MINISTRY FOR DEVELOPMENT OF INFORMATION TECHNOLOGIES AND COMMUNICATIONS OF THE REPUBLIC OF UZBEKISTAN

TASHKENT UNIVERSITY OF INFORMATION TECHNOLOGIES

«**ADMITTED**»
to the defense by Head of the department
"Information educational technologies"

_____

« » _____2016 y.

FINAL QUALIFYING WORK

on the subject:

Creation of educational web application "Teaching to self-education" using Java Server Pages technology

Graduate _____ Khairov T.R.
signature

Consultant _____ Zakirova F.M.
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Consultant of SVA _____ Amurova N. Yu.
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signature

Tashkent 2016

THE MINISTRY OF DEVELOPMENT INFORMATION TECHNOLOGIES AND COMMUNICATION OF REPUBLIC OF UZBEKISTAN

TASHKENT UNIVERSITY OF INFORMATION TECHNOLOGIES

Faculty Professional education in sphere ICT
Department "Information educational technologies"
Direction 5111000 "Professional education: Informatics and information technologies"

«CLAIM»
Head of the department
"Information educational technologies"
_____
« ___ »_____ 2016 y.

TASK
for final qualifying work of

Khairov Talgat Rahimovich
on the subject: Creation of educational web application "Teaching to self-education" using Java Server Pages technology

1. The subject was claimed with order of university 15 December 2015 № 1324-20
2. The deadline for delivery finished work 25.05.2016
3. Raw data for work lecture, books, methodical applications, articles, websites, multimedia applications
4. The content of settlement and explanatory notes (list of the subjects, which are to be developed), abstract, introduction, Chapter 1, Chapter 2, Chapter 3, conclusion, a list of references, the application.
5. The list of graphics drawings, diagrams, tables, screenshots.
6. The date of issue the task 24.12.2015

Consultant _____
signature

Task taken _____
signature

7. Consultants of separated sections of the final qualification work

Name of the part	Consultant	Signature, the date of issue	
		Task given	Task received
MAIN PART	Zakirova F.M.		
SAFETY OF VITAL ACTIVITY	Amurova N. Yu.		

8. Graph of the performing the work

№	Name of the part	Execution date	The signature of consultant
1.	Introduction		
2.	Analyzing literature and existing technologies		
3.	Development of educational web application		
4.	Safety of vital activity		
5.	Preparation presentation		
6.	Report		
7.	Provisional protection		
8.	Protection		

Graduate Khairov T.R. «____»_____ 2016 y._____

Consultant Zakirova F.M. «____»_____ 2016 y. _____

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In this paper, we consider the final qualifying work on creating an educational course on the subject of "Teaching to self-education" with the use of educational technologies on the example of an educational web application. The first chapter deals with the theoretical aspects of the educational web applications, a general description of self-education theories, their types, and basic principles. The main part describes in detail the process of creating a web application and educational course. Final qualifying work includes introduction, three chapters, conclusion, tables, figures, list of references, appendix.

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Ushbu bitiruv malakaviy ishida web ilova asosida zamonaviy ta'lim texnologiyalaridan foydalangan holda "Mustaqil talim olish uchun oqitish" o’quv kursini tashkil etish texnologiyasi yoritilgan. Mazkur ishning birinchi bobida ta'lim web ilovalari, zamonaviy mustaqil ta'lim uslublari, ularni turlari va principlariga umumiy ta'rifi berilgan. Asosiy qism ta'lim web ilovasini va o’quv kursini yaratish texnologiyasini yoritib beradi. Bitiruv malakaviy ish mavhum, mundarija, uch bob, xulosa, jadvallar, o'quv kurs materiallarini va web ilovani o'z ichiga oladi.

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В данной выпускной квалификационной работе рассматривается технология создания образовательного веб приложения для преподавания курса «Обучение самообразованию». В первой главе рассмотрены теоретические аспекты образовательных веб приложений, общее описание технологий по самообразованию, их виды и основные принципы. В основной части подробно описывается методика создания образовательного веб приложения и учебного курса. Выпускная квалификационная работа состоит из введения, 3 глав, списка использованной литературы и приложения.

CONTENTS

Introduction

"... Mental education since ancient times is considered to be the most important prerequisite. The thought, the idea are becoming a condition of human nobility, his vigor and efficiency. Knowledge, science - human aid, his mentors, his weapons and power"

I.A. Karimov

The rapid development of information technologies and a sharp increasing the volume of accumulated information of mankind has led to acute poverty and the need for new technologies and techniques in the field of education. The necessity for them is essential for the rapid and qualitative study of large amounts of disparate information, and then using that in everyday life and in the labor activity.

Limitation of vital resources and the consistent reduction of them in the consequence unrestrained consumption or inefficient use have led to fierce competition between nations, organizations and peoples. In the same time, in order to stay "afloat" and to be "in the trend" of recent changes in they own field of activity every single individual, organization or government needs not only new theoretical knowledge and practical skills, but also the ability to constantly, quickly and efficiently to improve the knowledge and skills and then apply them in their field of activity for their own development.

It is also necessary to mention that the people of the Republic of Uzbekistan have a big goal - to build a legal, democratic state with a socially oriented economy. This goal is very difficult to achieve without education and grafting at school among the younger generation the desire to develop a highly educated and highly moral person, in the words of President Islam Karimov - a harmoniously developed personality [2].

The relevance of the topic, on the basis of mentioned above, is the most important for the education sector and in general for the progressive development of the state. "Personnel decide everything," said the great reformer. Current studies

in the field of neuroscience say that the human brain capabilities in training are very large, which unfortunately not used the absolute majority of the human society. For this reason, it is necessary to spend the maximum number of human and material resources in the development of systematic and consistent action plan in the field of rapid human development in our society and the state, and then to implement that action plan in the life.

The purpose of work is to develop a web application using JavaServer Pages (JSP) technology dedicated for the providing course on self-education techniques in the 21st century.

The tasks of this work:

1. To study the theoretical basis of the subject of research, as well as the technology which used for development web application;
2. Development of a conceptual architecture of web application and implementation it using JSP technology;
3. Investigation of inactivity and life safety while working on the computer.

The object of research is modern educational web -applications.

The subject of research is the development of educational web application for providing a course on self-education using JSP technology.

In carrying out this final work there has been developed an educational web application for providing a course on self-education. **The practical significance** of this development lies in the fact that it useful for the students of schools, lyceums, professional colleges, higher educational institutions, as well as for peoples who interested in self-development and self-education in the field of modern and effective methods of acquiring knowledge and skills.

The structure of the work consists of an introduction, three chapters, bibliography, and appendices.

The introduction describes the main reasons for the development of this web application and its content, designated purposes, object and subject of this final

work. There are also provided arguments in favor of the practical significance of the developed web application.

The first chapter describes the theoretical information on the subject, namely:

1. Analysis of the structure of modern educational web applications;
2. Basic information on the technologies used for developing web application;
3. Comprehensive research in the field of modern neuroscience and the human brain capabilities.

In the second chapter are carried out the practical development of the structure of the educational web application for providing a course on self-education, its implementation using JSP technology, as well as providing information on the practical usage of application in the educational process.

In the third chapter of the study are carried out one of the most serious diseases of the 21st century, the so-called lack of exercise as well as carried out analysis of life safety during the work on the computer.

References consist of 31 items, 13 of these are Internet resources. In the appendix provided the code of developed web application together with its information content and the database.

CHAPTER I. THEORETICAL FOUNDATIONS OF DEVELOPING EDUCATIONAL WEB APPLICATION USING JSP TECHNOLOGY

1.1. Analytical review of modern educational web applications and their structure

In the second decade of the XIX century, the basic trend in the development of educational technologies with the use of information technologies is the active development and application of the MOOC (Massive Open Online Course) in the learning process.

MOOC – it is modern trend in education that based on the provision of courses from leading universities in the remote mode, anyone from anywhere in the world, with clear deadlines intermediate and final verification tasks and the ability to communicate freely between the teacher and the hundreds of thousands of his students together.

One of the pioneers of MOOC-direction was Stanford University, which in 2012 launched the first 3 courses. These courses are instantly drawn an audience of 100,000 listeners. For a few months for a course on artificial intelligence of the professor S. Troon signed up 160,000 students from 190 countries.

Currently own educational online platform developed in Australia, Germany, and Brazil. In the UK, created Futurelearn Alliance those union12 leading UK universities.

Structure MOOC:

- Short video tutorials;
- Materials for self-study;
- Joint project work of students;
- Test and homework.

Video lessons of MOOC recorded in the studio, carefully worked out through supply and plan to keep within canonical 7-10 minutes.

Materials for self-study may include books, as well as links to articles on the topic that had studied.

Joint project work of students is a tool to consolidate the acquired knowledge and to enable collaborative learning element and interaction between students.

Test and homework must be submitted before a certain time. Homework can be checked by professional instructors or by the students themselves.

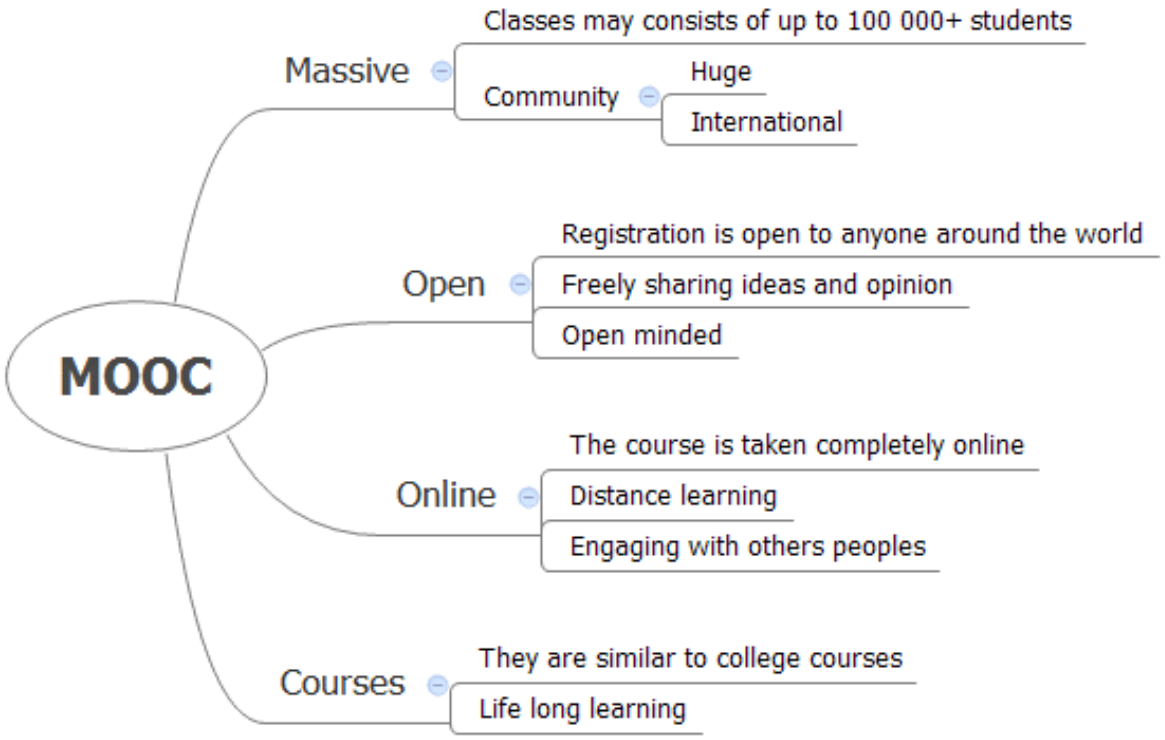


Figure 1.1. What is MOOC

1.1.1. Open Education

"Open education" - a modern educational platform offering online courses in basic subjects studied in Russian universities. The platform was created by the Association "National Platform for Open Education", founded by Russian leading universities - Moscow State University, SPbPU, SPbSU, NUST "MISA", NRU "Higher School of Economics", MIPT, Ural Federal University and ITMO.

All courses are posted on the Platform, available free of charge and without formal requirements for a basic level of education. For those wishing to offset passed online course during the development of the educational program or

undergraduate specialties in high school, it provides a unique opportunity to obtain a confirmed certificate. Obtaining the certificate is possible if passing an online course with control measures, the identification of the individual learner and control the conditions of their passage.

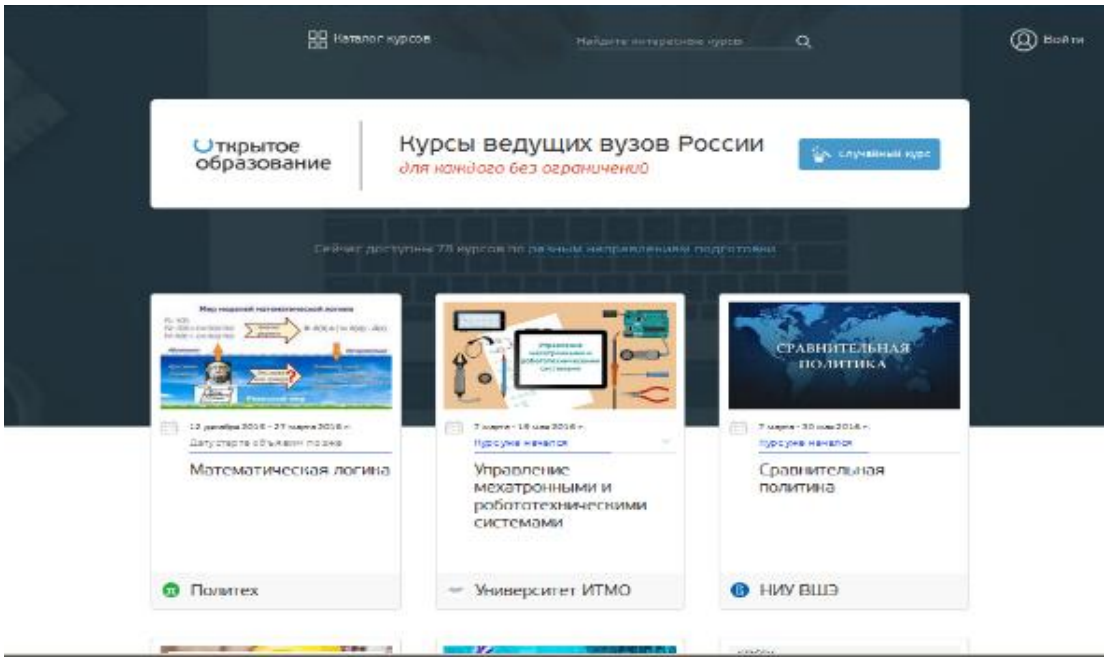


Figure 1.2. Openedu.Ru home page.

In comparison with other platforms of online learning, the courses of national platform have certain characteristics:

1. All courses are developed in accordance with the requirements of the state-federal educational standards;
2. All courses meet the requirements for learning outcomes to be implemented in higher education curricula;
3. Special attention is paid to the effectiveness and quality of online courses, as well as procedures for assessing learning outcomes.

The platform presented courses in the following areas:

1. Mathematics and Natural Sciences;
2. Engineering, technology, and technical sciences;
3. Health care and medical sciences;
4. Agriculture and agricultural sciences;
5. Science of society;

6. Education and pedagogical sciences;
7. Humanities;
8. Art and Culture.

If the student has successfully passed the exams, it will be provided with documentary evidence of the results of training - Certificate.

1.1.2. Coursera

Coursera - project in the field of mass online education, founded by a professor of computer science at Stanford University Andrew Ng and Daphne Koller. Within its framework, there is a project for the publication of educational materials on the Internet, in the form of a set of free online courses.

The project collaborates with universities that publish and conduct courses in the system in various areas of human knowledge. Students take courses, communicate with other students, take tests and exams directly on the website of Coursera. There is also the official mobile app for the iPhone and Android. In November 2014 10 million users and 844 courses from 108 educational institutions registered in Coursera.

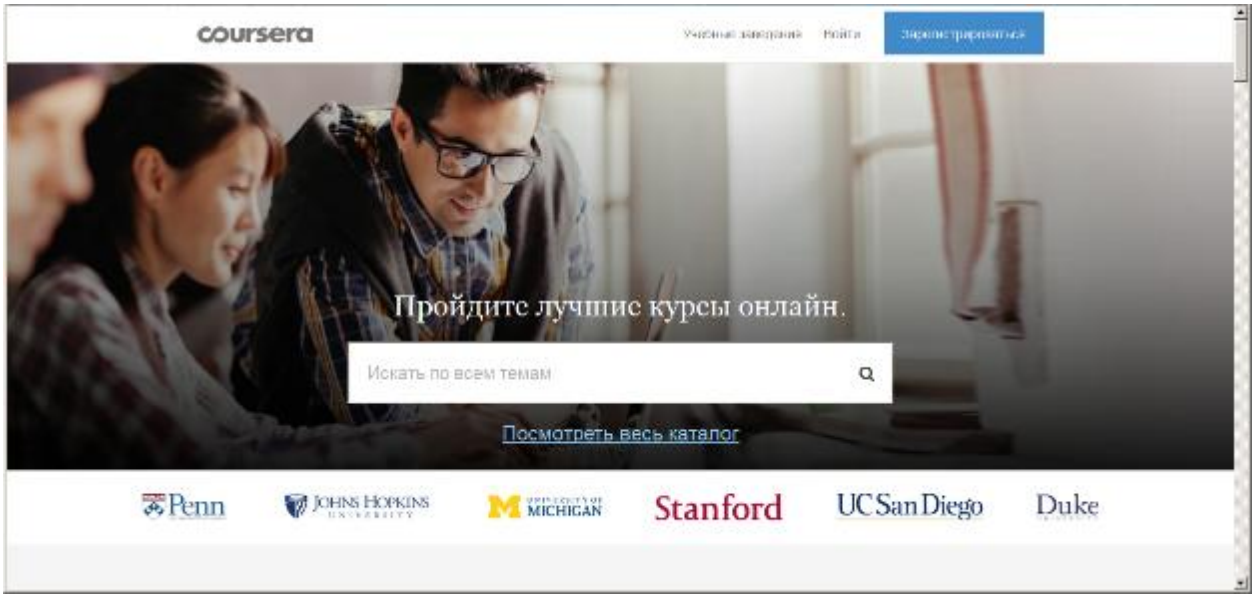


Figure 1.3. Coursera.Com home page.

Key training areas:

1. Arts and Humanities;
2. Computer Science;
3. Data Science;
4. Math and Logic;
5. Personal Development;
6. Physical Science and Engineering;
7. Social Sciences.

Course duration of about six to ten weeks, with 1-2 hours of video lectures per week. Courses contain tasks, weekly exercises and sometimes the final project or exam.

Access to the courses is limited in time: every homework assignment or test should be performed only in a specific time period. On completion of the course, successful completion of interim assignments and a final exam, the listener has issued a certificate of completion.

As of 2014, the bulk of the courses are in English, there are also courses in Chinese, Spanish, French, Russian, Portuguese and several courses in other languages. At the same time actively added subtitles in many languages, which are created by students on a voluntary basis. To create subtitles in Russian launched the project "translate Coursera", which at the beginning of 2015 registered 15 thousand participants and 30 courses translated.

The stated mission of the organization - to teach millions of students from around the world and changing the traditional teaching method.

The main sections of the project website:

1. Company – here is a general information about the project, project management, and staff;
2. Communication – provides opportunities to send feedback to the creators of the project;

3. Friends - provides information about the partners and developers of the project, as well as provides an opportunity to join the volunteer project in the framework of the project to transfer the online courses provided on this website in other languages;

4. More - it contains diverse information on the conditions of use of materials from this website, the terms of confidentiality and others.

Table 1. Comparative analysis of the two platforms

	openedu.ru	**coursera.com**
Platform	Open edX	Private development on Scala and Play framework
Involved higher education institution	8 leading HEI of RF	114 from the around the world
Amount of Courses	~76	~900
Amount of Users	50 hundreds	~20 million

1.2. Basics of development web applications using Java Enterprise Edition technology

1.2.1. The process of developing the web –applications

Web application - a client-server application running on a computer network in which the browser it is the client and the server – is a web server.

The responsibility of the client:

- implementing a user interface;
- the request to the server;

- handles the responses from the server.

The responsibility of the server:

- receives a request from a client;
- performs the necessary calculations and processing;
- creates a web page;
- sends the Web page to the client over the network using a particular protocol (HTTP, FTP, HTTPs, etc.).

The benefits of this approach to building information systems:

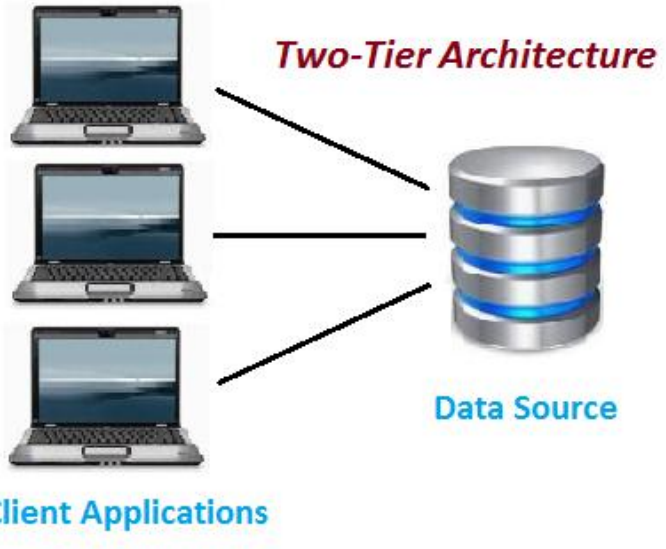
- Independence from the particular user's operating system;
- High reconfigurability due to functional separation between client and server;
- No need to install additional software, just a web browser is needed;
- Cross-platform Web applications.
- Disadvantages of this approach:
- Depending on the quality of the communication channel;
- Issues of data protection from unauthorized access.

The web application can also act as a client to other services:

- Database;
- Other web applications.

Models of building web-applications:

- Two-tiered;
- Three-tiered.



- *Figure 1.4. Two tier architecture schema of web applications.*

A two-tier architecture - is a model for the implementation of information systems in which emit only two functional parts: the client and the server. Web browser or specially installed client application can be used to access the server on the client side. The server responds to client requests independently using only its own resources. Therefore, the server does not cause third-party network applications and does not apply to third-party resources to handle any part of the request.

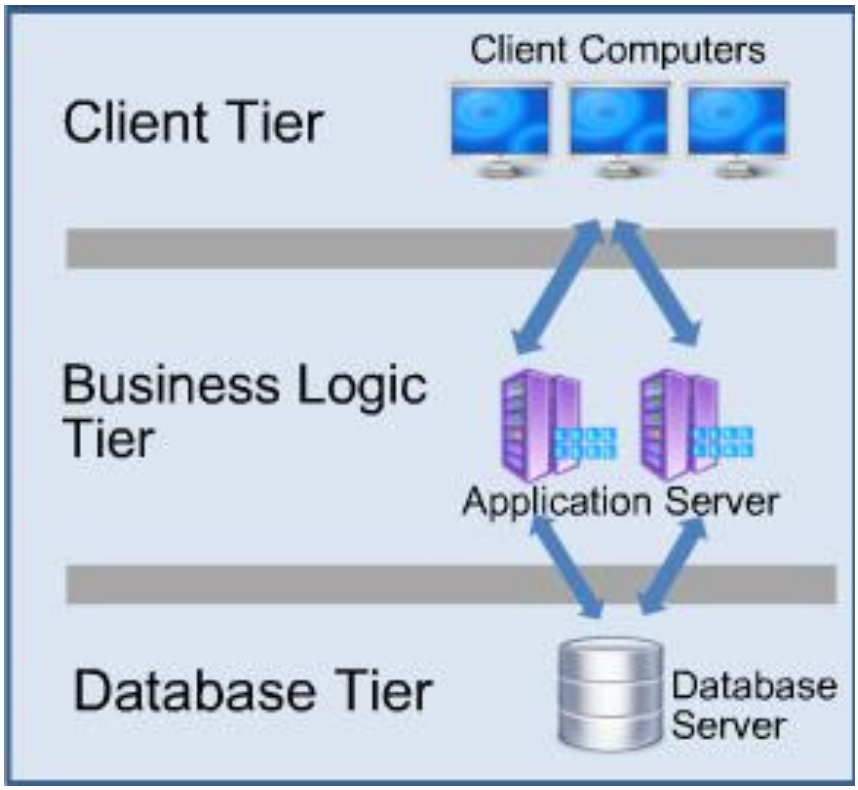


Figure 1.5. Three tier architecture schema of web applications.

Three-tier architecture -model of information systems, in which the system is clearly divided into 3 parts:

- the client application, which is the user interface for working with the system;
- an application server accessed by the client application. The main objective - providing to the client limited access to information stored in the database;
- the database server, which communicates with the application server. There, all necessary information is stored.

Before embodied in the life of an idea for a start it is necessary to clearly define the goals and objectives of the implementation of this idea. Those, we must clearly understand what goals we want to achieve and what problems to solve in the course of realization of this idea. In the words of Stephen Covey, **"Begin with the end in mind".**

Based on the objectives and specific tasks we must create a register of interested peoples. For an information system - is its people who use it, and those who provide technical and informational support of the system and its users.

After that, you need to paint in more detail the problem posed by the system, as well as features that should be given to different groups of users. Then you need to break these tasks and functionality into smaller subtasks. This process must be done as long as no problem would be so small that it can be easily programmed.

Following the ancient principle of management of "Separate and Rule" in the design of information systems we should seek to maximize separation and independence of the functional parts of the system from each other. Taking into account the fact that the main substance of the majority of today's web applications is:

- Client;
- The server that handles client requests;
- The database that stores the information you need,

the most appropriate are the choice of a three-tier architecture of building information systems.

Thus, there are two types of links:

1. Communication between the browser and the server part;
2. The relationship between the server side and database.

After this analysis, you can continue the actual development. This stage is divided into the following sub-steps:

- Installing and configuring the development environment;
- Development of information model of the application;
- Create a user interface layout;
- Developing the application user interface;
- Development of the business logic of the application;
- Develop server-side applications;
- Application database connection;
- Implementation of multilingualism;
- Development of the Admin Console;
- Implementation of information security.

1.2.2. Building Web applications using the Java Enterprise Edition technology

Java Enterprise Edition - a set of specifications that describe the architecture of the server platform and related technologies to the Java language for development information systems of medium and large enterprises [9].

The main objective of the specifications - to ensure application scalability and data integrity during system operation. Developed using Java EE system is largely focused on the use of a web interface through both the Internet and local networks.

This platform provides an API and runtime environment for developing and running industrial-scale applications, including networking and web services, as well as multi-level, secure and scalable network applications.

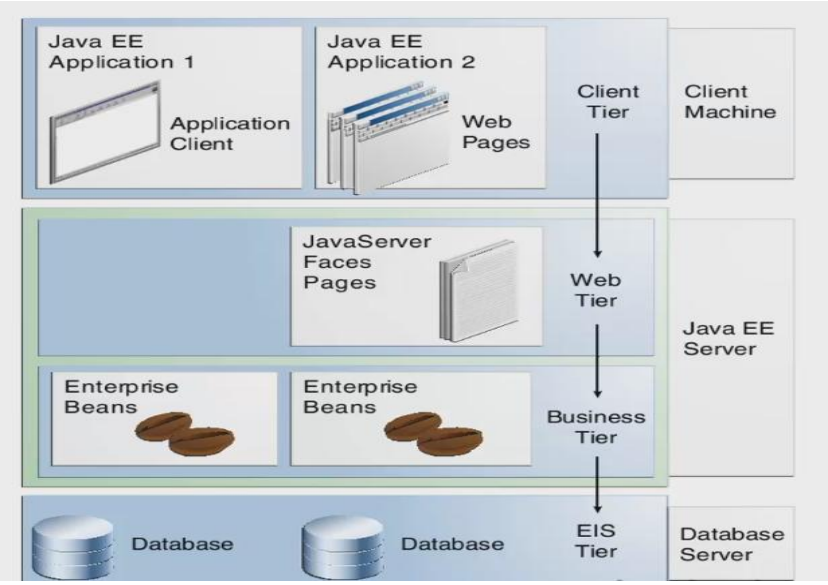


Figure 1.6. Architecture of Java EE application

The principal difference the Java EE from Java SE:

- Java EE is used for industrial development;
- Supports industrial ICT standards;
- Runs on a dedicated application server.

For communication between the client and server part may be used different protocols and the most common of which is the HTTP.

HTTP (HyperText Transfer Protocol) - a set of rules and associated procedures for communication between computers on the computer network. With this protocol, the client sends a request (HTTP request) to the server, and the server sends a response (HTTP response) to the client.

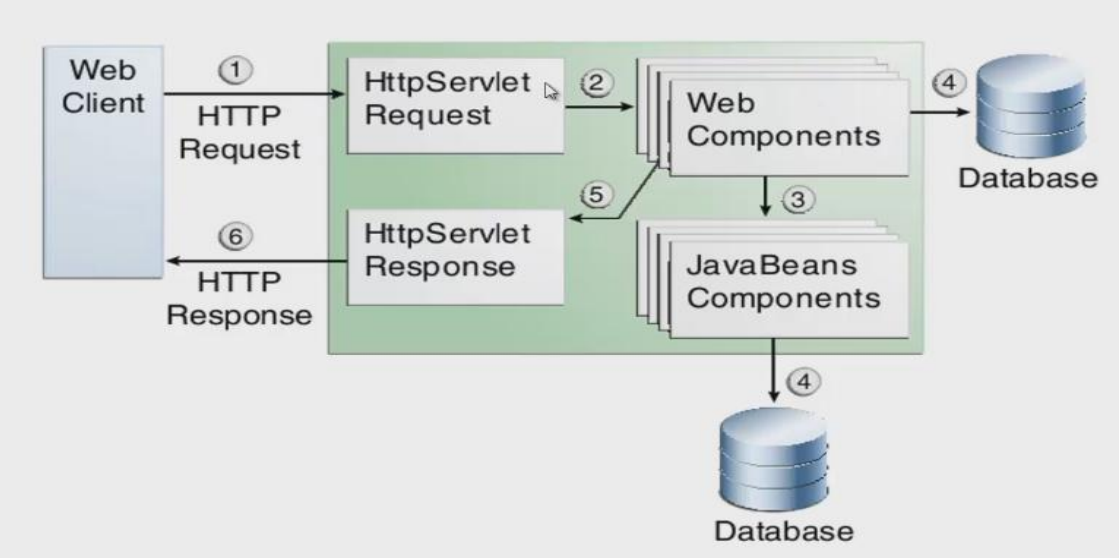


Figure 1.7. The processing requests in Java EE application

The Web application is running on the special application called web container.

Basic tasks of this application:

- Servlet lifecycle management (loading classes, creating instances of the class, call the required methods of the class, passing to the garbage collector);
- Create a multi-threading;
- The actual management of incoming requests;
- The actual management of connections.

Web applications developed by Java EE based on servlets. Servlet – is a specialized Java classes designed to run on a web server in order to get requests from the web application clients, as well as the formation and issuance of the necessary responses back to the clients. javax.servlet and javax.servlet.http packages store necessary interfaces and classes to create a servlet, HTTP requests processing and create a HTTP response[10].

The main purpose of the servlet - process and service customer requests.

The processing of the query in a Java EE application consists of the following steps:

1. Determination of the servlet that responsible for the request. This is defined in the deployment descriptor of web application - web.xml.

2. In the absence of a servlet container:

a. Loads servlet class into web container;

b. The container creates an instance of the servlet class;

c. The container calls the init () method. This method initializes the servlet and called in the first place before the servlet can service requests.

3. Maintenance of the client request. Each request is handled in a separate thread. Web container invokes the service () method for each request. This method determines the type of request made by the client (GET, POST, etc.) and sends it to the appropriate method of the servlet to handle the request. The developer shall provide the implementation for these methods (doGet, doPost, and so on). When making the request, the method for which is not implemented is called the parent class method and is generally complete return an error to the caller.

4. In the end, the container must remove the servlet. For that purposes, it calls the destroy ( ) method, which takes a servlet out of service.

The deployment descriptor – is an XML configuration file of Java EE web application designed for the web server on which the web application will run. This XML file describes:

1. Initialization parameters of web application;
2. Settings of servlet of the web application;
3. Definitions reference to the necessary resources (databases, etc.);
4. The parameters of information security of web application.

Separating settings information from the web application code allows changes into the work of a web application without making changes to the code. For example, you can change the links to the database, to which web application should contact, making the necessary amendments to the deployment descriptor file and without changing the code [4].

JavaServer Pages (JSP) - technology based on servlets, allowing web developers to create web page content that has both static and dynamic

components. This technology allows the generation of web pages on the server side with dynamic content.

JSP page contains a code of two types:

- Static raw data;
- JSP elements, which construct dynamic content.

When writing code, JSP pages can be used the following Java EE technology:

1. JSTL – Java Standard Tag Library;
2. Expression Language;
3. Scriptlets - for the introduction of Java code in JSP-pages.

Expression Language Syntax:

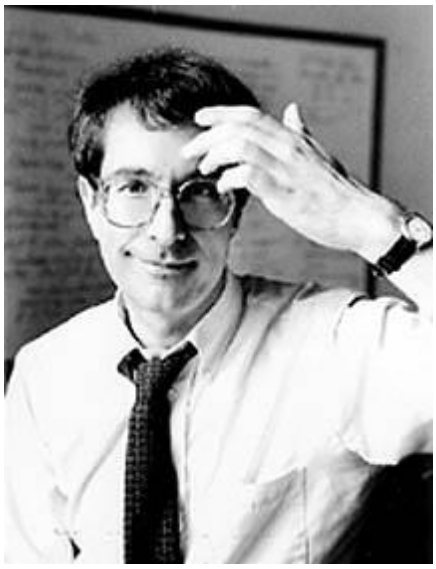
- Expressions that are wrapped with $ { <expression> } characters;
- Expressions give direct access to objects / beans;
- Access to every scope through implicit objects.

The JSP-page code is translated into a Java servlet code using the JSP-pages compiler - Jasper, and then compiled into Java bytecode for virtual machine (JVM).

1.2. Methods of self-education in the 21st century

Since ancient times, mankind has consistently expanded their knowledge about the environment. In this, he was helped by the incredible innate quality of every human being - the desire to explore and learn about the world around us.

If we look at the behavior of children 1 - 3 years, we can observe strong fighting desire to learn all about each of them. They try everything to feel, taste, etc. Thus, they seek to explore the world. But very often young parents fear that the child may harm himself or others and they restrain their children curiosity forbidding them to touch or try anything, and sometimes even punishing them for their not experienced steps in the study of the surrounding world. This leads to the fact that the child begins to be afraid to do something new - to touch the subject,



try to make a new action, etc. because he/she can be punished for that. This leads to the fact that growing up the child thinks and acts according to clearly specified pattern, which parents, caregivers, teachers, etc taught him. As a result, the person loses his innate quality - the desire to learn and explore the world around them.

At the same time, the world is growing rapidly, there are new areas of human activity with new technologies and equipment where new knowledge's and skills are needed. This situation compels people to constantly learn something new and improve themselves in order to be in step with the time. And this requires knowing a methodology for self-education, as well as the skills to apply it in their sphere of activity and personal life.

1.3.1. Theory of Multiple Intelligences

In the late XX-th and early XIX centuries, different scientists and research institutes of the world engaged in an investigation in the field of human brain functionality in the learning process. These studies were directed at areas such as:

- Functioning of human memory;
- Processing of new information;
- Mechanism of activity of the eye and the brain in the process of reading, etc.

So there appear various theories that describe the activity of the brain in the learning process, as well as providing an arsenal of methods and means to improve the effectiveness of training.

Harvard professor Howard Gartner and his colleagues in the course of his research project "Spectrum" put forward the theory of multiple intelligence. In accordance with this theory of human cognitive ability can be represented as a set

of seven intelligences or 7 kinds of human brain activity. In his book, "The structure of the mind: the theory of multiple intelligence," Howard Gardner describes them as follows:

Figure 1.8. Howard Gartner

1. Verbal-Linguistic - skills related to reading, writing, sensitivity to the meaning of words, as well as easy to learn foreign languages;
2. Mathematics and logic - the ability to solve various logic and math problems, puzzles, etc.;
3. Body-motor - capacity for physical activity (sports, dance, etc.), fine motor skills and plasticity of movements;
4. Musical - the ability for music and sense of rhythm, tone, timbre and melody, in other words, an ear for music;
5. Visual-spatial - figurative thinking, i.e. skills and abilities in painting, sculpture, architecture, as well as orientation in space;
6. Intrapersonal - the tendency to self-knowledge and internal analysis, rich inner world;
7. Interpersonal - the ability to communicate and cooperate with other people, ability to listen, understand and feel the people.

Further use and development of this theory were in studies of Collin Rose. In his book «Accelerated Learning» Colleen Rose describes the methodology for accelerated learning technologies.

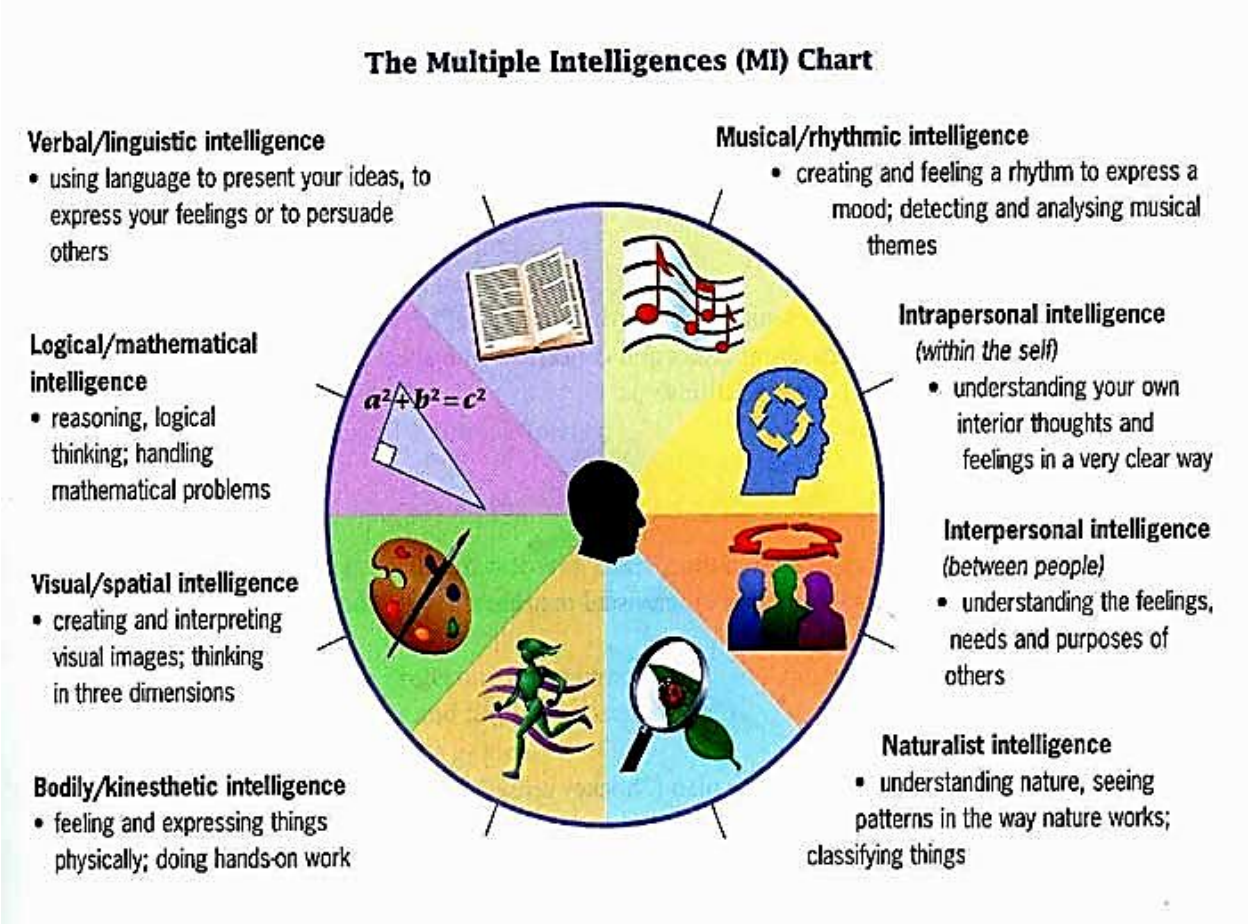


Figure 1.9. Multiple intelligence theory schema.

1.3.2. Methods of accelerated learning

Accelerated Learning unlocks much of our potential for learning by actively involving the whole person, using physical activity, creativity, music, images, color, and other methods designed to get people deeply involved in their own learning [3].

Accelerated learning has really one aim: to get real results.

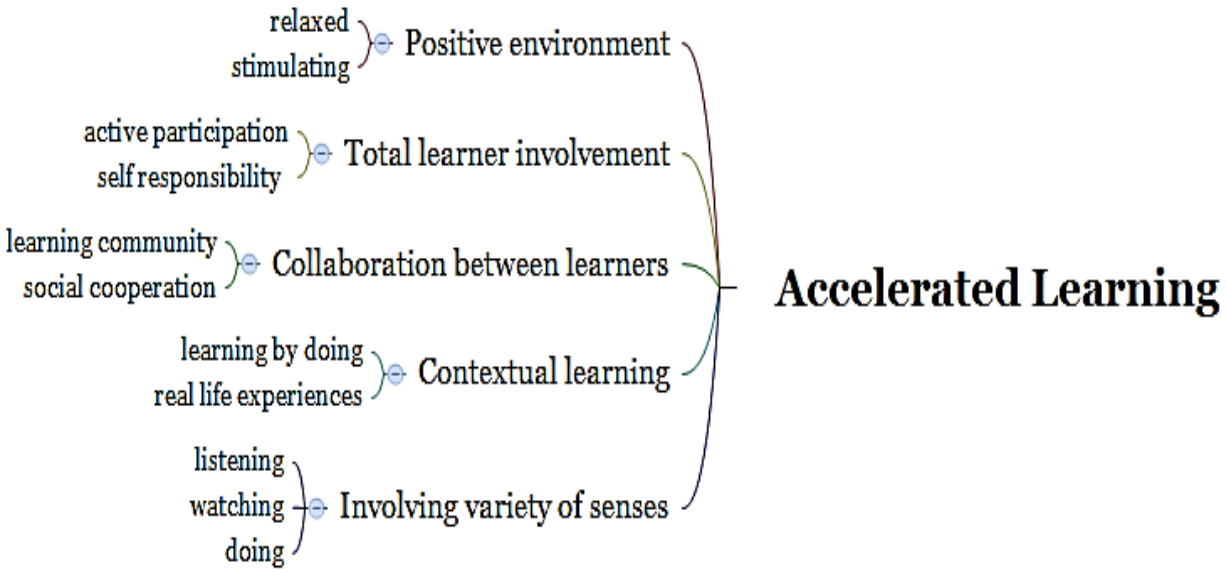


Figure 1.10. Optimal learning environment according to accelerated learning

The Guiding Principles of Accelerated Learning

1. Learning involves the whole mind and body. learning is not all merely "head" learning (conscious, rational, "left-brained," and verbal) but involves the whole body/mind with all its emotions, senses, and receptors.

2. Learning is creation, not consumption. Knowledge is not something a learner absorbs, but something a learner creates. Learning happens when a learner integrates new knowledge and skill into his or her existing structure of self. Learning is literally a matter of creating new meanings, new neural networks, and new patterns of electro/chemical interactions within one's total brain/body system.

3. Collaboration aids learning. all good learning has a social base. We often learn more by interacting with peers than we learn by any other means. Competition between learners slows learning. Cooperation among learners speeds it. A genuine learning community is always better for learning than a collection of isolated individuals.

4. Learning takes place on many levels simultaneously. learning is not a matter of absorbing one little thing at a time in linear fashion, but absorbing many things at once. Good learning engages people on many levels

simultaneously (conscious and subconscious, mental and physical) and uses all the receptors and senses and paths it can into a person's total brain/body system. The brain, after all, is not a sequential, but a parallel processor and thrives when it is challenged to do many things at once.

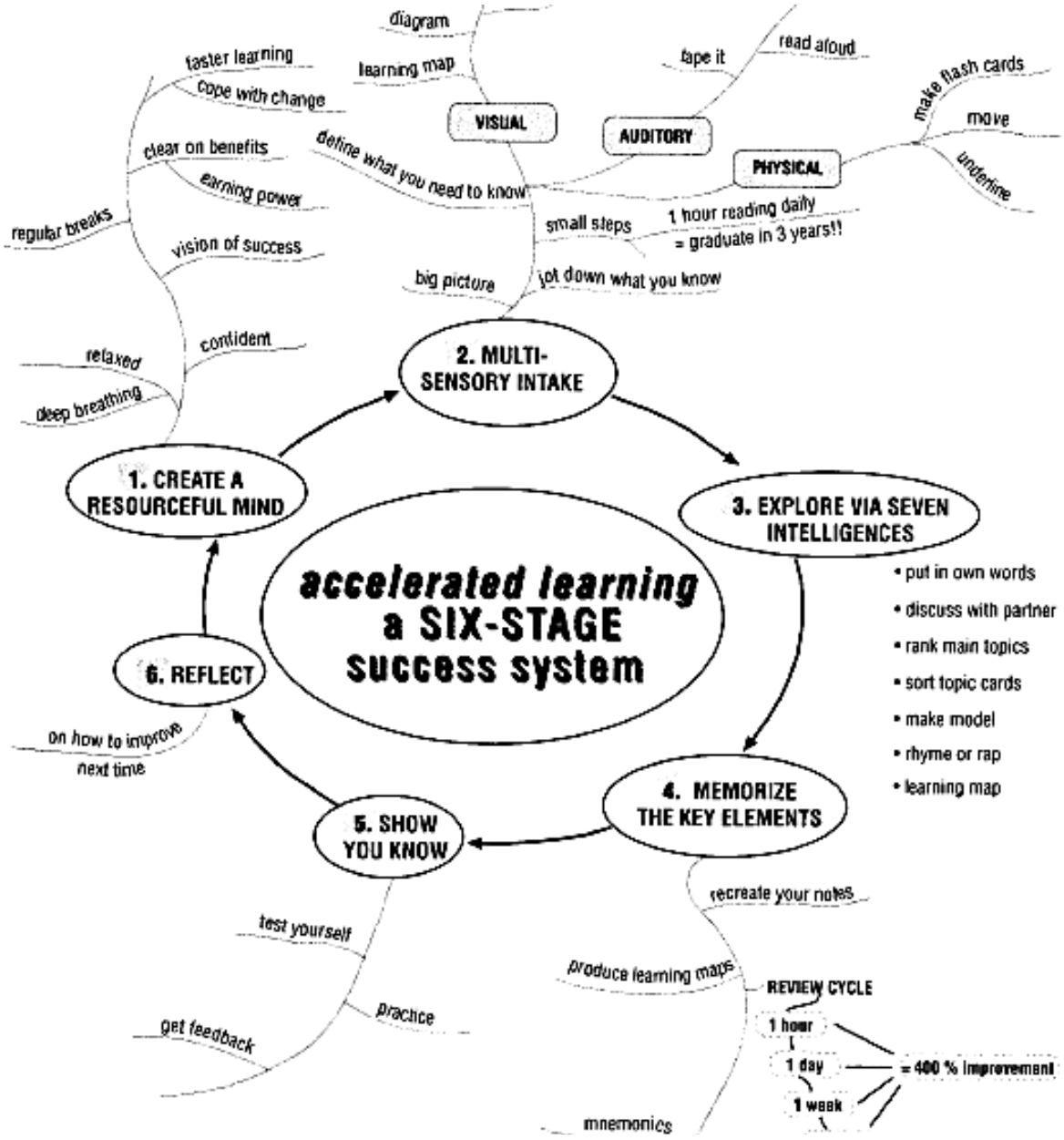


Figure 1.11. Mind map of Accelerated learning technique.

5. Learning comes from doing the work itself (with feedback). People learn best in context. Things learned in isolation are hard to remember and quick to evaporate. We learn how to swim by swimming, how to sing by singing, and how to care for customers by caring for customers. The real and the concrete are far better teachers than the hypothetical and the abstract - provided there is time for total immersion, feedback, reflection, and re-immersion.

6. Positive emotions greatly improve learning. feelings determine both the quality and quantity of one's learning. Negative feelings inhibit learning. Positive feelings accelerate it. Learning that is stressful, painful, and dreary can't hold a candle to learning that is joyful, relaxed, and engaging.

7. The image brain absorbs information instantly and automatically. The human nervous system is more of an image processor than a word processor. Concrete images are much easier to grasp and retain than are verbal abstractions. Translating verbal abstractions into concrete images of all kinds will make those verbal abstractions faster to learn and easier to remember [3].

CHAPTER II. CREATION OF EDUCATIONAL WEB APPLICATION “TEACHING TO SELF-EDUCATION” USING JAVA SERVER PAGES TECHNOLOGY

2.1. Web Application Structure "Teaching to self-education"

2.1.1. The goals and tasks of the web application

The purpose of developed web application it is to provide a platform for the study of methods of accelerated self-education and exchange of experience on this subject between users.

The goal of creating a web application - creating the educational platform for learning the basics of self-education.

Task of implementation the web application – it is the creation and delivery of the course on proactive and accelerated methods of self-education.

Users of the system:

1. People who want to educate themselves;
2. Teachers;
3. The students (15 to 25).

The main functions of the web application:

1. Register a new account;
2. Enabling the course on proactive and accelerated teaching methods
3. Save the results of the course.

2.1.2. Conceptual design of the web application

Main subsystems of web application:

1. Core
2. Administration module
3. Content
4. The User Control Panel
5. Database.

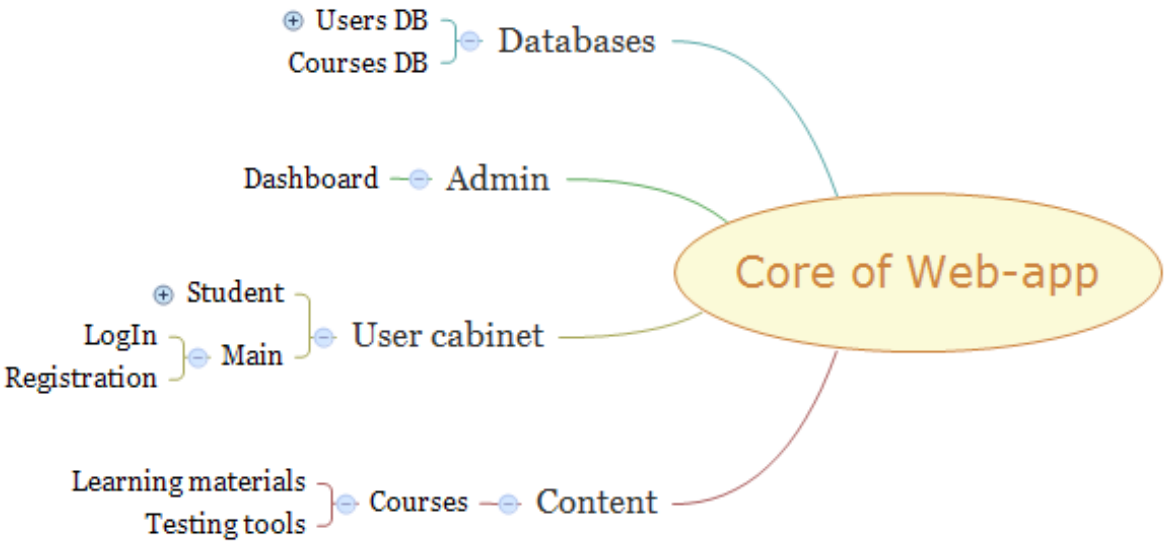


Figure 2.1. The architecture of web application.

The core of web application functions is a binder between the other subsystems of the web application.

The "Administration" subsystem used for data management of web application. This subsystem consists of the following modules:

1. Dashboard - used to configure Web application;
2. Superuser - is required to provide an interface for the administrator of the web application.

Subsystem "Content" needed to encapsulate the functionality of web application to work with the training courses presented in this web application. Core modules of "Content" subsystem:

1. Training materials;
2. Knowledge testing tools.

The subsystem "User Control Panel" is intended to provide users with tools to interact with the web application. This subsystem consists of the following modules:

1. Student - user account system;
2. Basic - contains general functions for the user.

The subsystem "Database" is intended to interact with a Web application database, which stores the necessary information.

2.1.3. Developing of the infological model for the web application

Infological structure of the web application consists of four main modules:

1. Home (About) - here is general information about the project, its goals, and mission;
2. My cabinet - designed for the user. Here are all the user tools to work with the web application;
3. Courses - in this section there is a course that can be studied using this educational web application;
4. Miscellaneous - there is various content information related to a given Web application, such as FAQ (Frequently Asked Questions), assistance, etc.

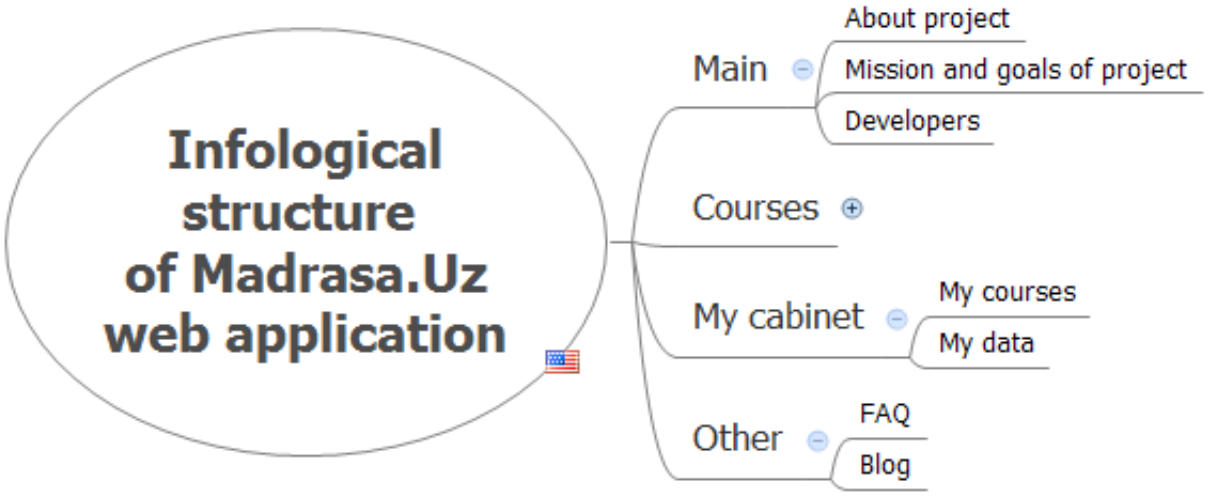


Figure 2.2. Infological structure of web application

2.1.4. Creating a web page layouts

Page layouts are created using Balsamiq Mockups application. Balsamiq Mockups is a graphical user interface mockup builder application. It allows the designer to arrange pre-built widgets using a drag-and-drop WYSIWYG editor. The application is offered in a desktop version as well as a plug-in for Google Drive, Confluence, and JIRA.

Welcome page

The welcome page is the website's home page and entry point for the application. It introduces the business and service to the user and enables the user to navigate to login or register page.

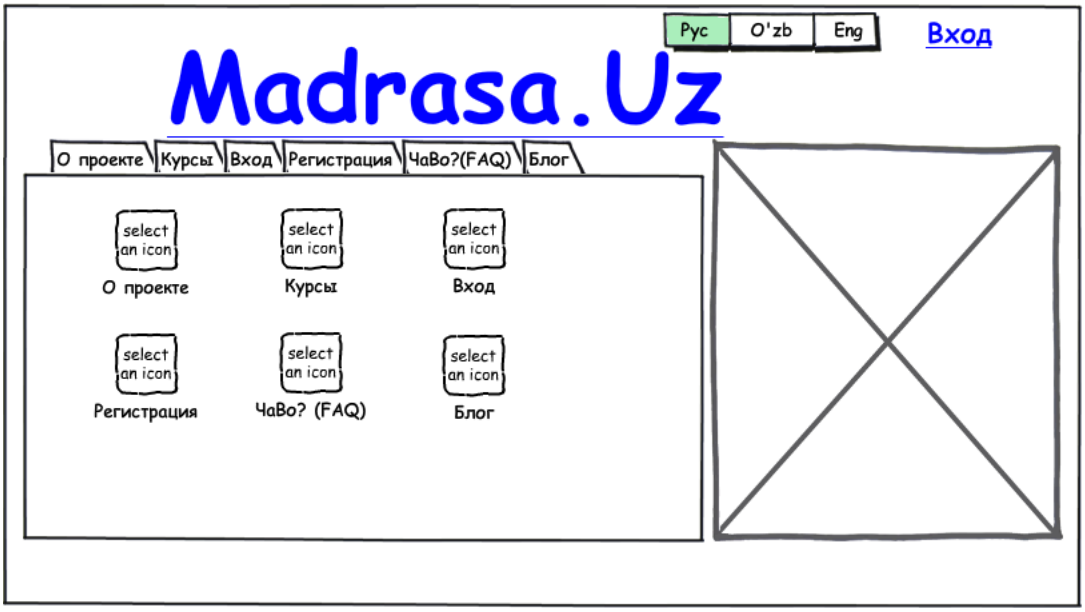


Figure 2.3. Main page

Courses page

The course page provides a listing of all products within the selected category. From this page, a user is able to view all courses that available on the platform. A user can also navigate to any of the provided course home pages.

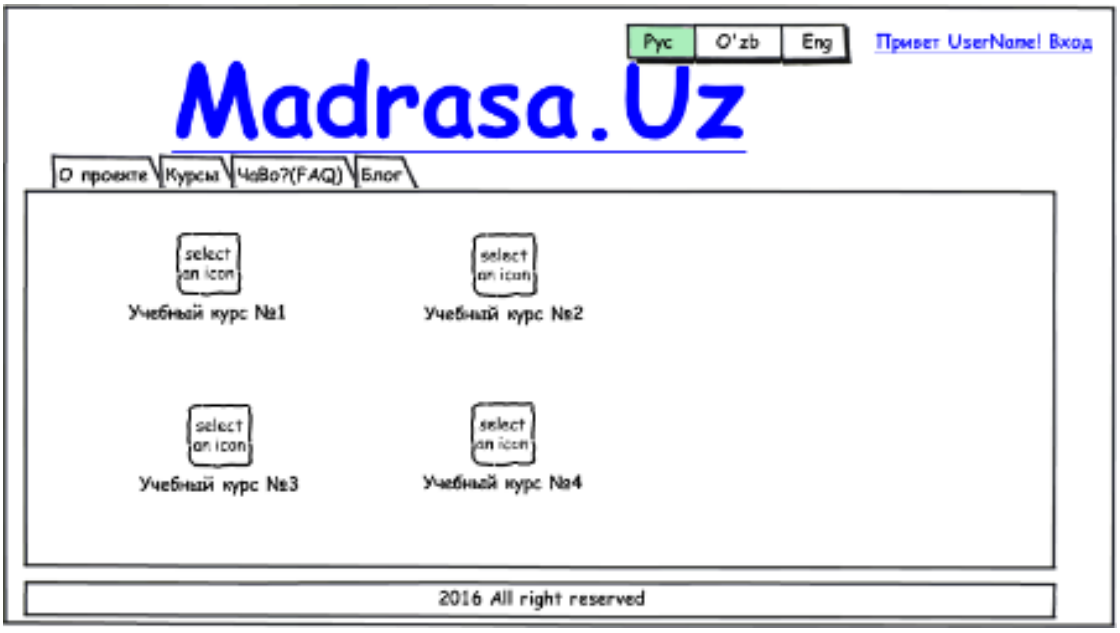


Figure 2.4. "Courses" pages

Course home page

This page provides basic information about the course and gives little information about course modules. On this page user can enroll for that course and navigate to course module page.

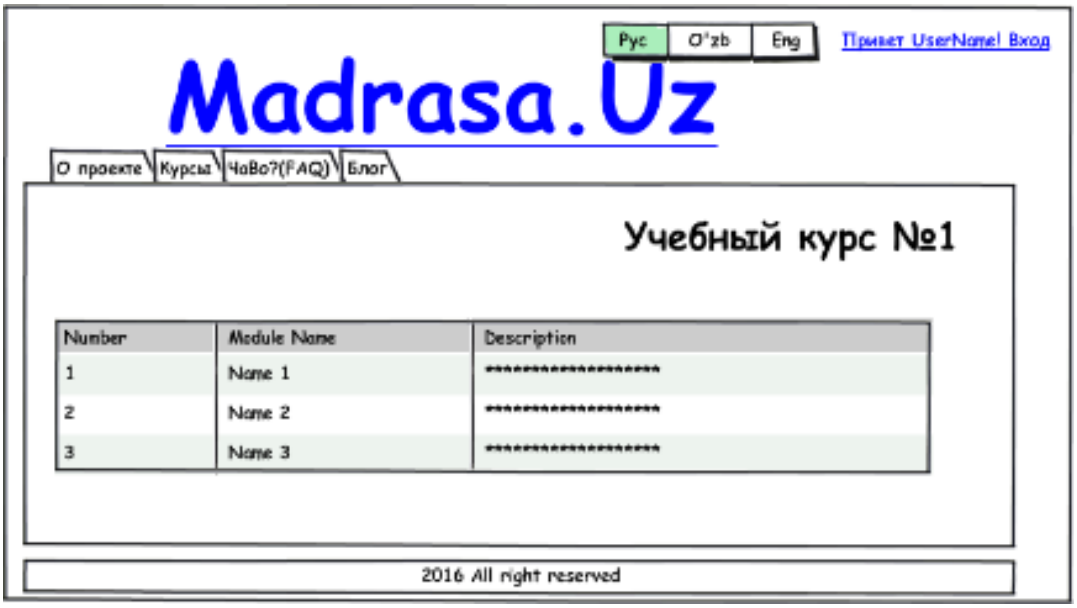


Figure 2.5. Chosen course page

Course module page

This page is designed for course module page. On that page user can find module lecture, additional materials, and quizzes.

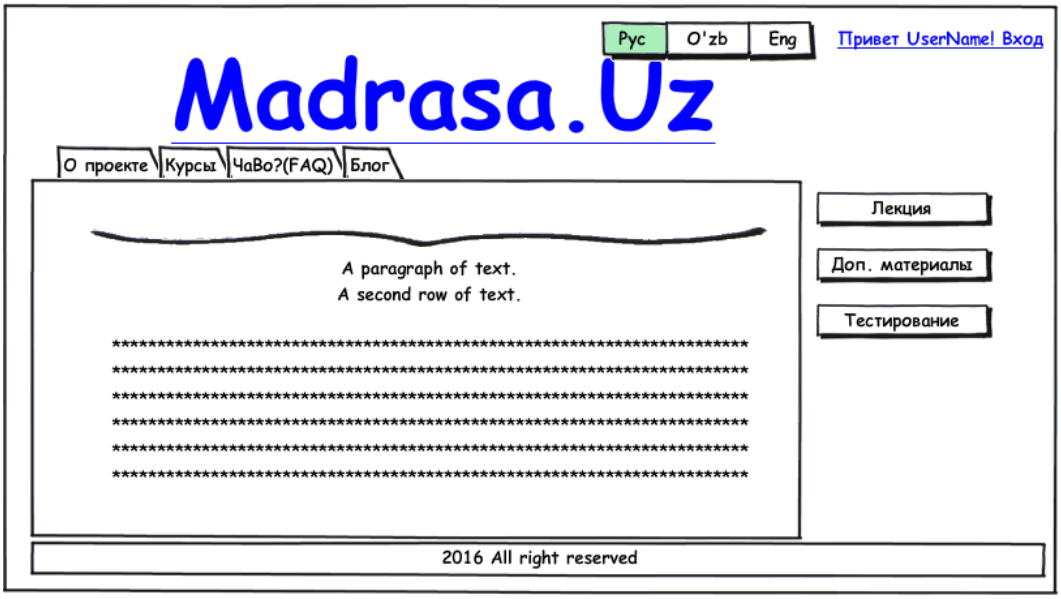


Figure 2.6. Course module page

User home page

User home page is an entry point for the user where he can find information about his information, courses for that he is enrolled. Also, he can set up basic configuration of his account.

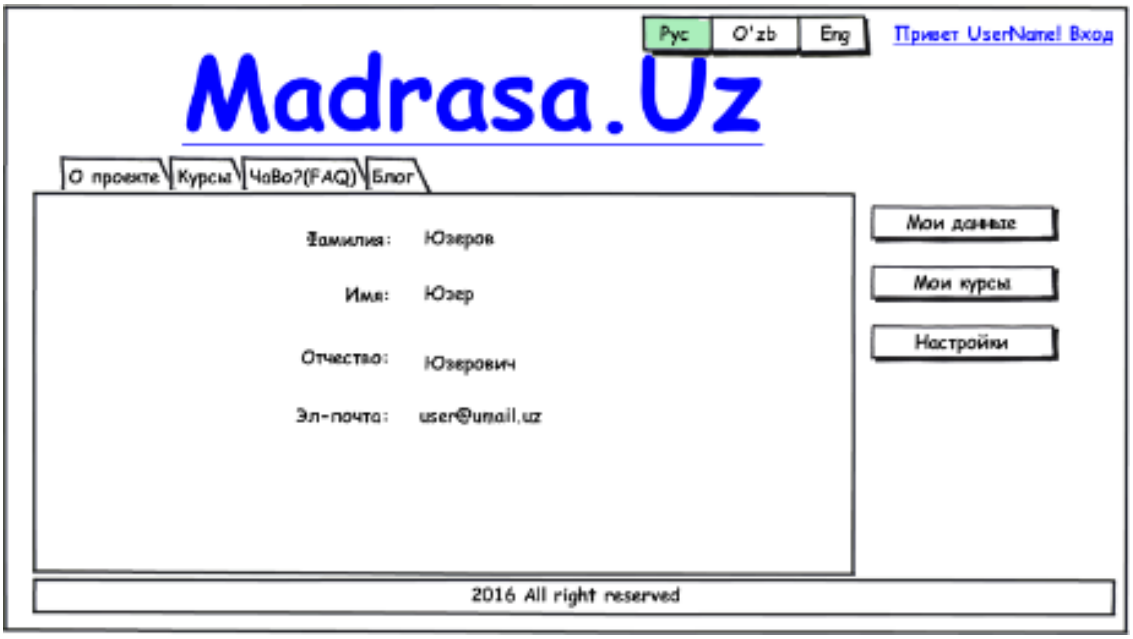


Figure 2.7. "User cabinet" page

2.2. Practical developing "Teaching to self-education" web application using JSP technology

2.2.1. Creating core of web application

In the course of designing a web application framework, and create web page layouts we:

I. Created the structure of the project file;

II. Identify common parts for all web pages of a web application that can be excluded into separate files - JSP segments, also known as JSP Fragment.

The process of creating JSP Fragment File

1. Call the context menu of our project by right-clicking on the project folder where you want to place the generated file. In this menu, select the item New -> Other. After that there is appear a dialogue window Create a file;

2. In this dialog box, under Categories, select Web and then under the File Types choose JSP. After that, click the Next button;

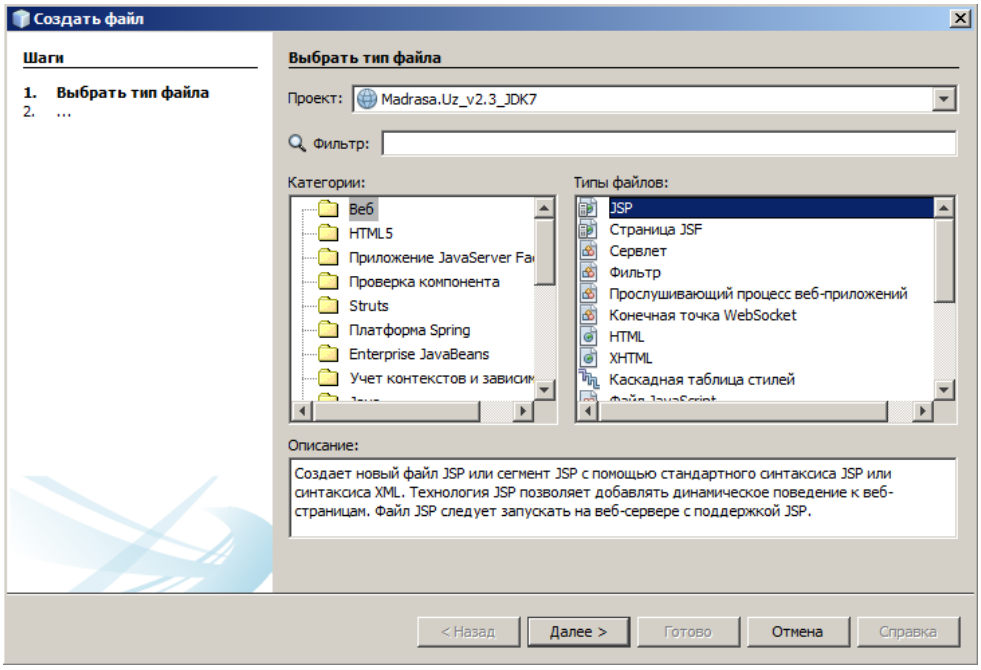


Figure 2.8. Dialogue box Create file

3. In the next window, we can specify the file name and location in the project folder hierarchy, in which we want to save the file. The main part of this window is the Settings section, where we have to check the box Create a JSP segment. This is necessary in order for the NetBeans IDE to create JSP fragment and save it file with the extension .jspf.

4. By setting these settings click the Finish button.

5. The NetBeans IDE generates jspf with standard file contents.

After that we have to write in the file appropriate code based on the destination JSP pages in this segment. In this case, the contents of the web pages of the title.

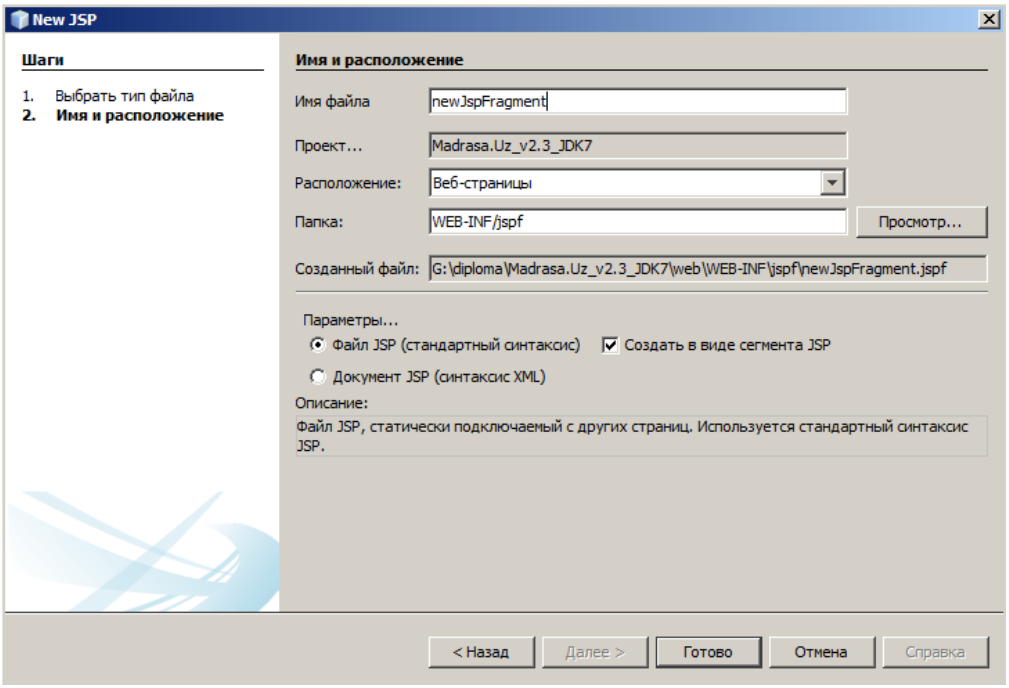


Figure 2.9. Dialogue box of setting up name and configuration of jspf file

```
<%@page import="entity.User"%>
<%@ page pageEncoding="UTF-8" %>
<%@page import="javax.servlet.http.HttpSession" %>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <link href="resourses/css/loginStyle.css" rel="stylesheet" type="text/css" />
        <link rel="stylesheet" type="text/css" href="resourses/css/courseStyle.css">
        <link rel="stylesheet" type="text/css" href="resourses/css/main.css">
        <!--<link rel="stylesheet" type="text/css"
href="resourses/css/bootstrap.min.css">-->
        <title>Madrasa.Uz</title>
    </head>
    <body>
        <%request.setCharacterEncoding("UTF-8");%>
        <div id="main">
            <div id="header">
                <div id="widgetBar">
```

```
<%
    User u = (User) request.getSession(false).getAttribute("user");
    if (u != null) {%>
<div class="userHeaderWidget">
    <b>Привет,
        <a
href="<%=getServletContext().getContextPath()%>/userCabinet/main.jsp">
            <%= u.getUserName() + " " + u.getUserSurname()%></a> !
</b>
    <a
href="<%=getServletContext().getContextPath()%>/logout.jsp">Выйти</a>
</div>
<%} else {
%>
<%}%>
<div class="userHeaderWidget">
    [ <span class="lang-list">
        <a
href="<%=getServletContext().getContextPath()%>/resourses/images/ru.jpg"
title="Русский"> Русский
            <img
src="<%=getServletContext().getContextPath()%>/resourses/images/ru.jpg">
        </a>
        ~|~
        <a
href="<%=getServletContext().getContextPath()%>/resourses/images/uz.jpg"
title="Узбекский">
            <img
src="<%=getServletContext().getContextPath()%>/resourses/images/uz.jpg">
            Узбекский</a>
```

```
            </span> ]
          </div>
        </div>
        <a href="index.jsp" style="font-family: 'Jokerman'; font-size: 70px;
color: #0000cc;">
          <!--<img src="resourses/images/logo.png" id="logo" alt="Madrasa.Uz
logo">-->
          <p>'Ma`dra*sa . U z'</p>
        </a>
        <nav id="nav01"></nav>
      </div>
```

After you create a fragment, you must add it to the web page. There are 3 options to do this:

Adding setup note in the deployment descriptor for any web pages you want to include this fragment. This option is mainly intended to include the title (header) and footer (footer) web page. For this:

1. Open the NetBeans IDE in the web.xml file editor;

i. Go to the Page section and click the Add button in the JSP Property Group;

ii. After this there is appear Add JSP Property Group dialog box, where you need to:

a. Set the name of the JSP Property Group in the Display Name box;

b. Write an explanatory description of the group;

c. Add jsp page addresses templates for which you want to include that segment. For convenience, you can use the Browse button and select the Web page files from the list. Then click OK.

iii. Further, in the Pages window, you must specify additional settings for web pages, addresses that match the patterns of addresses specified in the previous window. List of additional settings:

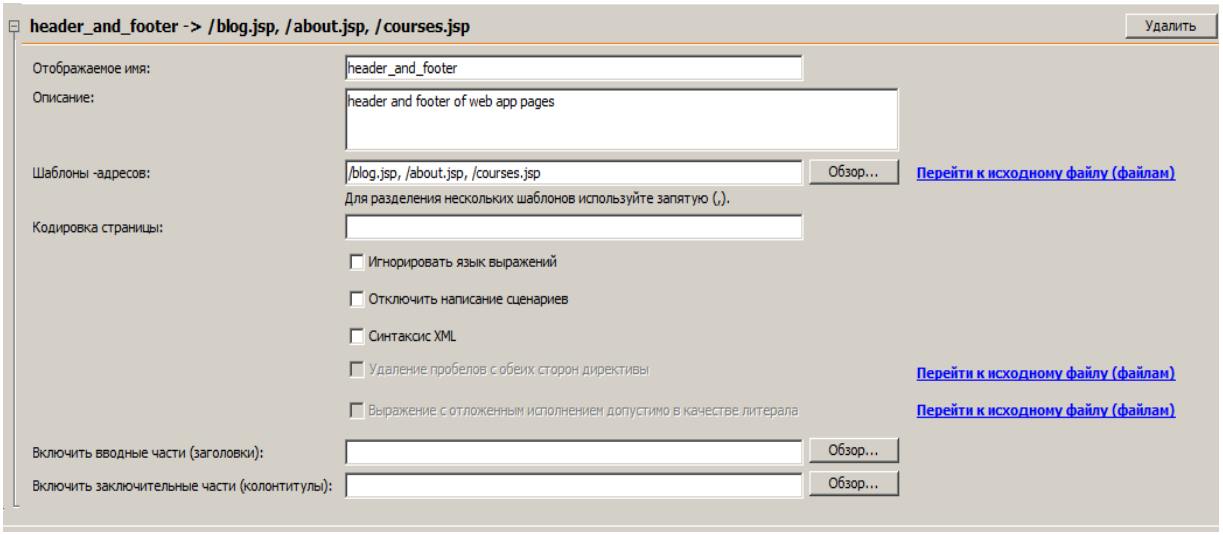


Figure 2.10. Pages widget in web.xml

a. Encoding page - to specify the encoding of the page;

b. Include introductory part (headers) - to refer to the address of file, which will be header of web pages;

c. Include final part (footers) - to refer to the address of file, which will be the footer of web pages;

d. After that, you need to save the project.

Next method is using the <jsp: include page = "path" /> tag. Instead of the word path should be a path to jspf file that you want to include in the jsp page.

And the last method is including in a jsp file jspf fragment using <% @ include file = "path"%> directive. Instead of the word path should point to jspf file that you want to include in the jsp page.

Model–view–controller (MVC) is a software architectural pattern. It divides a given software application into three interconnected parts, so as to separate internal representations of information from the ways that information is presented to or accepted from the user and controlling data transfer between database and user side.

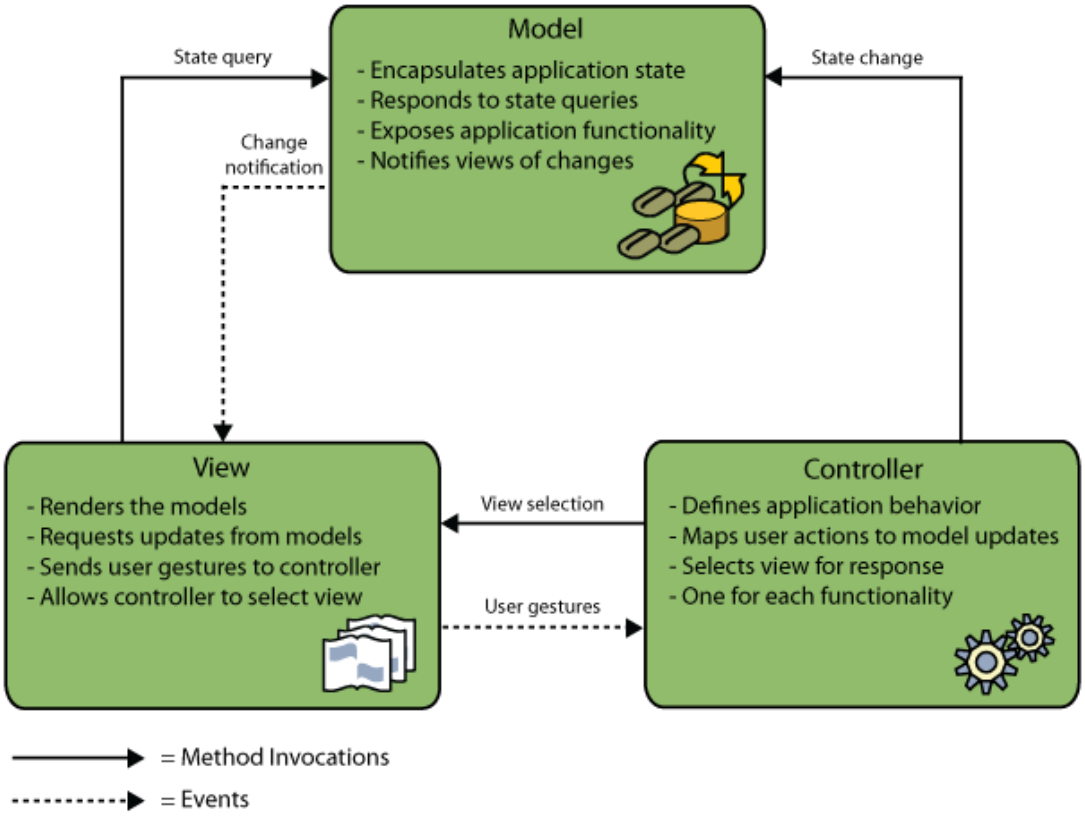


Figure 2.11. MVC pattern schema

For example, we will create a bunch of MVC for a registering system for a new user in the web application.

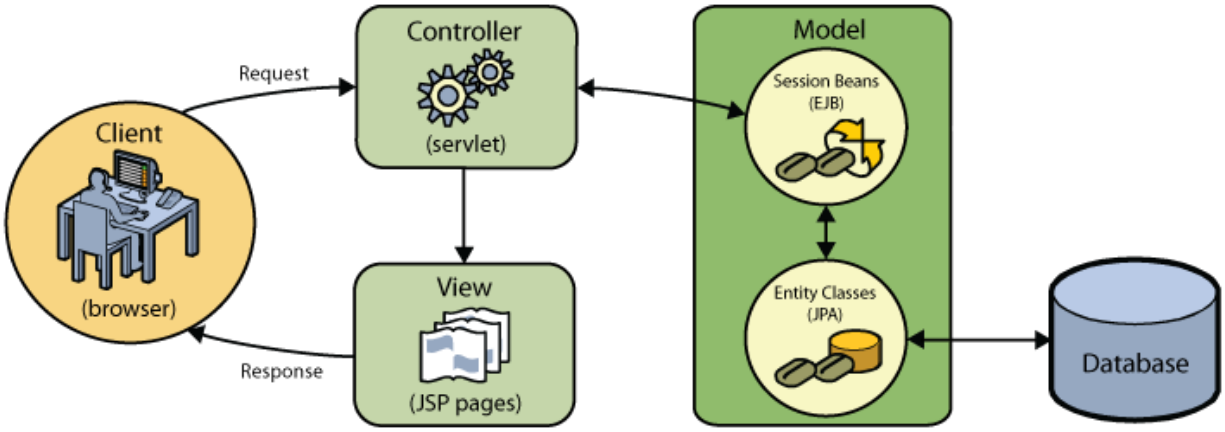


Figure 2.12. The request processing when MVC pattern is used.

For the first we need the MVC view model element, i.e. jsp page. For this:

1. Call the context menu of our project by right-clicking on the project folder where you want to place the generated file. In this menu, select the item New -> Other. After that there is a window Create a file;

2. In this dialog box, under Categories, select Web and then under the File Types choose JSP item. After that, click the Next button;

3. In the window that appears, you need to specify the file name and location for saving. After that, to save performed actions you need to press the Done button.

The NetBeans IDE creates the jsp file in which we must include code that is provided in the appendix № 1.

After that we need to create a control element of MVC pattern that handles the client request. For this:

1. Call the context menu of our project by right-clicking on the project folder where you want to place the generated file. In this menu, select the item New -> Other. After that there is a window Create a file;

2. In this dialog box, under Categories, select Web and then under the item types Servlet files. After that, click the Next button;

3. In the window that appears, you need to specify the file name and save location.

4. By clicking Next, we turn to the window settings servlet deployment where you need to specify the following settings:

a. Checkbox Adding information to the deployment descriptor (web.xml) to specify the NetBeans IDE to add information about this servlet in the web.xml file;

b. The name of the servlet through which you can access it from different elements of the project;

c. Template (s) URL-addresses for specified address template with which you can access from jsp pages project.

As you can see from the screenshot servlet name may differ from the template URL-addresses, as well as the fact that you can choose several templates URL-addresses. After that, to save the generated actions you need to press the Done button.

NetBeans IDE creates a .java file in which you must enter the controller's code that provided in the appendix №2.

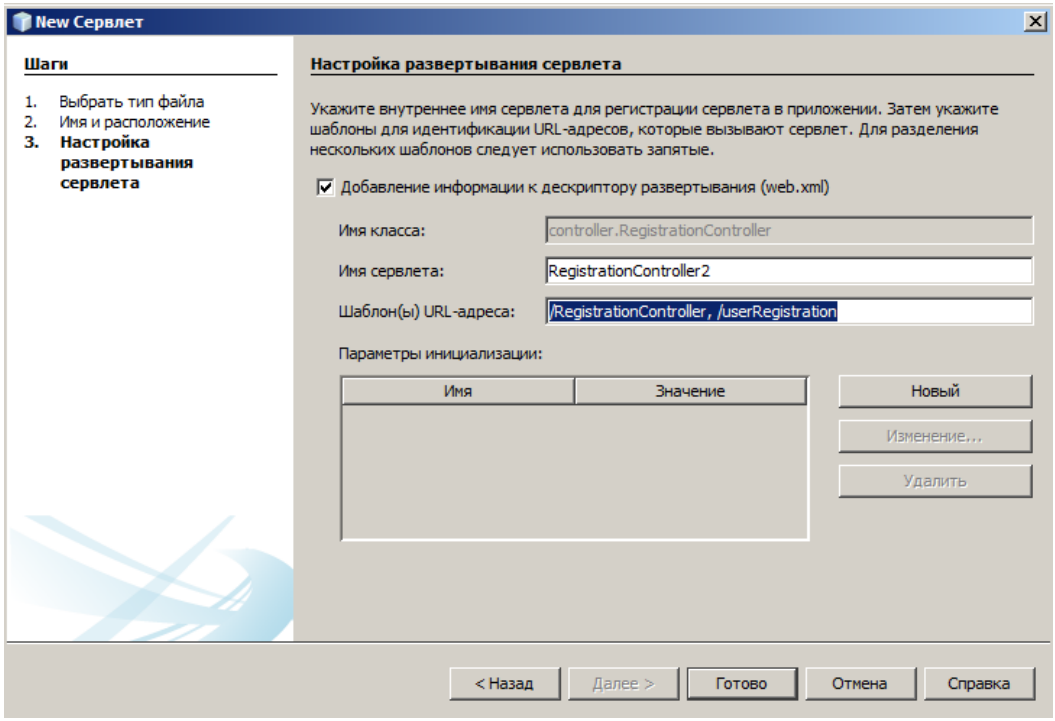


Figure 2.13. Dialogue box creating and setting up servlet

Following the principle of "divide and rule" and the purpose of the separation of business logic between the servlet and other components of the project we must create a java class. This class is responsible for:

- Processing received registration information about the user;
- Interaction with the database - Query sending and receiving a response from the database;
- Issuance of a servlet response that caused the class, the result of processing the received information and interaction with the basis for a new user registration data.

To create this class, we need:

1. Call the context menu of our project by right-clicking on the project folder where you want to place the generated file. In this menu, select the item New -> Other. After that there is a window Create a file;
2. In this dialog box, under Categories, select Java and then under the File Types choose Java Class item. After that, click the Next button;
3. In the window that appears, you need to specify the file name, the folder where to save that file and then click Finish.

As a result of this programming environment generates java class with template content. After that, we need to write the code that provided in the appendix №3.

Model data in our MVC bundle of elements serves java bean User class that we created by the database table User. This is implemented by including Hibernate platform in our project. A description of this process is given in section 2.2.2.

Java Bean is a class:

- of any name that is implement a Serializable interface;
- that contains a default no argument constructor;
- all properties of it start with get / set -PropertyName. Except Boolean properties - they start with is -PropertyName;
- all properties named in camel notation.

The code of User java bean is provided in the appendix №4.

2.2.2. Development of a database and its binding to the Web applications using Hibernate platform

After that, we create the general infological structure of web application we need to develop an informational model of a database of the web application. For that purposes, we use MySQL RDMS and MySQL Workbench.

MySQL - free relational database management system. Development and support for MySQL provide Oracle Corp. The product distributed under the GNU General Public License, as well as under its own commercial license.

MySQL is a solution for small and medium-sized applications. Included in the WAMP Server, AppServ, LAMP and portable build servers Denver, XAMPP, VertrigoServ. MySQL is usually used as a server that is accessed by local or remote clients, but in the distribution includes a library of internal server that allows MySQL to include stand-alone programs.

MySQL Workbench it is a visual environment for working with MySQL RDMS and creating a visual model of the database and parse it into SQL script. It also can reverse engineering existing database and create its visual model.

Using MySQL Workbench has been created a database model (figure 2.13).

Hibernate – it is a library for the Java programming language designed for solving the object-relational mapping (ORM) tasks [8].

This library provides a platform (framework) for displaying an object-oriented data model in traditional relational databases and vice versa.

Adding ORM Hibernate platform web application project

After creating an actual database, we need to add the Hibernate platform library in our project for binding web application and its database. For this:

1. It is necessary to open the project properties window. For this right-click on the project name. In the context menu select Properties;
2. A window Project Properties Madrasa.Uz appear;
3. Press the Add button in this window. In the resulting dialog box, select the Add Hibernate 4.3.1 platform and click OK;
4. Next in the Project Properties Connection to the database field is necessary to select reference to the actual database for that project;
5. If in the list does not exists link to the database it is necessary to select a New connection to the database. After this appears a dialog box for the new connection wizard;

a. Here you need to select the database driver, add the database driver file as needed, and click Next;

b. In the Connection setup window, you need to put down the address, port, database name, username and password of the database.

6. Click OK in the Project Properties Madrasa.Uz to save changes.

After that NetBeans IDE makes the necessary procedures for adding files and setting up platform definition for Hibernate to our project.

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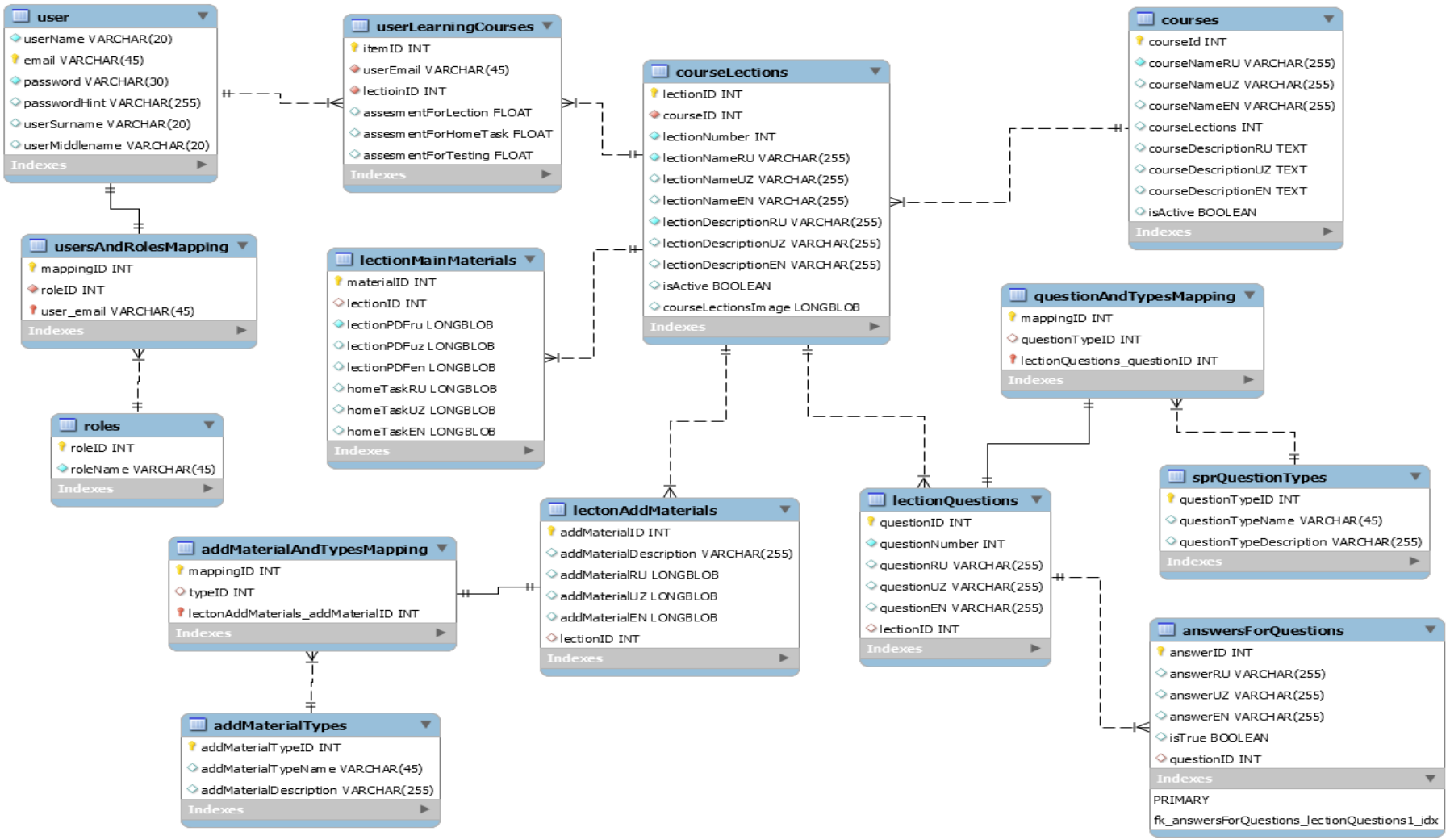


Figure 2.14. Infological model of web application

Then we need to add the Hibernate reverse engineering settings file into the project. For this:

1. Call the context menu of our project by right-clicking on the project. In this menu, select the item New -> Other. After that there is a window Create a file;

2. In this dialog box, under Categories, select Hibernate library and then under File Types choose Hibernate Reverse Engineering Wizard. After that, click the Next button;

3. In next window, we can specify the file name and select a project folder in which we want to keep that configuration file. By setting up this information click the Next button;

4. Then there are window database tables, where you need to select the table that we want to convert to java classes, under Available Tables and click Add.

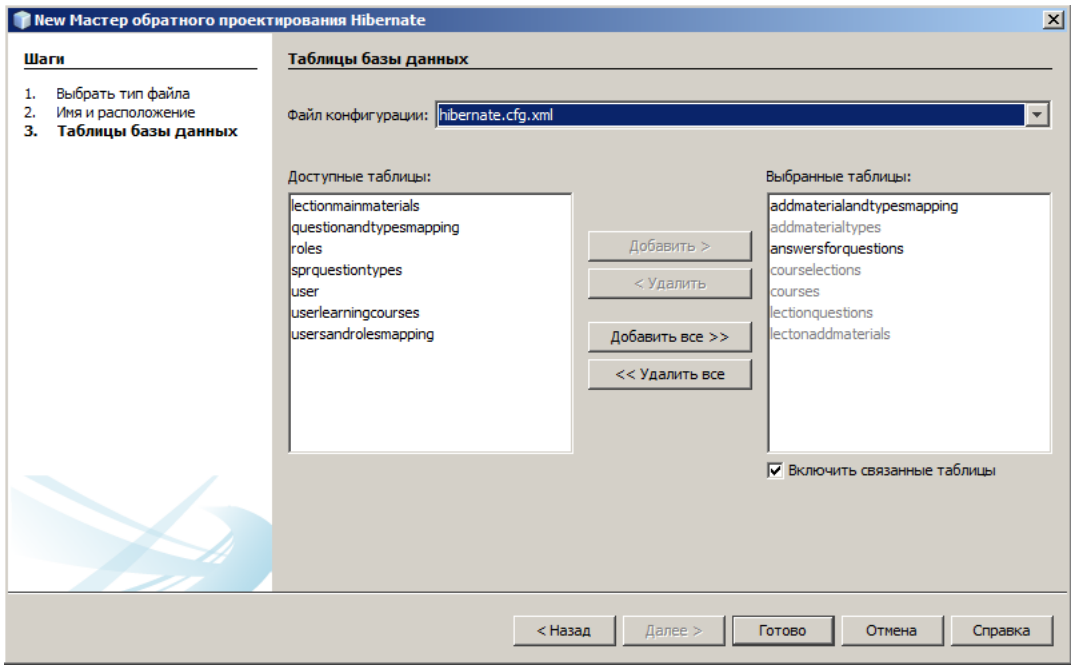


Figure 2.15. Dialogue box of choosing tables of database for which needed objects in the web application

In order to save the above actions, you need to press the Done button.

As a result, NetBeans IDE creates hibernate.reveng.XML file that stores configuration information and a list of database tables that need to be converted to java classes.

At the end of implementation Hibernate platform, we need to create POJO (Plain Old Java Object) classes for entities from the tables of our database. For this:

1. Call the context menu of our project by right-clicking on the project. In this menu, select the New -> Other. After that there is a window Create a file;
2. In this dialog box, under Categories, select Hibernate library and then under File Types choose Hibernate mapping files and POJO objects from the database. After that, click the Next button;
3. Thereafter, in the Create code window it is necessary to make the tuning steps:

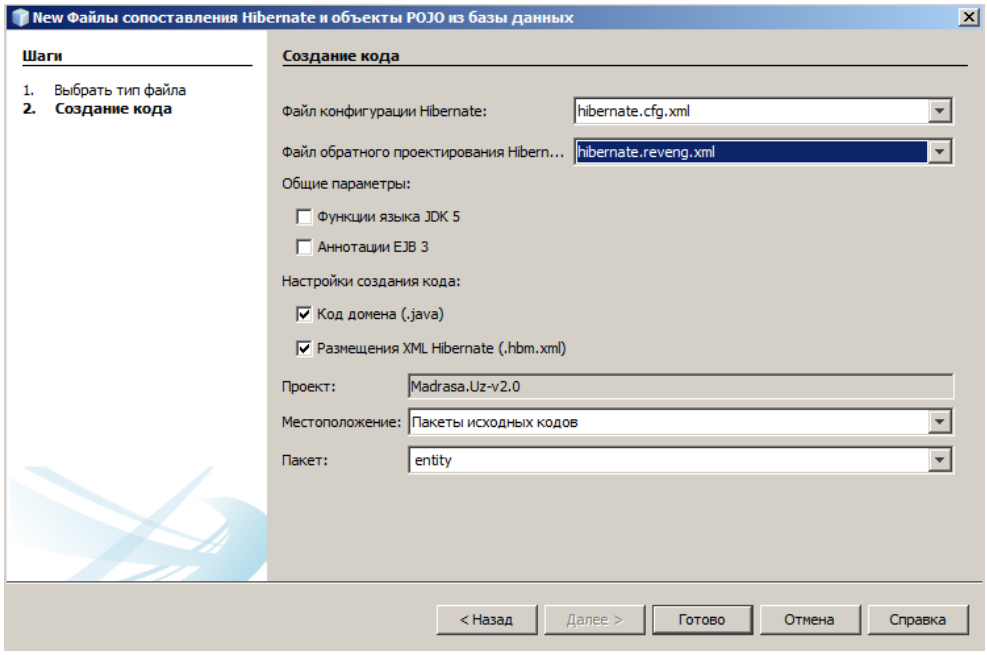


Figure 2.16. Create code window of Hibernate mapping files and POJO objects from the database dialogue box

a. Select the Hibernate configuration file;

b. Select Hibernate reverse engineering file;

c. Select the check box JDK 5 language features if your platform is the fifth version of the Java programming language;

d. Select the EJB 3 annotations checkbox if you want to use EJB technology;

e. Selecting Domain code (.java) check box provide guidance to the master to create POJO classes on the basis of the entity from the database tables, and checking the Offering XML Hibernate (.hbm.xml) will point to the creation of XML files for entities from data tables;

f. Select a package in which to create data files.

4. At the end of the above actions, you need to press the Done button.

As a result of the NetBeans IDE generates the necessary files in the directory entity.

2.3. Methods of using developed web application in education process

2.3.1. Installing and configuring web application on web server

Developed education web application Madrasa.Uz may be used in the colleges, academic lyceum and higher educational institutions for teaching created course on self-education.

For that purposes, the web application must be installed on the web server. Requirements for dedicated web server:

1. Operating system: Windows or Linux;
2. Java platform: version 1.8;
3. Application server: GlassFish 4.1 Community Edition web server;
4. RDBMS: MySQL 5.7.

2.3.2. Using web application to teaching the course "Teaching to self-education"

After that, we install and configure web application first of all students need to be registered in the web application. For that:

1. Перейти по адресу localhost:8080/Madrasa.Uz/
2. After that home page is loaded choose Registration (Регистрация) button;

3. When registration page is loaded enter your personal information into the appropriate fields and then click Send (Отправить) button;

Figure 2.17. Madrasa.Uz home page

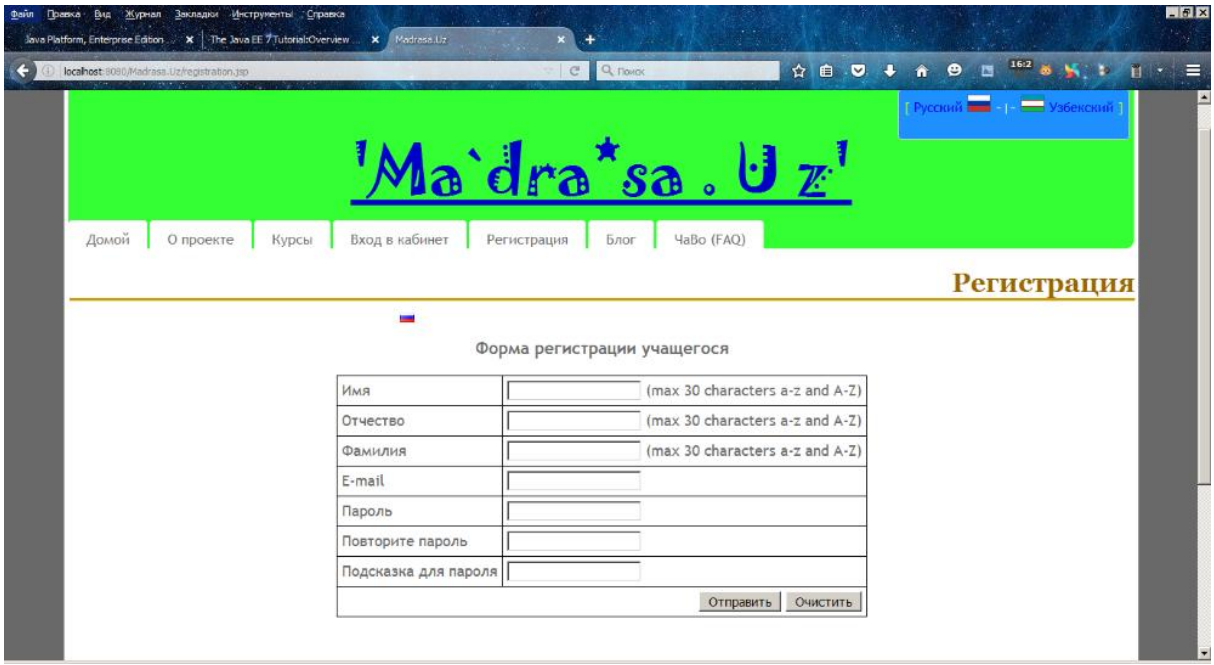


Figure 2.18. Madrasa.Uz registration page

After that, you successfully register in the web application you need to login into the system. For that:

1. Turn to home page and choose Login (Вход в систему);
2. Enter your credentials, i.e. your e-mail and password;
3. Then click Enter (Вход) button.

Figure 2.19. Madrasa.Uz login page

After that, your home page is loaded. Ther you can find 3 basic buttons:

1. My information (Мои данные) – there you can find you registration information;
2. My courses (Мои курсы) – there will appear list of courses for that you enrolled;
3. Settings (Настройки) – there you can configure your cabinet.

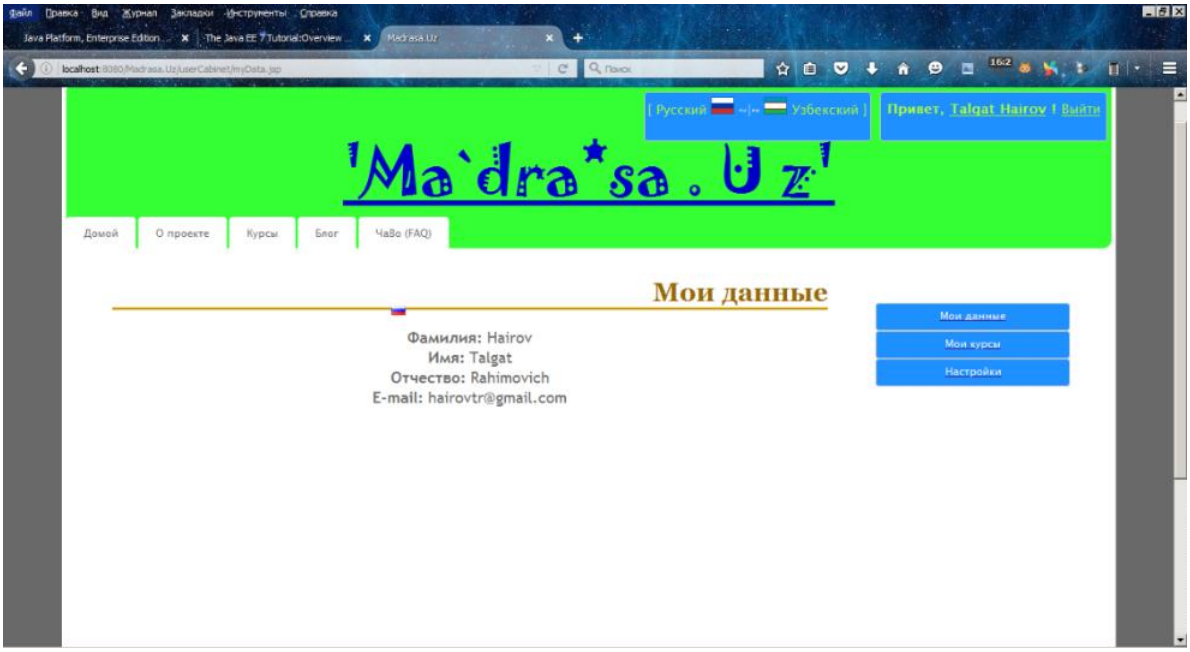


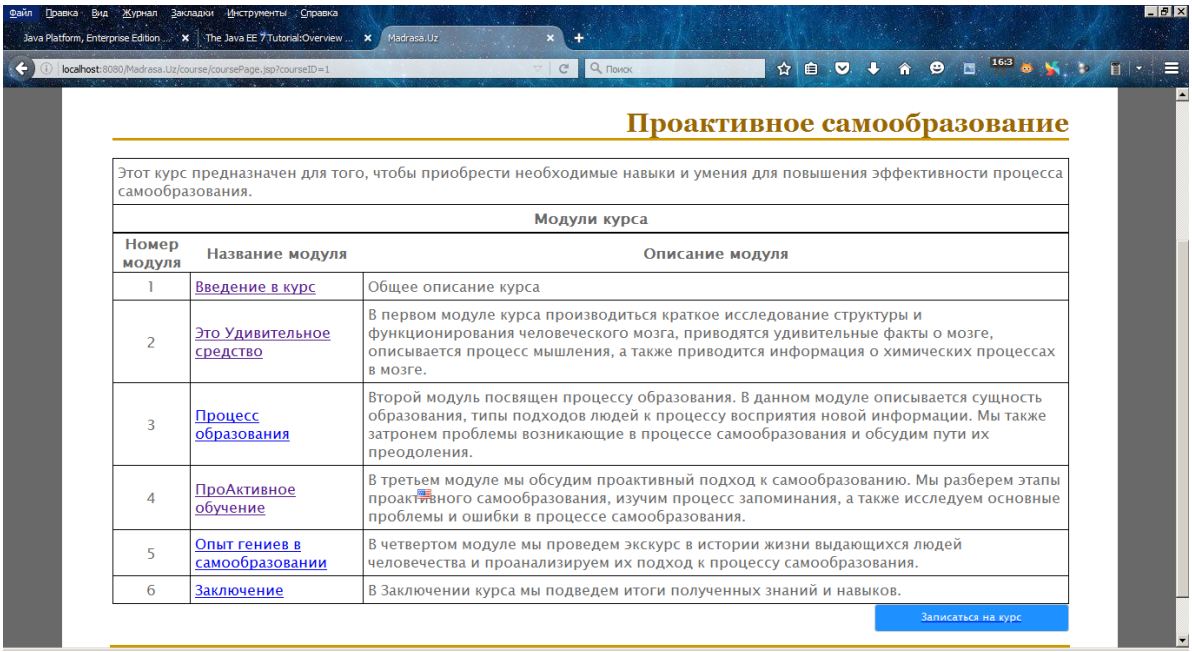
Figure 2.20. Madrasa.Uz user home page

For viewing courses that available on a web application, you can use Courses (Курсы) button below Madrasa.Uz logo.

After that there will appear web page with the list of available courses. Choose on of them to go to the home page of that course.

Figure 2.21. Madrasa.Uz courses list page

If we choose the course «Teaching to self education» (Проактивное самообразование) there will appear home page of that course with it list of modules.



Проактивное самообразование

Этот курс предназначен для того, чтобы приобрести необходимые навыки и умения для повышения эффективности процесса самообразования.

Модули курса

Номер модуля	Название модуля	Описание модуля
1	Введение в курс	Общее описание курса
2	Это Удивительное средство	В первом модуле курса производиться краткое исследование структуры и функционирования человеческого мозга, приводятся удивительные факты о мозге, описывается процесс мышления, а также приводится информация о химических процессах в мозге.
3	Процесс образования	Второй модуль посвящен процессу образования. В данном модуле описывается сущность образования, типы подходов людей к процессу восприятия новой информации. Мы также затронем проблемы возникающие в процессе самообразования и обсудим пути их преодоления.
4	ПроАктивное обучение	В третьем модуле мы обсудим проактивный подход к самообразованию. Мы разберем этапы проактивного самообразования, изучим процесс запоминания, а также исследуем основные проблемы и ошибки в процессе самообразования.
5	Опыт гениев в самообразовании	В четвертом модуле мы проведем экскурс в истории жизни выдающихся людей человечества и проанализируем их подход к процессу самообразования.
6	Заключение	В Заключении курса мы подведем итоги полученных знаний и навыков.

Записаться на курс

Figure 2.22. Chosen course page

To view a module of that course choose one of the available modules. After that will appear the page of that module, where you can find educational materials

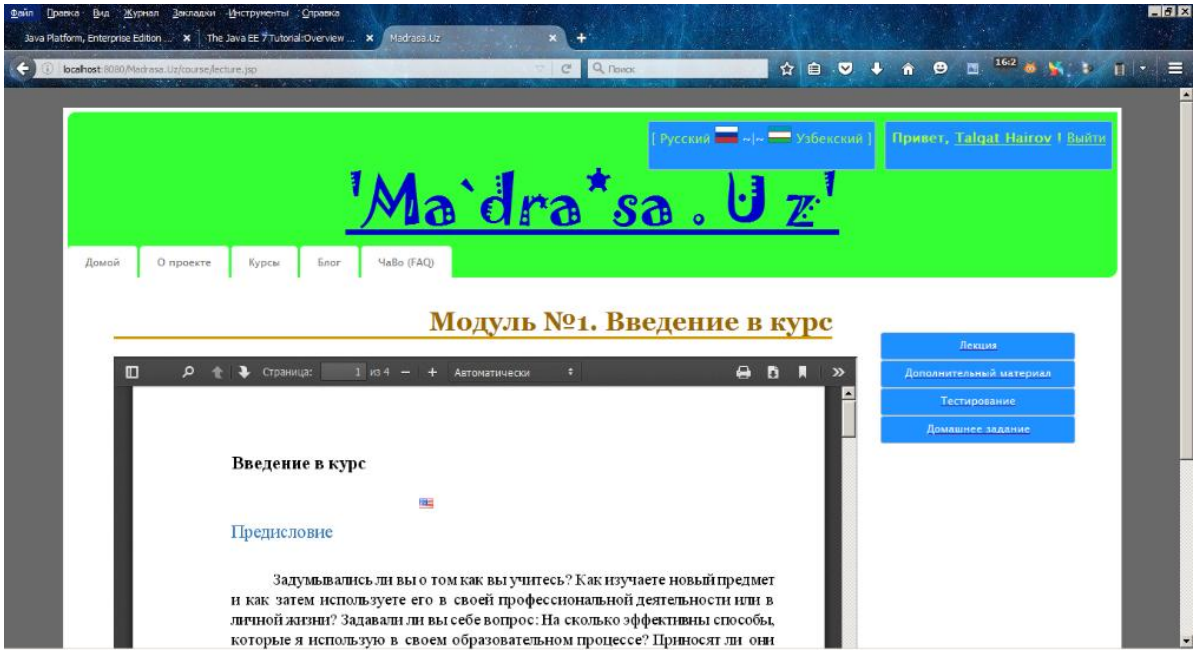


Figure 2.23. Chosen module page

CHAPTER III. LIFE SAFETY. ECOLOGY. ERGONOMICS

3.1. Hypodynamy

Hypodynamy (physical inactivity or reduced mobility, from the Greek . hypo - « an » and dynamics - « force ») - disruption of the body (musculoskeletal , circulatory, respiratory, digestive) with limited physical activity, reducing the force of contraction of the muscles. The prevalence of physical inactivity is increasing due to urbanization, automation and mechanization of labor, increasing the role of communication.

Physical inactivity is a consequence of man's liberation from physical labor, it is sometimes called the “disease of civilization”. Especially physical inactivity affects the cardiovascular system - weakens the force of heart contractions, reduced work capacity, reduced vascular tone. The negative effect on energy metabolism and decreases blood flow to tissues. As a result of defective lipolysis, blood becomes "fat" and lazily flows through the vessels , - the supply of nutrients and oxygen is reduced. The consequence of inactivity can become obese and atherosclerosis.

Due to lack of physical activity, a person more and more time is spent sitting or lying position. Many of us have a whole load of the limited road from the entrance to the car. Without the work of the muscles gradually weaken and atrophy. Reduced strength and endurance, broken nerve reflex connections, leading to frustration of the nervous system (developed vegetative-vascular dystonia, depression myofascial syndromes), the metabolism. With the passage of time due to physical inactivity are increasing changes in the musculoskeletal system: progressively reduced bone mass (osteoporosis develops), suffers a function of the peripheral joints (osteoarthritis) and spine (low back pain). Prolonged lack of exercise leads to cardiovascular diseases (coronary heart disease, hypertension), respiratory disorders (chronic obstructive pulmonary disease) and digestive (bowel dysfunction).

Chain due to endocrine disorders inactivity manifests metabolic syndrome (obesity, insulin resistance and increased risk of atherosclerosis). All of these changes ultimately lead to a reduction in lifetime. To identify at an early stage of the disease, caused by physical inactivity is a necessary laboratory and instrumental examination. It is also important to note that physical inactivity negatively affects the work of the brain. As a result, self-give to know the following symptoms: general weakness, decrease disability, insomnia, decreased mental activity, excessive fatigue, and others. When inactivity also noted a decrease in lung capacity and pulmonary ventilation. Quite often you can observe and decrease in the intensity of gas exchange. Due to lack of movement cardiovascular system deteriorates.

Rehabilitation

When inactivity caused by acute or chronic disease, it is necessary to resort to medical care. The clinics of nervous diseases and orthopedics conducted a comprehensive recovery of the body after a period of inactivity - with the participation of neurology, orthopedics, nutritionist, massage therapist and instructor of physiotherapy (physical therapy). Individual lessons gymnastics, combined with physiotherapy, massage, nutrition program, - help restore muscle tone, help to normalize body weight, stabilize the internal organs. Developed movement patterns help to keep the achieved results for a long time.

Physical inactivity: the symptoms, its consequences, and prevention

Regular physical activity is necessary for all people regardless of age and gender. Systematic training strengthens the muscular system, including the myocardium, serve as prevention of stagnation in the lungs, improve the circulation of blood in the vessels. People who exercise regularly have a good memory, high efficiency, and good immune status.

Lack of exercise - one of the most urgent problems in the world today. A disease called this term does not exist in medicine, but this condition can lead to impairment of the function of many organs and systems. That's why doctors around the world every year paying inactivity among the population more and

more attention. On the meaning of this term is not difficult to guess, "lack of exercise" means "reduced activity".

Reasons for inactivity

The main reason for inactivity in people in the modern world is obvious. Technological advances make human life more comfortable, but few people think that the decline in physical activity, for example, when using a personal vehicle, a negative impact on health. In addition, lack of exercise constant companion of people so-called sedentary occupations (programmers, manager , etc.). Do not shy away from this issue and children, especially school age who are after school (during which they also sit) prefer to spend their free time at home on the computer and not in the street.

Of course, there are reasons why people have had limited movement, such as severe illness or in the result of the injury. But even in such cases, patients should go. No wonder the ancient healers said: "Movement - this is life."

Symptoms of inactivity.

Physical inactivity - a condition that is accompanied by a huge number of symptoms, most of which - and this is a consequence of the lack of physical activity. The following main features:

- lethargy, drowsiness;
- a bad mood, irritability;
- general malaise, fatigue;
- loss of appetite;
- sleep disturbance decreased performance.

Similar symptoms may occasionally feel almost everyone, but few associates them with physical inactivity. Therefore, the appearance of such signs should consider whether there is enough time you devote to physical training.

The long-term decline in physical activity results in changes in muscle atrophy, bone metabolism is disturbed, reduced protein synthesis.

Hypodynamy extremely adverse effect on the operation of the brain, there are headaches, insomnia, people become emotionally unbalanced. Another one of the signs of physical inactivity - increased appetite, thereby increasing the amount of food consumed. Reduced physical activity and excessive food can quite quickly lead to the development of obesity, which contributes to disorders of lipid metabolism and atherosclerosis. It is known that presence of arteriosclerosis significantly increases the risk of cardiovascular diseases. This contributes to the increased fragility of blood vessels, which is also a consequence of metabolic disorders.

Much attention should be paid to physical activity in children, especially school age. When prolonged sitting at a desk there is stagnation of blood in the vessels of the lower extremities, which leads to the impoverishment of the blood supply to other organs, including the brain. As a result of deteriorating mental processes, memory, and concentration.

In addition, sedentary children weak muscular system. Because of the weakness of the back muscles they formed incorrect posture. As we can see, the effects of physical inactivity can be expressed in violation of the functions of many organs and systems, often such violations with low physical activity linked to the last, although in fact it is not.

Prevention of inactivity

It is obvious that preventive measures should be aimed at increasing physical activity for each person. Children need early childhood accustomed to the daily performance of the morning exercises, active games outdoors, compulsory attendance physical education lessons at school, very useful visit sports clubs.

In recent years become widespread sports centers and health clubs, which regularly visit - excellent prevention inactivity. Nevertheless, the lack of opportunity to attend sports complexes should not be a reason for the lack of physical activity.

Prevention is the main movement, exercise and a healthy lifestyle, as smoking and other bad habits always only aggravate the condition.

Avoid diseases caused by physical inactivity may be, if lead a healthy lifestyle. Reasonable driving mode should be combined with a balanced diet and avoiding harmful habits. Recommended daily half-hour exercise, walking (at least 2 km) in the morning.

3.2. Emergencies

In theory safety emergencies - is a set of events, the result of the onset of which is characterized by one or more of the following signs:

a. danger to life and health of a significant number of people;

b. the material violation of the ecological balance in the area of the emergency;

c. the failure of the life support systems and control, full or partial cessation of economic activities;

d. significant material and economic damage;

e. the need to involve large as the usually external to the area of emergency forces and means for the salvation of men and the elimination of consequences;

f. psychological discomfort for large groups of people.

It is characteristic that emergency arises outwardly suddenly, suddenly. Specification of the definition of the emergency is achieved by introduction of quantitative measures of the dangers.

The classification of emergencies.For reasons of emergencies are of natural, man-made, man-made, environmental, and social.

To the natural (natural) emergency situations are dangerous natural phenomena or processes that have extraordinary in nature and lead to a breach of everyday life more or less significant groups of the population, loss of life destruction of material values. These include earthquakes, floods, tsunamis, volcanic eruptions, mudflows, landslides, avalanches, hurricanes, and Smer-Chi, massive forest and peat fires, snow and avalanches. The number of natural

disasters is also droughts, long-term heavy rains, strong stable frosts, epidemics, epizootics, epidemics, mass distribution of pests of agriculture and forestry. Natural disasters can happen: as a result of rapid movement of the substance earthquakes, landslides); in the release of within the earth's energy (volcanic activity earthquakes) at increasing the overall level of rivers lakes and seas floods tsunamis) under the influence of an unusually strong wind ahurricanes cyclones. Some natural disasters fires avalanches landslides, etc.. may arise as a result of the actions of the people themselves but their consequences are always the result of the action of the forces of nature. For each natural disaster characterized by the presence of intrinsic in the affecting factors, adversely affecting human health. Natural disasters are a tragedy of the entire state and especiallyo for those areas where they occur. As a result of natural disasters are affecting the economy of the country since the collapse of production of the enterprise the destruction of material values and most importantlyo there are losses among the peoplee killed their housing and property. In addition, natural disasters pose extremely adverse conditions of life for the population, which may be the cause of outbreaks of infectious diseases. The number of people affected by natural disasters can be considerable and the nature of the lesions is very diverse. Most people suffer from floods (40% of the total damage), hurricanes (20%), earthquakes and droughts (15%). About 10% of the total damage is on the other types of disasters. A number of Soviet and foreign experts, citing data on the losses in major disasters assume that in the future in connection with the growth and concentration of population similar in the force of the disaster will be accompanied by an increase in the number of casualties in the tens of times.

Man-made emergency situations are considered a sudden failure of machines, mechanisms and units during their operationи accompanied by serious violations of the production processc the explosions the formation of fire radioactive chemical or biological infections of large territories a group of damage destruction of people. To technogenic emergencies are accidents at industrial facilities constructione as well as on railм airo roado pipeline and water transport

as a result of which the firesa the destruction of civil and industrial buildingsa there was a danger of radioactive contaminationя chemical and bacterial contaminationт there was the spreading of the oil products and aggressive poisonous liquid on the surface of earth and water and there are other consequences endangering human health and the environment.

The nature of the consequences of technogenic catastrophes depends on the type of accident, its scale and characteristics of the enterprise, where the crash occurred (on the means of transport and the circumstances in which the accident occurred.

Anthropogenic emergency situations are the consequence of the erroneous actions of the personnel. This class of emergency can occur at the same objects that and man-made emergency situations. The difference consists only in the fact that man-made emergency situations are not connected with the human factor directly.

The emergency ecological character may include: intensive degradation of the soil and its pollution by heavy metals (cadmium, lead, mercury, chromium, etc.) and other harmful substances, polluting the atmosphere of harmful chemical substances noise electromagnetic fields acid rain the destruction of the ozone layer, etc.

To the social emergency relate the events taking place in the society robbery violence) ethnic conflicts accompanied by the use of force contradictions between the States with the use of weapons.

3.3. Life Safety while working on a computer

Though education staff is not usually working at a computer all day, the introduction of planning, preparation and assessment time and the electronic marking of examinations have resulted in increased use of computers[15].

There are health problems associated with working with computers, which include repetitive strain injury, eye strain, back pain and stress.

Figure 1.1. Localization of symptoms

Risk assessment

The regulations require employers to carry out a risk assessment of users' workstations, which should consider the entire workstation, including equipment and furniture, as well as the work environment, e.g. lighting, temperature and leg room. The tasks that are being performed at the workstation should be considered as should any special needs of individual staff.

Display screen equipment (DSE) risk assessments should also consider those factors that may contribute to repetitive strain injuries such as:

- sitting in the same position for a long period;
- awkward positioning of the wrist and hand in relation to the keyboard;
- the high workload for a prolonged period of time;
- excessive use of the mouse.

Checklist for workstations

There is the minimum list of requirements providing the safest using the computer.

The display screen should:

- display well-defined characters of adequate size and spacing;
- have a stable image;
- have easily adjustable brightness and contrast;
- tilt and swivel easily to suit the user;
- be free from glare and reflections;

- use a separate base for the screen, or an adjustable table.

The keyboard should:

- be tiltable and separate from the screen to allow the user to adopt a comfortable working position;
- have space in front to provide support for the hands or arms of the user;
- have a matt surface;
- have clearly legible symbols on the keys.

The work surface should:

- provide adequate space for the user;
- have a low reflective surface;
- be of adequate size to allow the screen, keyboard, etc to be flexibly arranged;
- have a stable, adjustment document holder, which should be at the same level as the screen and at the same viewing distance.

The work chair should have a seat that is adjustable in height, with a seat back adjustable in height and tilt. A footrest should be available [16].

The workstation must do the following:

- provide sufficient space for the user or the operator to alter position comfortably;
- lighting must be adequate with the suitable contrast between the screen and background;
- glare and reflections on the screen should be avoided;
- windows should be fitted with adjustable coverings to alter the daylight level.

When a workstation is shared by more than one person, it should be assessed in respect of each person.

Schools and colleges should consult their safety reps on all matters concerning work with computers.

Training in using computers

Employers are obliged to provide information and training on the health and safety aspects of working with computers. This should cover:

- the importance of good posture, changing position and good keyboard technique;
- how to avoid glare or bright reflections in the screen;
- cleaning and adjusting the screen;
- the importance of frequent short breaks;
- using a mouse;
- health risks;
- who to report symptoms or to contact for help;
- information about the right to eyesight tests.

The work of laptop users should be properly assessed. As some laptops can be heavy, the assessment ought to include the risk of manual handling (i.e. lifting and carrying) [17].

Laptops should be used in proper workstations and not on one's lap, especially if large amounts of data need to be inputted. As prolonged use is likely to cause ergonomic problems, it is even more important for users to take regular breaks, position themselves correctly, flex their arms, etc.

Councils for the correct pose while using a computer.

Incorrect using of a computer can lead to serious health problems. Prolonged use of a computer keyboard and/or mouse can lead to frequent muscle aches and nerve pain unless a few guidelines are followed. You can work more comfortably and safely if you incorporate the following ergonomic tips into your work style:

I. Posture and Positioning:

1. Maintain good posture when working at the keyboard. Utilize a chair with back support.
2. Keep your feet supported on the floor or on a footrest when you work to reduce pressure on your lower back.

3. Avoid twisting or bending your trunk or neck. Frequently used items should be positioned directly in front of you and angled upward on a copyholder when working.

4. Keep your shoulders relaxed with your elbows close to your sides.

5. Avoid resting your elbows on the hard surface or edge of your table. Pads can be used to protect your elbows if necessary.

6. Elbows should be positioned at 100 to 110 degrees when working in order to keep a relaxed position at the keyboard. This could require a slight negative tilt (front of keyboard higher than back) when working in upright positions. If reclined in your chair, the keyboard could be at a positive angle to maintain this relaxed position.

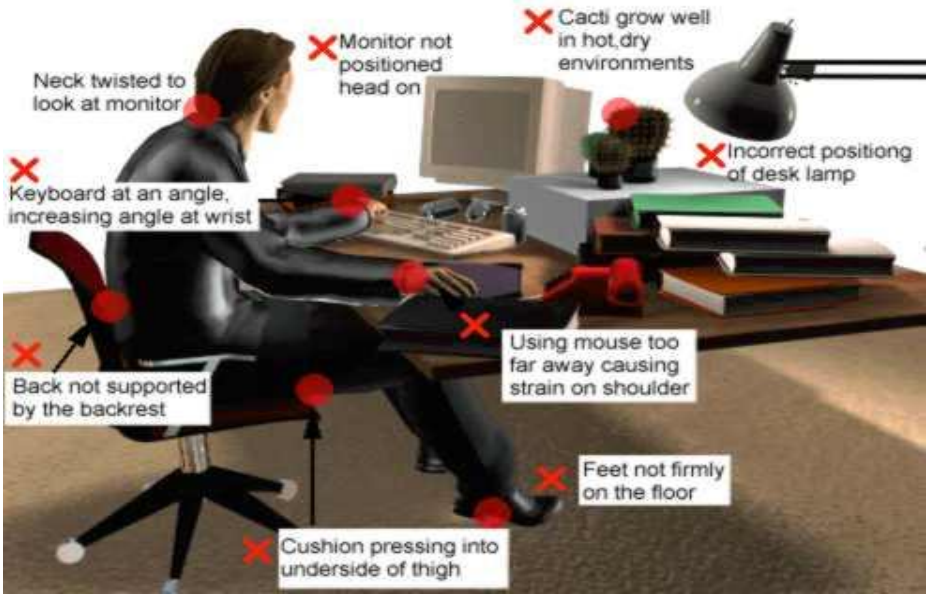


Figure 3.2. Incorrect position on a computer

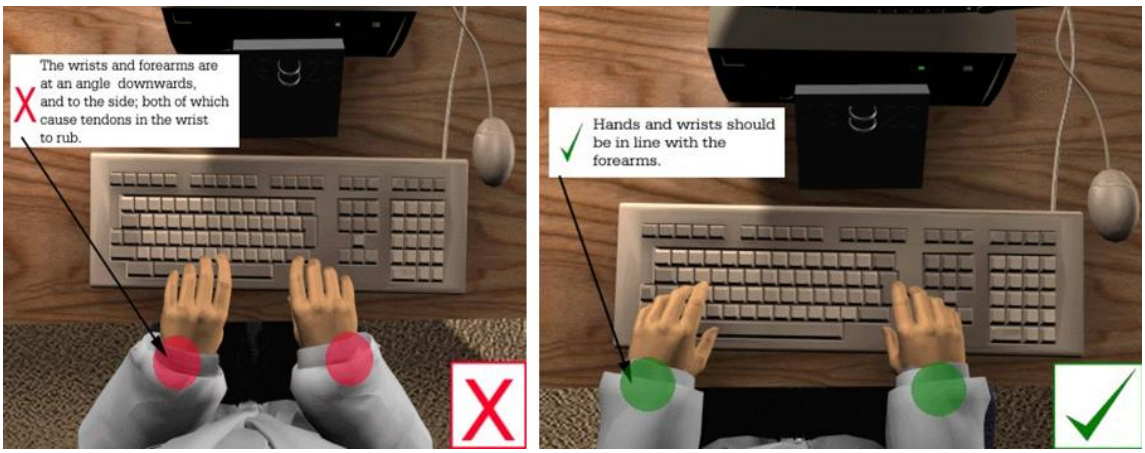


Figure 3.3. Hands position

7. Your wrists should be in a neutral or straight position when keying or using a pointing device or calculator. Wrist rests can assist you in maintaining a neutral position when used properly during pauses. Float your arms above the keyboard and wrist rest when keying. Avoid planting your wrists on the table or wrist rest. This can result in bending the wrists either up and down or side to side.

8. Take breaks. These breaks can be brief and should include stretches for optimal results. If possible, take a one or two-minute break every 15 to 20 minutes, or a five-minute break every hour. Every few hours, get up, move around, and do an alternative activity.

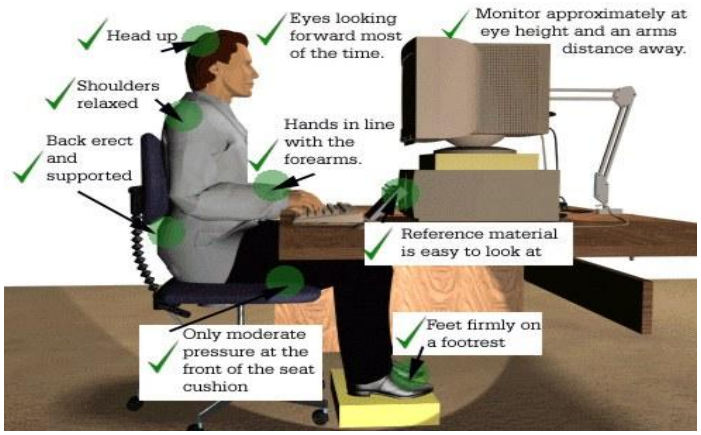


Figure 3.4. Ideal position on a computer

II. Work Technique

1. Reduce keystrokes with the use of macros or software programs allowing "sticky keys." Use scroll locks and keystroke combinations to reduce pointing device movements.

2. Alternate tasks to make changes in your working position to avoid making the same movements for prolonged periods of time.

3. Keep your fingers and knuckles relaxed when working at the keyboard.

4. Never hold a pen or pencil in your hand when keying.

5. Avoid hitting the keyboard with excessive force. Studies have shown that the average user hits the keyboard with four times the required force when keying.

6. Avoid holding your pointing device tightly. Your hand should be relaxed.

7. Rest your eyes by refocusing on distant objects intermittently when working.

III. Work Environment

1. Avoid excessive reaching. Your keyboard, pointing device, files and telephone should be within easy reach.

2. Use a keyboard tray to properly position your keyboard and pointing device.

3. Use a copyholder positioned in line with your monitor and keyboard.

4. When writing at the computer, avoid excessive reaching over the keyboard or work materials. A sturdy in-line copyholder can double as a writing surface if appropriately positioned.

5. Position the monitor so that the viewed part of the screen allows you to keep your neck in a neutral or straight position. The monitor should be centered directly in front of you. The top of the computer screen should be slightly below the top of your head so that you are looking at it with a slightly downward gaze.

6. Position your monitor to eliminate excessive glare or reflections from windows and lighting.

7. Customize your computer by using your software. The screen font, contrast, pointer size, speed, and color can all be adjusted to maximize your comfort and efficiency.

IV. Lifestyle

1. Aerobic exercise will help to sustain strength, improve cardiovascular conditioning, and counteract the strain of sedentary computer use.

2. Routine use of non-prescribed medications or a wrist brace is not recommended. If you begin to develop symptoms, notify your supervisor. Slight changes made early can avoid future complications. Also, it’s possible to use the following exercises for the office:

- One of the biggest injury risk factors is static posture.
- Trying to spend at least 5 minutes every hour away from your computer.
- Remember to the only stretch to the point of mild tension.
- Try to incorporate the stretches into your daily routine.
- This slide provides some illustrations of simple active stretches to perform at the office.

Conclusion

In chapter first of this work has been analyzed educational web applications. For that purposes were chosen 2 educational web sites:

1. Openedu.ru;
2. Coursera.com.

This analysis was applied during the design the Madrasa.Uz web application. Also in this chapter was produced an overview of the main types of web applications and studied the process of their design. In the end of the chapter were analyzed the basic theories and techniques of self-education:

1. Theory of multiple intelligence;
2. Accelerated learning technique.

In the second chapter was given the process of designing the web application on the example of designing Madrasa.Uz web application. In the first part of the chapter were described:

1. The process of designing architecture ;
2. And infological model of a web application,

Also were created database schema and web pages layouts of the web application.

In the second part was showed the process of the development of parts of the web application using the NetBeans 8.2 IDE and the database of the developed web application.

In the third chapter was produced a study of issues relating to life safety and ecology, namely:

1. Physical inactivity;
2. Emergency situations;
3. Health and Safety while working on the personal computer.

During the working on this project:

- Has been studied literature on the basics of the design and implementation of information systems;

- This knowledge was applied in the process of designing and developing a web application and its database;
- Was developed web application using Java EE (Servlets, JavaServer Pages, Hibernate ORM) technology that runs on GlassFish 4.1 Community Edition web server;
- Was developed the database of the web application in the visual editor - MySQL Workbench. This database runs on the MySQL 5.7 RDBMS.

Also studied the literature on various scientific theories in the field of self-education and on the basis of that has been developed the training course on effective self-education.

Thus, the goals and tasks that we set at the beginning of the work were implemented and achieved.

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Appendix

Appendix №1. Code of JSP file for registration page.

```
<div id="middle">
  <h1>Регистрация</h1>
  <div id='textArea'>
    <div>
      <h3>Форма регистрации учащегося</h3>
      <form action="RegisterServlet" method="POST">
        <table align="center" cellpadding = "10">
          <tr>
            <td>Имя</td>
            <td><input type="text" name="firstName" maxlength="30"/>
              (max 30 characters a-z and A-Z)
            </td>
          </tr>
          <tr>
            <td>Отчество</td>
            <td><input type="text" name="middleName" maxlength="30"/>
              (max 30 characters a-z and A-Z)
            </td>
          </tr>                <tr>
            <td>Фамилия</td>
            <td><input type="text" name="lastName" maxlength="30"/>
              (max 30 characters a-z and A-Z)
            </td>
          </tr>                <tr>
            <td>E-mail</td>
            <td><input type="text" name="email" maxlength="100" /></td>
          </tr>
          <tr>
            <td>Пароль</td>
            <td><input type="password" name="password" maxlength="100" /></td>
          </tr>
          <tr>
            <td>Повторите пароль</td>
            <td><input type="password" name="passwordCheck" maxlength="100" /></td>
          </tr>
          <tr>
            <td>Подсказка для пароля</td>
            <td><input type="text" name="passwordHint" maxlength="100" /></td>
          </tr>
          <tr>
            <td colspan="2" align="right">
              <input type="submit" value="Отправить">
              <input type="reset" value="Очистить">
            </td>
          </tr>
        </table>
      </form>
    </div>
```

Appendix №2. Code of java controller class for registering new user.

```
package controller;
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
 import entity.User;
import service.RegisterService;
public class RegisterServlet extends HttpServlet {

   public void doPost(HttpServletRequest request, HttpServletResponse response)
         throws ServletException, IOException
{
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    System.out.println("do izvlechenia"+request.getParameter("firstName") );
    String firstName = request.getParameter("firstName");
    System.out.println(firstName);
    String middleName = request.getParameter("middleName");
    String lastName = request.getParameter("lastName");
    String email = request.getParameter("email");
    String passwordHint = request.getParameter("passwordHint");
    String password = request.getParameter("password");
    String passwordCheck = request.getParameter("passwordCheck");
    User user = new User(email,firstName,password, passwordHint, lastName, middleName);
    try {
       RegisterService registerService = new RegisterService();
       boolean result = registerService.register(user);
       out.println("<html>");
       out.println("<head>");
       out.println("<title>Регистрация прошла успешно!</title>");
       out.println("</head>");
       out.println("<body>");
       out.println("<center>");
       if(result){
          out.println("<h1>Спасибо за регистрацию:</h1>");
          out.println("Для входа в систему при помощи Вашего email и пароля <a
href=login.jsp>пройдите по данной ссылке!</a>");
       }else{
          out.println("<h1>Регистрация завершилась ошибкой!</h1>");
          out.println("Пожалуйста попробуйте еще раз пройдя по <a
href=registration.jsp>данной ссылке!</a>");
       }
       out.println("</center>");
       out.println("</body>");
       out.println("</html>");
    } finally {
       out.close();
    }}}
```

Appendix №3. Code of java class for servicing of the registration of new user

```
package service;
import org.hibernate.Query;
import org.hibernate.Session;
import org.hibernate.Transaction;
import entity.HibernateUtil;
import entity.User;
public class RegisterService {

public boolean register(User user){
    Session session = HibernateUtil.openSession();
    if(isUserExists(user)) return false;
    Transaction tx = null;
    try {
        tx = session.getTransaction();
        tx.begin();
        session.saveOrUpdate(user);
        tx.commit();
    } catch (Exception e) {
        if (tx != null) {
            tx.rollback();
        }
        e.printStackTrace();
    } finally {
        session.close();
    }
    return true;
}

public boolean isUserExists(User user){
    Session session = HibernateUtil.openSession();
    boolean result = false;
    Transaction tx = null;
    try{
        tx = session.getTransaction();
        tx.begin();
        Query query = session.createQuery("from User where email='"+user.getEmail()+"'");
        User u = (User)query.uniqueResult();
        tx.commit();
        if(u!=null) result = true;
    }catch(Exception ex){
        if(tx!=null){
            tx.rollback();
        }
    }finally{
        session.close();
    }
    return result;
}
}
```

Appendix №4. Code of User java bean.

```
package entity;
import java.util.HashSet;
import java.util.Set;
import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.FetchType;
import javax.persistence.Id;
import javax.persistence.OneToMany;
import javax.persistence.Table;

@Entity
@Table(name="user"
   ,catalog="openeduuz"
)
public class User  implements java.io.Serializable {

   public User(String email, String userName, String password, String passwordHint, String userSurname, String userMiddlename) {
       this.email = email;
       this.userName = userName;
       this.password = password;
       this.passwordHint = passwordHint;
       this.userSurname = userSurname;
       this.userMiddlename = userMiddlename;
   }

    private String email;
    private String userName;
    private String password;
    private String passwordHint;
    private String userSurname;
    private String userMiddlename;
    private Set userlearningcourseses = new HashSet(0);
    private Set usersandrolesmappings = new HashSet(0);

   public User() {
   }

   public User(String email, String userName, String password) {
       this.email = email;
       this.userName = userName;
       this.password = password;
   }
   public User(String email, String userName, String password, String passwordHint, String userSurname, String userMiddlename, Set userlearningcourseses, Set usersandrolesmappings) {
       this.email = email;
       this.userName = userName;
       this.password = password;
       this.passwordHint = passwordHint;
       this.userSurname = userSurname;
       this.userMiddlename = userMiddlename;
```

```
   this.userlearningcourseses = userlearningcourseses;
   this.usersandrolesmappings = usersandrolesmappings;
}

 @Id

@Column(name="email", unique=true, nullable=false, length=45)
public String getEmail() {
   return this.email;
}

public void setEmail(String email) {
   this.email = email;
}

@Column(name="userName", nullable=false, length=20)
public String getUserName() {
   return this.userName;
}

public void setUserName(String userName) {
   this.userName = userName;
}

@Column(name="password", nullable=false, length=30)
public String getPassword() {
   return this.password;
}

public void setPassword(String password) {
   this.password = password;
}

@Column(name="passwordHint")
public String getPasswordHint() {
   return this.passwordHint;
}

public void setPasswordHint(String passwordHint) {
   this.passwordHint = passwordHint;
}

@Column(name="userSurname", length=20)
public String getUserSurname() {
   return this.userSurname;
}

public void setUserSurname(String userSurname) {
   this.userSurname = userSurname;
}

@Column(name="userMiddlename", length=20)
```

```
    public String getUserMiddlename() {
        return this.userMiddlename;
    }

    public void setUserMiddlename(String userMiddlename) {
        this.userMiddlename = userMiddlename;
    }
@OneToMany(fetch=FetchType.LAZY, mappedBy="user")
    public Set getUserlearningcourseses() {
        return this.userlearningcourseses;
    }

    public void setUserlearningcourseses(Set userlearningcourseses) {
        this.userlearningcourseses = userlearningcourseses;
    }
@OneToMany(fetch=FetchType.LAZY, mappedBy="user")
    public Set getUsersandrolesmappings() {
        return this.usersandrolesmappings;
    }

    public void setUsersandrolesmappings(Set usersandrolesmappings) {
        this.usersandrolesmappings = usersandrolesmappings;
    }
}
```