paskal**, **dBase**, **Ada**, **KARAT**, **C++**, **Delphi**, **Visual Basic** va boshqa tillarni qo‘shish mumkin. Hozirgi kunda yaratilayotgan dasturlash tillari biror yo‘nalishdagi masalalarni hal qilishga mo‘ljallangandir.

Quyidagi jadvalda dasturlash tili rivojlanishi tarixidan qisqacha ma’lumot berilgan.

Dasturlash tili	**Yaratilgan yili**
Plankalkyul	1946
Qisqa kod	1949
Assembler «Edsak»	1950
AO	1950
Avtokod «Madlen»	1953
Tezkor kodlash	1955
A-2, Flou-metik	1956
IPL-1, Mat-metik	1957
Fortran	1958
Algol 58	1959
APT, LISP, Kobol, Algol-60	1960

Dasturlash tili	**Yaratilgan yili**
PL/1, Beysik	1964
Algol W	1965
Logo	1967
Algol 68	1968
APL	1969
Paskal	1970
Fort	1971
Prolog, Si	1972
Ada	1972
Smalltalk	1980

Ijrochilar va dasturlash tillari

Avvalgi boblarda turli ijrochilar bilan tanishdik va algoritmlar tuzdik. Endi ba‘zi dasturlash tillarida nomlar, ko‘rsatmalar, tuzilmalar va boshqalar qanday bo‘lishini ko‘rib chiqamiz. Biz ko‘rmoqchi bo‘lgan dasturlash tillarida o‘xshashliklar ko‘p. Masalan, ularning alifbosi quyidagi asosiy qismlardan iborat:

Lotin alifbosining 26 ta harfi: Aa, Bb, Cc, Dd, Ee, Ff, Gg, Hh, Ii, Jj, Kk, Ll, Mm, Nn, Oo, Pp, Qq, Rr, Ss, Tt, Uu, Vv, Ww, Xx, Yy, Zz ;

O‘nta arab raqami: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 ;

Arifmetik amal belgilari: + *(qo‘shish),* − *(ayirish),* * *(ko‘paytirish), / (bo‘lish);*

Munosabat belgilari: *=(teng), <>(teng emas), <(kichik), <=(katta emas), >(katta), >=(kichik emas);*

Maxsus belgilar: *. (nuqta), , (vergul), ; (nuqtali vergul), ‘ (apostrof), « (qo‘shtirnoq), ! (undov), ? (so‘roq), % (foiz), $ (dollar belgisi), @ (tijorat belgisi), & (ampersand), (bo‘shliq, ekranda tasvirlanmaydi), (,), {, }, [,] (turli qavslar);*

Mantiqiy amallar:

AND («VA» − mantiqiy ko‘paytirish amali),
OR («YOKI» − mantiqiy qo‘shish amali),
NOT («EMAS» − mantiqiy inkor amali).

Yodingizda bo‘lsa, nom va qiymati o‘zgaradigan miqdorlar haqida aytib o‘tgan edik. Yana dasturlash tillarida quyidagilar qo‘llaniladi:

Konstantalar (o‘zgarmaslar) − dastur ishlashi davomida qiymati o‘zgarmaydigan miqdorlar;

O‘zgaruvchilar − dastur ishlashi davomida qiymati o‘zgaradigan miqdorlar;

Algebraik ifodalar − arifmetik amallar bilan bog‘langan o‘zgarmaslar, o‘zgaruvchilar va funksiyalar;

Operatorlar − dasturlash tilining biror tugallangan amalini berish uchun mo‘ljallangan buyrug‘i, operatorlar BASIC da «:» bilan, PASCAL va DELPHI da «;» bilan ajratiladi;

Funksiya va protseduralar − o‘z nomiga ega bo‘lgan alohida dastur qismlari (bloklari). Ularga asosiy dasturdan murojaat etiladi;

Quyidagi jadvallarda butun sonli o‘zgaruvchilarni tavsiflash uchun maxsus so‘zlar, ularga mos qiymatlar chegarasi va egallaydigan xotira hajmi keltirilgan:

PASCAL da	Qiymatlar chegarasi	Egallaydigan xotira hajmi
Shortint	-128 ... 127	8 bit
Integer	-32768 ... 32767	16 bit
Longint	-2147483648 .. 2147483647	32 bit
Byte	0... 255	8 bit
Word	0... 65535	16 bit

DELPHI da	Qiymatlar chegarasi	Egallaydigan xotira hajmi
Shortint	-128 ... 127	8 bit
Smallint	-32768 ... 32767	16 bit
Integer	-2147483648 ... 2147483647	16 bit
Longint	-2147483648 ... 2147483647	32 bit
Int64	-9223372036854775808 ... 9223372036854775807	64 bit
Byte	0... 255	8 bit
Word	0... 65535	16 bit
Longword	0...4294967295	32 bit

PASCAL va DELPHI: haqiqiy sonli qiymatlar qabul qiladigan o‘zgaruvchilar **haqiqiy sonli o‘zgaruvchilar** deyiladi. Ularning turlari quyidagi jadvalda keltirilgan:

PASCAL da	Qiymatlar chegarasi	Razryadi	Egallaydigan xotira hajmi
Real	$-2{,}9\cdot10^{39}$ ... $1{,}7\cdot10^{38}$	11-12	6 bayt
Single	$-1{,}5\cdot10^{45}$ ... $3{,}4\cdot10^{38}$	7-8	4 bayt
Double	$-5{,}0\cdot10^{324}$ ... $1{,}7\cdot10^{308}$	15-16	8 bayt
Extended	$-3{,}4\cdot10^{4932}$ ... $1{,}1\cdot10^{4932}$	19-20	10bayt
Comp	$-9{,}2\cdot10^{18}$ ... $9{,}2\cdot10^{18}$	19-20	8 bayt

DELPHI da	Qiymatlar chegarasi	Razryadi	Egallaydigan xotira hajmi
Real48	$-2{,}9\cdot10^{39}$...$1{,}7\cdot10^{38}$	11-12	6 bayt
Single	$-1{,}5\cdot10^{45}$ ... $3{,}4\cdot10^{38}$	7-8	4 bayt
Real	$-5{,}0\cdot103^{24}$ ... $1{,}7\cdot10^{308}$	15-16	8 bayt
Double	$-5{,}0\cdot10^{324}$ ... $1{,}7\cdot10^{308}$	15-16	8 bayt
Extended	$-3{,}6\cdot10^{4951}$ ... $1{,}1\cdot10^{4932}$	19-20	10bayt
Comp	$-9{,}2\cdot10^{18}$ ... $9{,}2\cdot10^{18}$	19-20	8 bayt
Currency	-922337203685477.5808 ... 922337203685477.5807	19-20	8 bayt

Quyida ba‘zi standart funksiyalarni keltiramiz:

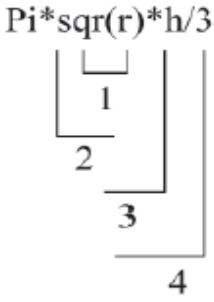
PASCAL va DELPHI	Izoh	BASIC
abs(x)	«x» ning absolut qiymati (moduli) - $\|x\|$	abs(x)
sin(x)	«x» ning sinusi (radian o‘.b.) -sinx	sin(x)
cos(x)	«x» ning kosinusi (radian o‘.b.) -cosx	cos(x)
sqrt(x)	«x» ning kvadrat ildizi -$\sqrt{x}$	sqr(x)
sqr(x)	«x» ning kvadrati - x^2	x^2
exp(x)	e^x (e= 2. 718282. . .)	exp(x)
round(x)	«x» ning yaxlitlangan butun qismi [x]	int(x)
trunc(x)	«x» ning yaxlitlanmagan butun qismi	fix(x)

Example.

R va H o‘zgaruvchilarning ma’lum qiymatlarida quyidagi ifodaning qiymati hisoblansin:

$$\frac{1}{3}\pi R^2 H$$

Bu ifoda **Pi*sqr(r)*h/3** kabi yoziladi. Bunda amallar quyidagi tartibda bajariladi:



1. **sqr(r)**
2. **Pi*sqr(r)**
3. **Pi*sqr(r)*h**
4. **Pi*sqr(r)*h/3**

Shuni eslatib o‘tish lozimki, ikkita amal ketma-ket kelganda ifodani qavssiz yozish mumkin emas. Masalan, $\sqrt{a^2 - b^2}$ ifodani **sqrt(sqr(a) − sqr(b))** kabi, |x + tgx| ifoda **abs(x + tan(x))** ko‘rinishida yoziladi.

Ba’zi hollarda dasturlash tilida yozilgan ifodani odatdagi matematik ko‘rinishda yozish talab etiladi. Masalan, **0.5*(sin(x)+ cos(x))** dasturlash tilida yozilgan ifoda matematik ko‘rinishda quyidagicha ifodalanadi:

$$\frac{1}{3}(\sin x + \cos x).$$

Daraja bilan ishlash biroz farqlanadi. **PASCAL** va **DELPHI** da a^3 ifodani **a*a*a** yoki **sqr(a)*a** ko‘rinishida, a^4 ifodani esa **sqr(sqr(a))** ko‘rinishida yozishga to‘g‘ri keladi. BASIC da a^n ifodani **a^n** ko‘rinishida yozish mumkin.

Umuman, a^b ko‘rinishdagi ifoda uchun matematikada $a^b = e^{b \cdot \ln a}$ formula o‘rinli. Shuning uchun **PASCAL** va **DELPHI** da u **exp(b*ln(a))** ko‘rinishda yoziladi.

Parametrli takrorlash

Algoritmik tilimizda

N1 DAN N2 GACHA BAJAR
<takrorlanishi lozim bo‘lgan ko‘rsatmalar>
TAMOM

bu tuzilmada sanoq **N1** dan boshlanadi va toki sanoq **N2** ga yetguncha bittalab oshirib boriladi. Har qadamda BAJAR va TAMOM orasidagi takrorlanishi lozim bo‘lgan ko‘rsatmalar bajariladi.

BASIC

For I = N1 To N2 Step N3
<operator>
Next I

bu yerda **For** (uchun),**To** (gacha) va **Nex**t I (keyingi I) xizmatchi so‘zlar; I – haqiqiy turdagi ixtiyoriy o‘zgaruvchi bo‘lib, u **N3** talab oshirib (kamaytirib) boriladi va **takrorlash parametri** deyiladi; **N**1 – takrorlash parametrining qabul qiladigan boshlang‘ich qiymati; **N2** – takrorlash parametrining qabul qilishi mumkin bo‘lgan oxirgi qiymati; **<operator>** – takrorlanishi lozim bo‘lgan operator yoki operatorlar ketma-ketligi bo‘lib,u **takrorlash tanasi** deyiladi. Takrorlash parametrining boshlang‘ich va oxirgi qiymatlari o‘zgarmas, o‘zgaruvchi yoki ifoda ko‘rinishida bo‘lishi mumkin. Agar N3=1 bo‘lsa, Step 1 ni yozish shart emas, N3 manfiy ham bo‘lishi mumkin bu holda **I** ning qiymati kamayib boradi.

PASCAL va DELPHI

For I: = N1 To N2 Do <operator>;

bu yerda **For** (uchun),**To** (gacha) va **Do** (bajar) xizmatchi so‘zlar; **I** - butun turdagi ixtiyoriy o‘zgaruvch bo‘lib,u bittalab oshirib boriladi va takrorlash parametri deyiladi; **N1** - takrorlash parametrining qabul qiladigan boshlang‘ich butun qiymati; **N2** - takrorlash parametrining qabul qiladigan oxirgi butun qiymati; **<operator>** - takrorlanishi lozim bo‘lgan operator yoki operatorlar ketma-ketligi bo‘lib, u **takrorlash tanasi** deyiladi. Takrorlash tanasini operatorlar ketma-ketligi tashkil etgan bo‘lsa,ular albatta **begin** ko‘rsatmasi bilan boshlanib,**end**; ko‘rsatmasi bilan tugallanadi. Takrorlash parametrining boshlang‘ich va oxirgi qiymatlari o‘zgarmas,o‘zgaruvchi yoki ifoda ko‘rinishida bo‘lishi mumkin. For operatorida takrorlash parametri katta qiymatdan kichik qiymatga qarab bittalab kamayib borishi ham mumkin. Buning uchun **Do** xizmatchi so‘zi o‘rniga **Downto** xizmatchi so‘zi qo‘llaniladi:

For I: = N1 Downto N2 Do <operator>;

Shart bo‘yicha takrorlash

Algoritmik tilimizda

TOKI <shart> BAJAR
<ko‘rsatmalar guruhi>
TAMOM

Bu tuzilma qanday ishlashini ko‘rib chiqamiz. Avval **TOKI** so‘zidan keyingi javobi **ROST** yoki **YOLG‘ON** chiqadigan savol beriladi. Agar javob **ROST** bo‘lsa, **BAJAR** va **TAMOM** so‘zlari orasidagi ko‘rsatmalar guruhi bajariladi. Bajarish jarayoni tugagandan so‘ng yana **TOKI** so‘zidan keyin yozilgan savol beriladi. Agar javob **ROST** bo‘lsa, yana (**BAJAR** va **TAMOM** so‘zlari orasidagi) ko‘rsatmalar guruhi bajariladi. Shundan keyin uchinchi marta, to‘rtinchi marta va hokazo marta savolga takrorlanadi. Bu takrorlanish jarayoni savolga javob **YOLG‘ON** bo‘lguncha davom etaveradi va javob **YOLG‘ON** bo‘lgandan keyingina to‘xtaydi.

BASIC

Do While <shart>
<operator>
Loop

bu yerda Do,While (toki) va **Loop** xizmatchi so‘zlar; <shart> - oddiy yoki murakkab mantiqiy ifoda; **<operator>** - takrorlash tanasini tashkil etuvchi operator yoki operatorlar ketma-ketligi. Mazkur takrorlanish operatori quyidagicha ishlaydi: avval **<shart>** tekshiriladi, agar uning qiymati "rost" bo‘lsa, takrorlash tanasini tashkil etuvchi operatorlar ishlaydi va yana <shart> teksiriladi. Bu jarayon shart "yolg‘on" qiymat qabul qilgunga qadar davom etadi.

Do Until <shart>
<operator>
Loop

Mazkur takrorlanish operatori quyidagicha ishlaydi: avval **<shart>** tekshiriladi, agar uning qiymati "yolg‘on" bo‘lsa, takrorlash tanasini tashkil etuvchi operatorlar ishlaydi va yana <shart> teksiriladi. Bu jarayon shart "rost" qiymat qabul qilgunga qadar davom etadi.

While <shart>
<operator>
Wend

bu yerda **While** (toki) va **Wend** xizmatchi so‘zlar; <shart> - oddiy yoki murakkab mantiqiy ifoda; **<operator>** - takrorlash tanasini tashkil etuvchi operator yoki operatorlar ketma-ketligi. Mazkur takrorlanish operatori quyidagicha ishlaydi: avval <shart> tekshiriladi,agar uning qiymati **"rost"** bo‘lsa, takrorlash tanasini tashkil etuvchi operatorlar ishlaydi, va yana <shart> teksiriladi. Bu jarayon shart "yolg‘on" qiymat qabul qilgunga qadar davom etadi.

PASCAL va DELPHI

While <shart> Do <operator>;

bu yerda **While** (toki) va **Do** xizmatchi so‘zlar; **<shart>** - oddiy yoki murakkab mantiqiy ifoda; **<operator>** - takrorlash tanasini tashkil etuvchi operator yoki operatorlar ketma-ketligi. Agar takrorlash tanasida operatorlar ketma-ketligi yozilsa, ular begin bilan boshlanib, **end;** bilan yakunlanadi.

Mazkur takrorlanish operatori quyidagicha ishlaydi: avval **<shart>** tekshiriladi, agar uning qiymati "rost" bo‘lsa, takrorlash tanasini tashkil etuvchi operatorlar ishlaydi va yana <shart> teksiriladi. Bu jarayon shart "yolg‘on" qiymat qabul qilgunga qadar davom etadi.

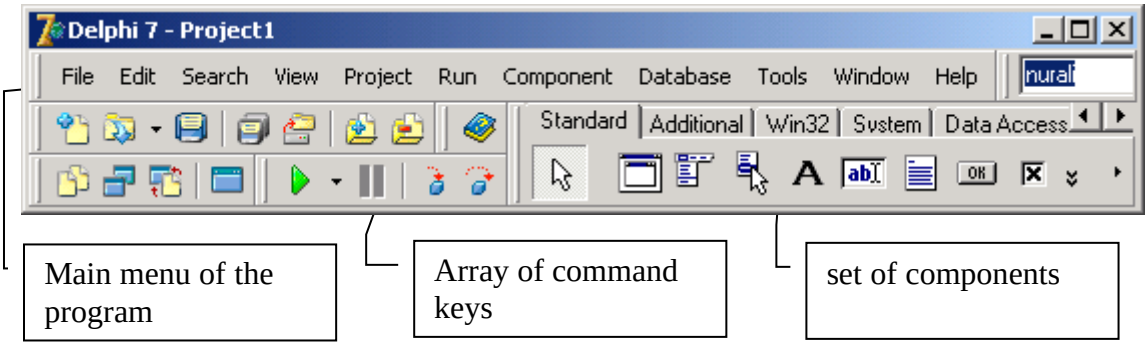
Repeat
<operator>
Until <shart>

bu yerda **Repeat** (takrorla) va **Until** xizmatchi so‘zlar bo‘lib, **Repeat** - takrorlash boshi, **Until** - takrorlash oxirini bildiradi; <shart> - mantiqiy ifoda**;** **<operator>** - takrorlash tanasini tashkil etuvchi operator yoki operatorlar ketma-ketligi. Agar takrorlash tanasida operatorlar ketma-ketligi yozilsa,ular begin bilan boshlanib, end; bilan yakunlanadi. Ular **<shart>** bajarilmaguncha (rost qiymat qabul qilmaguncha) takrorlanaveradi.

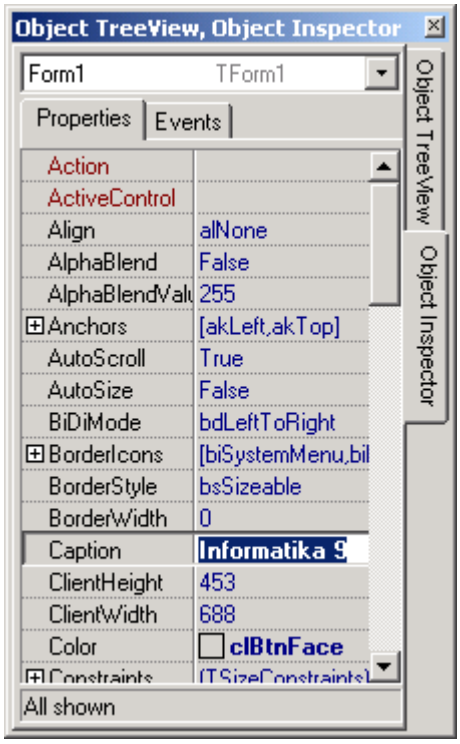
TDBNavigator buttons and what they do

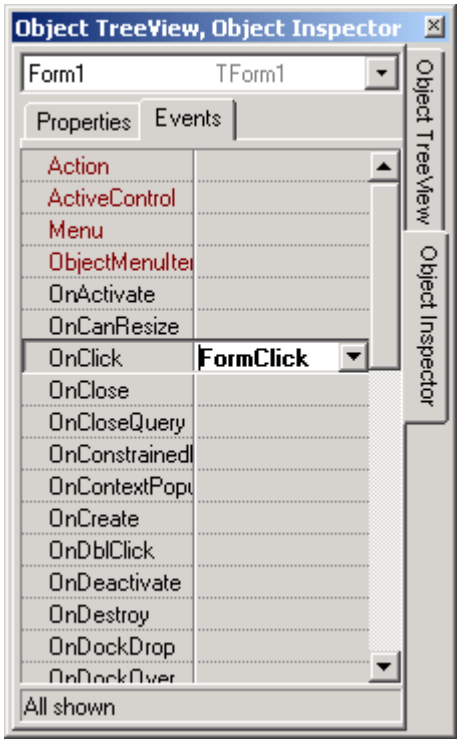
Button	Amal
The first	Activation of the initial record in the database. It is active only when the current entry is not the original entry.
Former	Activate the entry before the current entry in the database. It is active only when the current entry is not the original entry.
Next	Activate an entry after the current entry in the database. It is active only when the current entry is not the last entry.
Last	Activate the last entry in the database. It is active only when the current entry is not the last entry.
Insert	Add a new row to enter data into the table. In this case, the changes are saved when entering information in the optional field of the line
Delete	Delete the current entry. This will prompt you to delete the entry and the deleted entry will not be restored.
Edit	Change the current entry to an editable one.
Mail	Save your changes. In this case, changes made to the current field's previous data are saved.
Cancel	Undo changes to the current entry. This action can be used as long as it does not replace the current entry.

Delfitop working windows

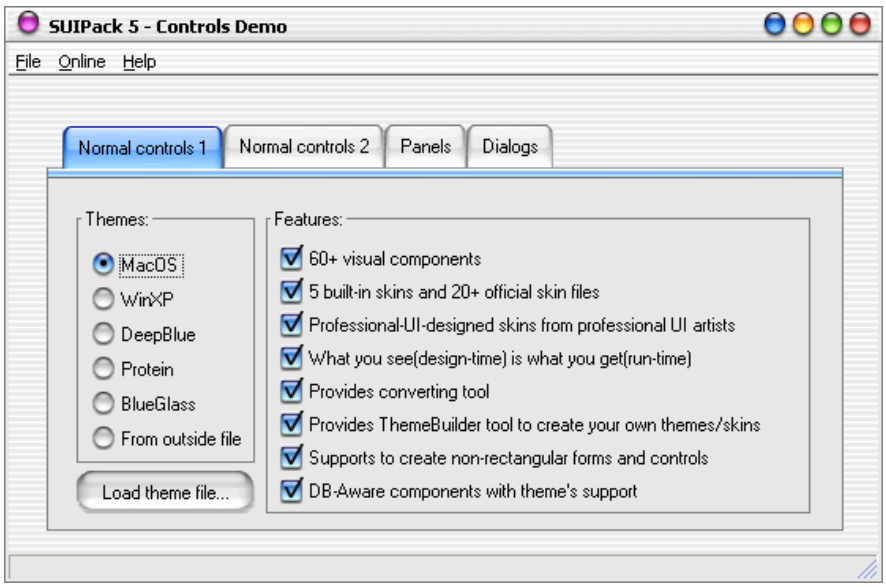


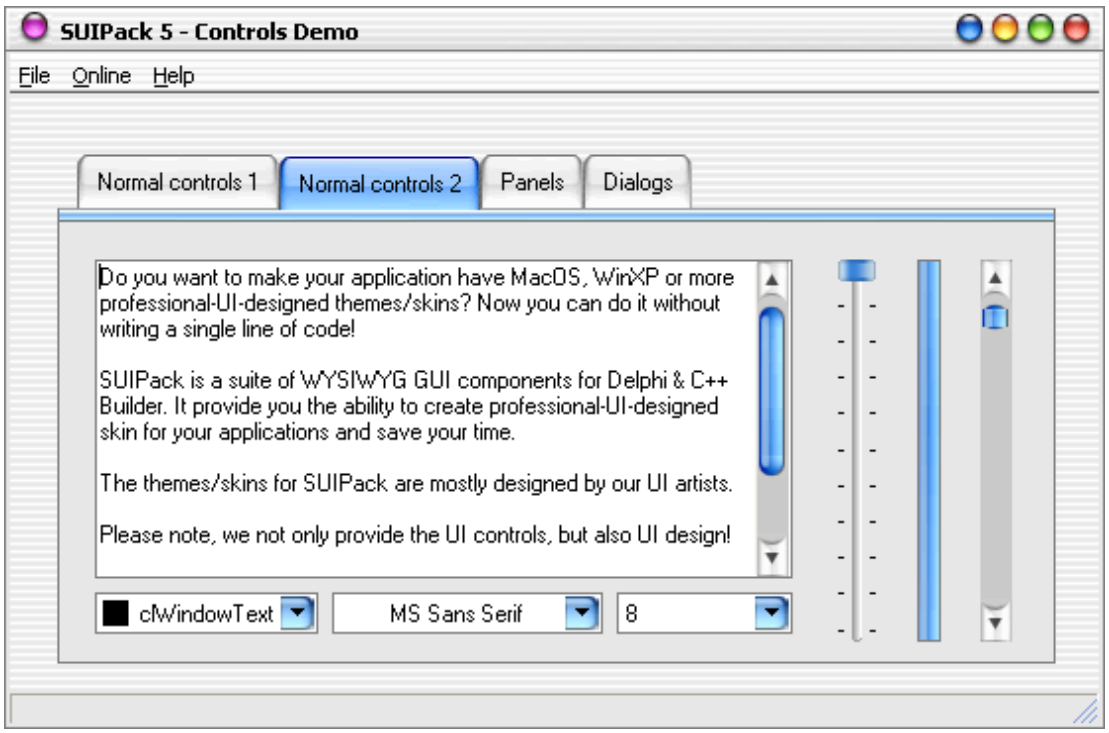
Object Inspector window

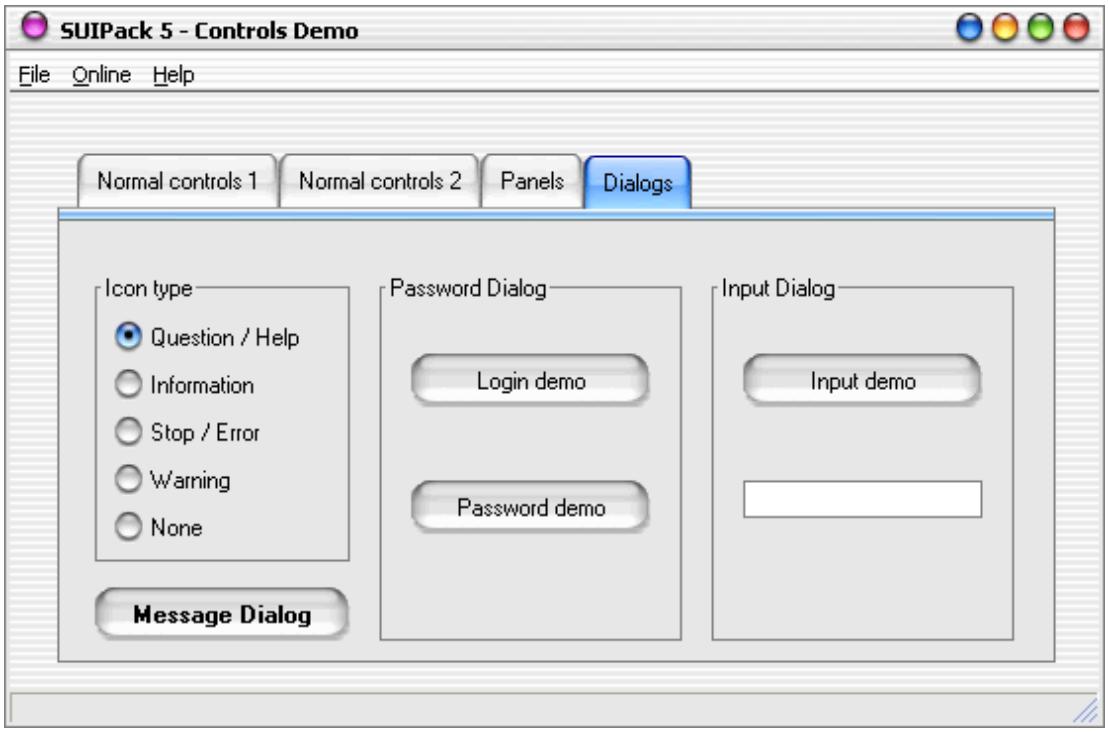




SUI package component options




SUIPack 5 - Controls Demo
File Online Help
Normal controls 1
Normal controls 2
Panels
Dialogs
Do you want to make your application have MacOS, WinXP or more professional-UI-designed themes/skins? Now you can do it without writing a single line of code!
SUIPack is a suite of WYSIWYG GUI components for Delphi & C++ Builder. It provide you the ability to create professional-UI-designed skin for your applications and save your time.
The themes/skins for SUIPack are mostly designed by our UI artists.
Please note, we not only provide the UI controls, but also UI design!
clWindowText
MS Sans Serif
8


SUIPack 5 - Controls Demo
File Online Help
Normal controls 1
Normal controls 2
Panels
Dialogs
Icon type
Question / Help
Information
Stop / Error
Warning
None
Message Dialog
Password Dialog
Login demo
Password demo
Input Dialog
Input demo

The main components of Delphi.

standard section


Main menu- Creation of the main menu.


Pop-up menu– a menu similar to the main menu.


Label– Show text.


*Edit*is a universal input element.


memo- Texts can be entered directly. It stores 32 kb (10-20 disks) of information.


Button- setting the button.


Checkbox- to choose.


Switch- but choose one.


ListBoxing- show multiple lines of words. You can choose any of them.


combo box– Unlike ListBox, you can select one of the hidden fields.

Scroll bar- scroll (kidney).


group box- Special place for grouping.


RadioGroup- groups RadioButton objects similarly to GroupBox.


Panel– Control element. After writing a new one, you can write new elements on top of it.

Additional section


BitBtn - "Install" button. Looks like a button.


SpeedBotton is a small button that can be clicked with the mouse.


MaskEdit - The masked input element. Analogue of editing. A characteristic is defined (for example,the date, currency, etc.).


StringGrid - output of text data in tabular form.


DrawGrid - Display any type of data in the form of a table.

 Image - output of graphic images in *.jpg, *.jpeg, *.bmp, *.ico, *.emf, *.wmf formats.

 Shape - output of simple graphical objects (circle, square and xk).

 A bevel is an element that decorates the edges.

 ScrollBox - creating a new scroll box.

 CheckListBox - the ability to select multiple. There are multiple checkboxes on one page.

 A separator is an element that separates or separates forms.

 StaticText - displaying information in a special form.

 ControlBar - control of toolbar components.

 Chart – set custom chart graphics.

 TabControl - Create a tabbed notebook.

 PageControl is a multi-page dialog box.

 ImageList is a special place to store images.

 RichEdit - a window for entering and editing text. Memo has a wide range of possibilities.

 TrackBar is a special control.

 ProgressBar is a progress tracking element.

 UpDown is up and down control.

 HotKey - an element that displays the names of active (pressed) keys.

 Animate - animation (movement) of objects.

 DateTimePicker - Work with dates of the year, month and day.

 MonthCalendar is a separate monthly calendar that works with days.

 TreeView is a window that displays data in a hierarchical, i.e., tree view.

 TListView is a window that displays data in full row.

 HeaderControl is a control container for objects.

 StatusBar - setting the status bar (lower bound).

 ToolBar - Button control panel (toolbar). It allows you to change the size and appearance of the buttons.

 CoolBar is a container for CoolBand objects.

 PageScroller is a small control panel. It looks like a toolbar.

System partition

 Timer - work with time.

 PaintBox - a field for drawing images.

 MediaPlayer - manage audio and video files.

 OleContainer - hosting and binding OLE objects.

Data access section

 DataSource - connection of data or components with each other.

 Table - a link to a database (file).

 Query - managing records in the database.

 StoredProc - download the data store from the server.

 Database - connection of a single database.

Data management section

 DBGrid - displaying records in the database in the form of a table.

 DBNavigator is a component that edits records in a database. You can add new words, change, delete, etc.

 DBText - Retrieve data from a text field in a database.

 DBEdit - editing a field in the database.

 DBMemo - edit memo type data in the database.

 DBImage - Display images stored in the database.

 DBListBox - a list of data from the database.

 Selecting a DBComboBox data combination.

 DBRichEdit is a more extensive resource editing option than memo.

Dialogue Section

 OpenDialog - open files.

 SaveDialog - save files.

 OpenPictureDialog - open image files.

 SavePictureDialog - save image files.

 FontDialog - font selection.

 ColorDialog - color selection.

 PrintDialog - print to a printer.

 PrinterSetupDialog - change printer properties.

 FindDialog - search for information from a file.

Section Vin 3.1

 FileListBox - displays a list of files in the selected directory.

 DirectoryListBox - list of directories on the active disk.

 DriveComboBox - an element for activating and selecting drives.

 FilterComboBox - select files by type (extension).

Sample section

 ColorGrid - select or activate a color type.

 SpinButton - control up or down.

 SpinEdit - automatic change of numbers.

 DirectoryOutline - directory structure.

 Calendar - calendar.

ActiveX section

 F1Book is a spreadsheet for writing formulas. Similar to Excel.

 VtChart is a chart.

 Graph - graphic diagrams and drawings.