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**Permitted to defence**

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**DEVELOPING THE ANDROID APPLICATION BY USING SQLITE DATABASE FOR OFFLINE DICTIONARY**

# GRADUATE QUALIFICATION WORK

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**CONTENTS**

# INTRODUCTION

Creating apps for iPhone OS, Android or platforms of Windows is a clear sign that a company is in trend. It is not always convenient for the user to be on the bulky version of the site, so you need an easy and affordable alternative.

The relevance of the chosen topic is due to the fact that the number of users of mobile phones on the operating systems iPhone OS, Android or platforms of Windows is growing every day. People understand that with a smartphone they have access to unlimited information: they can keep accounts, have fun watching media content, install useful programs and games, and plan their holidays. Due to this, the market of mobile apps can be called a promising area in which a large number of people are already working.

One of the priorities of the process of Informatization of modern society is the Informatization of education-the introduction of new information technologies in the education system.

This thesis is aimed at creating an application in the category of Education with the functionality of translation of English and Karakalpak languages under Android.The selection of this platform is due to the fact that, firstly, it the platform is most widespread both in Uzbekistan and in the world, secondly,programming for Android, thanks to the flexibility of this platform, allows you to create useful and memorable mobile applications for almost any needs.

**The relevance** of the topic is explained by the fact that at the moment there are no applications for the translation of English words into Karakalpak language for mobile devices. Due to this, learning English is difficult

**The purpose** of this work is to create an application for the translation of words from English into Karakalpak and Vice versa. Android operating system and Java programming language were chosen as the development platform. To achieve this goal, the following tasks were formulated:

- Review and analysis of existing solutions.

- Choice of methods of software (software) application development.
- Select tools and software.
- Development of the application structure.
- Application software development.
- Test the application.

**Object of research**-development of applications for mobile devices running Android.

**Subject of research**- English and Karakalpak dictionary on Android

In the thesis used research methods such as: literature analysis (in order to find the necessary material to build a database of words in English and Karakalpak)

In the process of writing the thesis was reviewed existing online courses on the development of applications for mobile devices based on Android OS.

The structure of the thesis due to the subject, purpose and objectivesresearches. The work consists of an introduction, three chapters and a conclusion.

# CHAPTER I. REVIEW AND ANALYSIS OF THE SUBJECT AREA

## 1.1 Actuality

Nowadays there are many different languages, but English is considered to be one of the most used languages in the world. According to statistics for 2016, English ranks 3rd in the top 10 most used languages in the world [1]. In addition, it is estimated that 85 per cent of all scientific publications, 75 per cent of all international communication in writing, 80 per cent of all computer information in the world and 90 per cent of Internet content are in English. [2] Therefore, knowledge of English is necessary for every modern person.

Learning English takes a lot of time and effort. Many lessons, exercises, tests, websites, computer programs and mobile applications have been created to facilitate learning English. But materials on the study of one of the most difficult topics of verbs in the English language is not enough. Most of the materials are either too light or limited in quantity or paid.

In the last few years, the issue of using mobile technologies in learning has become really common. For example, two Chinese scientists conducted a study on this topic [3]. In this study, the following questions were raised:how is learning using mobile technology now? What mobile technologies are currently used? How do students react to the use of mobile technologies? Research on this topic was conducted for two years on 122 students. For two years, students were taught English using a mobile application. A survey of 120 students was used to identify the results of this approach to the study. The survey showed that 92 percent of respondents use mobile technology for learning and it helped to raise academic performance. Also, respondents say that the most convenient way to get access to lessons is the use of mobile technologies and I think this industry is in demand in the future. As a result of this study, it can be concluded that the use of mobile technologies in education is indeed a promising area at the present time.

To learn English, there are a large number of mobile applications such as Lingualeo, Easy ten, Duolingo, polyglot and others. But each of these applications has its drawbacks.

Lingualeo's mobile application is mostly paid, and to access real texts from the Internet you will have to pay money and real texts do not help to learn the tenses of irregular verbs [4]. Also in this application are free only test materials that do not quite help to learn real English. Easy ten, a mobile app for learning English, is based on learning 10 words a day, which really helps to learn new words and enrich your vocabulary of English words [5]. In the Duolingo mobile app, English verb tenses are learned through test exercises, text reading and translation, and listening. [6] That does not allow you to learn English on real texts in real time. The study of English verbs in the application polyglot is based on the translation of the Russian text into English, which is not very productive and is most likely suitable for beginners learning English .

On the basis of these applications, it is possible to clearly identify the problem of the study, that at the moment there are no applications that allow you to directly translate into **Karakalpak** language.

### 1.2 Methods of education in the modern world

Currently, there are many ways to get education, which are significantly various from what it was 20 years ago. People who follow the latest trends in this area are the most competitive and adapted to the modern world. For a start, it is necessary to formulate a clear definition of the term "Education". Education is a single purposeful process of education and training, which is a socially significant good and is carried out in the interests of the person, family, society and the state, as well as a set of acquired knowledge, ability, experience and competence of a certain volume and complexity for the purpose of intellectual, spiritual, moral, creative, physical and (or) professional development of a person, to meet his educational needs and interests. It is clear from this definition that education is

necessary for human development and for the satisfaction of educational needs and interests. The main intention of education is to obtain knowledge that will be useful in later life and will make a person in demand in the labor market.

Education can be obtained in the following ways:

1. the official education system of the Uzbekistan, which includes pre-school, General and vocational education;
2. self-education, which includes learning from books and textbooks, reading the press, listening to the radio or watching TV, and finally as a result of attending courses, master classes or other similar events;
3. self-education using the Internet, which includes online courses from leading universities in the world, electronic libraries and social networks.

Of the above methods, the most convenient and often used is self-education using the Internet, since most of the resources are free and are freely available

You can learn English not only sitting at a Desk. Using a mobile phone, you can engage in transport, in breaks at work, in any free minute. In this review, we'll look at English learning apps, useful sites, and ways to learn English using your phone.

How useful are apps for learning English?

The phone is a thing that we always take with us. He's around 24 hours a day. With it, when there is free time, you can "pump" all language skills:

- Listening – listen to audio on the go, watch videos in English.
- Reading-read books in English or English sites.
- The practice of communication is to communicate via text (or even voice) messages in the language of social networks.
- Vocabulary - learn words with the help of special applications or in the process of listening, reading, communication.
- Grammar - read theory, do exercises.

Something of the above is more convenient to do on the computer. For example, few people want to speak English standing in line for a parcel. Someone

does not like to read on a small phone screen. You can't practice grammar or vocabulary cards while Jogging.

The phone is most convenient for listening. After all, you do not have your hands busy and do not need to look at the screen, which means you can listen, for example, while walking or digging beds in the country.

**Apps and websites to listen to audio on the go**

Beginners often have a problem: the text that is clear when reading is not clear by ear. For example, the subtitles are understandable, and it's without subtitles seems to be a hodgepodge of vaguely sticky sounds. This problem is solved with the practice of listening. To learn to understand English by ear, you need to listen daily and preferably more. Fortunately, no one forces you to engage in listening, sitting at a Desk in a specially allotted time.

You can listen on the go, using the time that is still wasted, for example in transport, on the way to work, in the queue, etc.polyglot Steve Kaufman, for example, often says that his favorite way to engage in foreign languages, which he knows about a dozen – to listen during classes on cardio.

The main thing is to find suitable audio materials that:

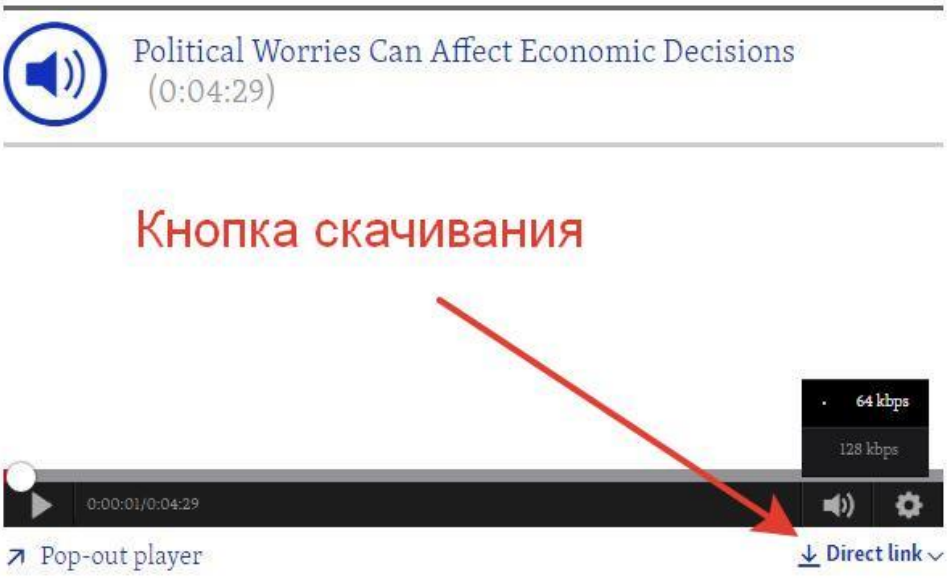
Simple enough to understand at least the General meaning.

It can be English lessons, podcasts, news, audiobooks – anything depending on your interests and level of understanding of English. In Pic 1.2

Examples:

*1.1 Voice of America news*

On site learningenglish.voanews.com the news is presented in an adapted form, with simplified vocabulary and grammar, slow pace of speech, and divided into three levels of complexity. You don't have to listen to the news with your browser, you can download it and copy it to your phone or player. In Pic 1.

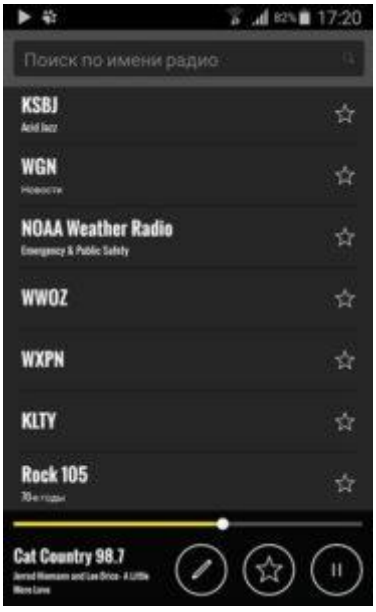



Pic 1. Voice of America news

Another way is to install the app VOA Learning English (Android, IOS). The audio and video in the app is given with text as on the website, but unfortunately there is no division into difficulty levels.

*1.2. Online radio*

online-radio-in-English there are many applications that allow you listening to online radio on your phone. There is no special difference in functionality between them.




Pic 1.2 Online radio

Many of these applications are radio stations, that is, you can choose the stations you are interested in (usually there is a description), and add them to your favorites. For example, in the application “Radio USA” (on Android) collected popular American radio stations.

Listen to the radio in English-not the easiest task: speak quickly, joke is unclear. For a full understanding of talk shows, humorous programs you need to have a serious cultural background: be aware of political life, fashion shows, book novelties, sports events, jokes and songs from the cartoons of the 80s, etc.

*1.3. ESLpod Podcasts*

Good podcasts for beginners, which I've been listening to for a long time – eslpod.com ahhh! Here are the main features of podcasts:

- Short issues, read first slowly, then with normal speed.
- The vocabulary is simple, difficult words are explained right in the process.
- Interesting stories with humor.
- For more advanced students, there is The English Café category with longer and harder issues.
- On the website eslpod.com there are episodes of podcasts

*Applications to watch videos in English (with or without subtitles)*

Another great way to kill time is to watch videos in English. The advantages are obvious:

- Time is killing a lot of fun. The main thing is not to pass your stop.
- Videos can be watched with subtitles.
- Video can be any. Watch on your phone video English lessons, movies, TV shows, talk shows – what do you like more

*2.1 Puzzle English Apps*

App "Series" - a mobile version of the service Puzzle Movies, designed to learn English on TV series (more than 300). As in Lingualia, click on the word in the subtitles – there is a translation. You can choose the language of subtitles:

Russian, English, both at the same time. To watch TV series, you need to pay a paid subscription.

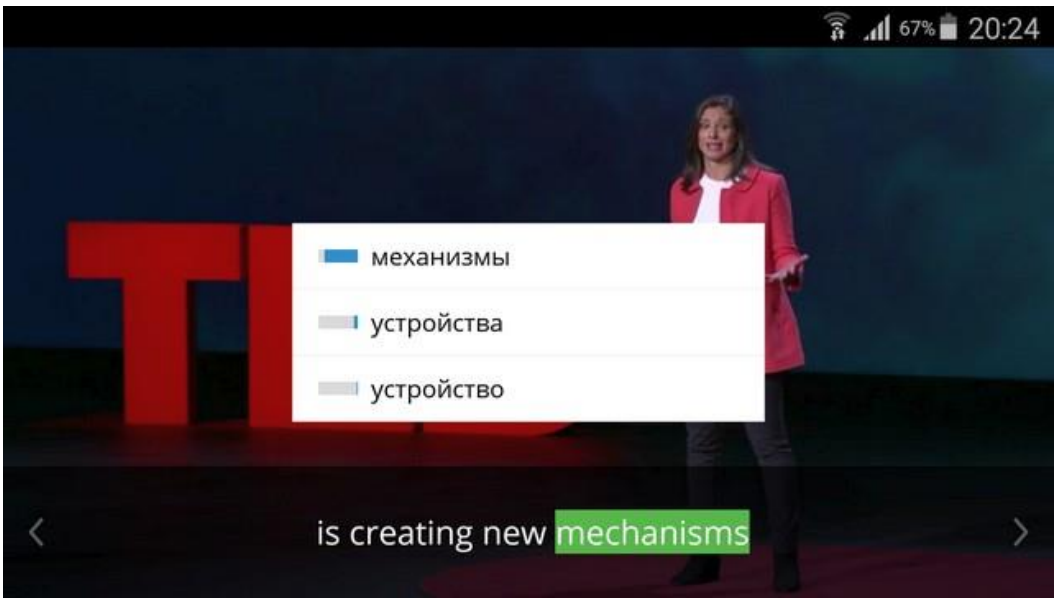
App "Puzzle English" - mobile version of Puzzle English. Short videos that you need to watch first, then do an exercise on them (if you want). When viewing, the same clickable subtitles as in Puzzle Movies work. In Pic 1.3


Pic 1.3 Puzzle English Apps

The main feature of these apps is in smart subtitles where you can click on a word to see the translation. But if you do not need this feature, you can watch any videos in English and without any additional software

2.2 English with LinguaLeo

Mobile version of the service, Lingualia, it has video and audio with subtitles. The peculiarity of the subtitles is that if you click on the word, you will see a translation that can be entered in your personal dictionary. Watch and listen for free in Pic 1.4




Pic 1.4 LinguaLeo

***3.Applications for reading in English***

Not so long ago, browsers and readers for phones were just a pitiful likeness of their desktop older comrades, but now almost nothing they are not inferior. With the help of the phone you can not less fully “surf” the Internet than on a PC, and programs for reading books allow you to read very comfortably.

The disadvantage of reading on the phone is that the computer is easier and faster to use a dictionary, but there are little tricks. Consider two options: reading e-books and reading sites in the browser.

***3.1 Ebook reader***

Application for reading books in English on your phone

Some e-book readers have a dictionary function, for example:

- Amazon Kindle (iOS, Android, Win) – by installing this app on your phone, you will get all the functionality that the Kindle reader has, including a built-in dictionary. The app is only for reading books purchased from the Amazon store. You can't download your books.
- Bookmate (iOS, Android, Win) is a popular Russian application for reading books with a monthly subscription, not individual books. Allows you to translate words on the go with the help of Yandex translator and save pairs

"word – translation" in notes. English-language literature a bit, but the Book, unlike Kindle, allows you to read not only" their " books, but also downloaded by the user. In other words, you can install the application, download your books and read them.

- English Reader (Android) – application specifically for reading books in English. Just select a word and it will be translated using GoogleTranslate and saved in notes. In Pic 1.5


Pic 1.5 Ebook reader

### *3.2 Read in browser*

App to read on your phone with a dictionary

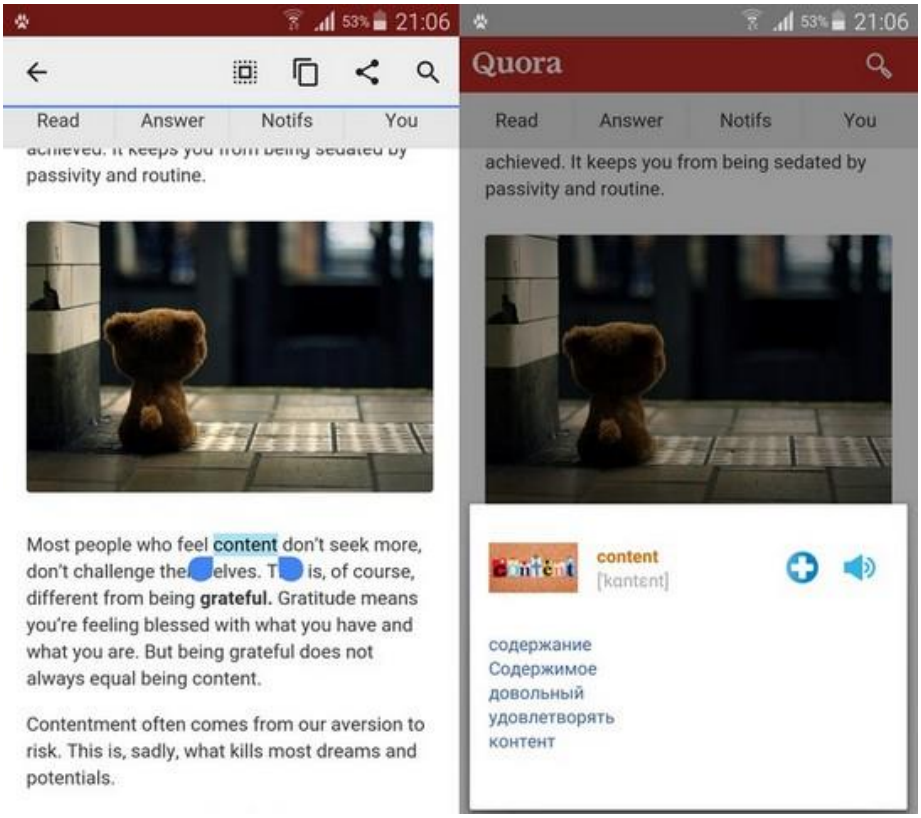
The translation of the word with Leo Finger. Vocabulary cards are added to the dictionary, Lingualia.

To read in browser with dictionary can be so:

- To open an online dictionary in another tab.
- Open a dictionary or translator app, such as Google Translate, at the same time as the browser, in the background.
- Use the Leo Finger app (Android).

Leo Finger is essentially a mobile version of Leo translator (unofficial). Reading, you select the word, click "copy", Leo finger immediately gives the translation.

The app is especially useful if you are using the service, Lingualia, because the words are automatically stored in your dictionary, Lingualia.In Pic 1.6




Pic 1.6 Read in browser

***4.Applications for language practice with foreigners***

The phone can be used to practice communication in English. Here are two options:

- Find pen pals, exchange contacts and chat using popular apps. Keep in mind that not all messengers and social networks are popular all over the world. In the US, for example, MSN, which is almost unknown to US, is popular, and Facebook does not work in China. The most versatile messenger today is Skype. Pen pals can be found, for example, in the popular language network Italki (aitoki).
- Chat with the help of special applications. The option is convenient because you can find someone at any time.

Here are some apps for language practice:

- Italki (Android, iOS) is a mobile version of the language social network italki. With italki you can find both Tutors for paid lessons and partners for free communication.
- Speaky (Android, iOS) is a mobile version of the social network Speaky the language (used to be called Gospeaky). Search for friends by correspondence, text chat. The mobile version is noticeably inferior to the immobile.
- Hello Talk (Android, iOS) – an application for language exchange with rich functionality: you can send not only text, but also voice messages, videos, photos. There is a built-in translator working directly in the chat, you can also correct the messages of the interlocutor (on language sites are often asked to correct errors). There is no version of Hello Talk for your computer, you can only communicate using the application.

***5.Applications for memorizing words with flashcards and other exercises***

Two ways of learning words-hard and easy.

- The hard way is to learn words purposefully. For example, take a list of 20 words, make cards “word-translation” and learn.
- Easy way-to remember the words "background" while reading, listening, watching a movie, talking.

The hard way is harder but the words are memorized faster, better and in more quantity. The easy way is easier, but most of the words in one ear flies in and out of the other.

Note that” teach “is not necessary = ”cram". Cramming is a special case of memorization, consisting in repeated repetition of words. You can learn words in a different way, for example, by inventing associations, making sentences with words, using special exercises, programs, etc.

At the initial stage of language learning, when the vocabulary is clearly still small, quite a lot to learn in a difficult way. Here come to the aid of the program for learning words.

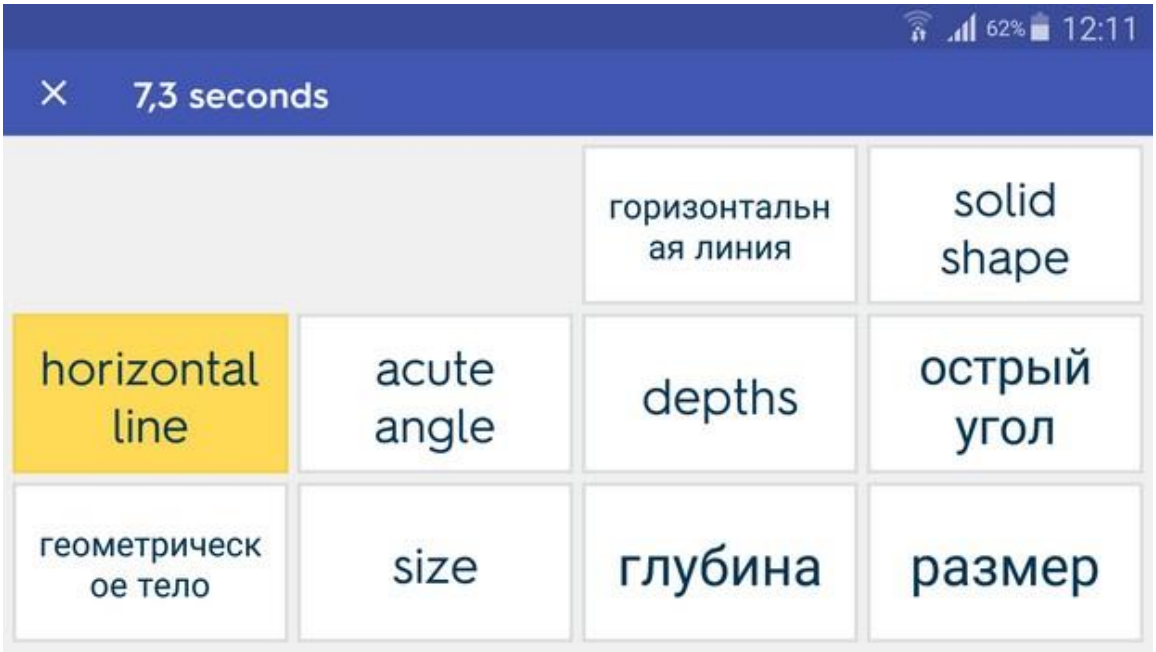
Programs for learning words – a great many

### *5.1 Quizlet*

In Pic 1.7

Its feature:

- Words can be learned in four modes.
- The words are automatically added to the voice. English voice is very high quality, and Russian is better to immediately turn off unnecessary and terrible implementation.
- It is convenient to add new words, create sets.
- New words can be added to the PC (in the web version), so as not to suffer with the keyboard of the phone. The data is synchronized, so the words added to the PC will appear in the mobile application.
- There are many ready-made word sets.




Pic 1.7 Quizlet

- Cards-two-way cards mode. You can change the direction to teach cards from Russian to English or Vice versa. Automatic voice can be turned off, and separately for each language.

- Learn-the word appears in Russian, you need to write it in English (or Vice versa).
- Match-a game in which you need to temporarily match words in Russian and English.
- Test-a comprehensive test of knowledge of words. Includes tasks 1) write a translation of the word, 2) select the correct option, 3) “True\False” – specify true or false statement

.To memorize words on the cards there is a popular application Anki. The main difference from Quizlet is the use of the interval repetition method

### *5.2. LinguaLeo*

If you use the LinguaLeo service, the mobile app has a ” Training " section where you can learn words from your personal vocabulary. Learning modes less than in the big version: 7 modes, 1 of them paid. Unlike Quizlet and Anki, not only cards are used here, but also other exercises.

App, Lingualia on the phone

One of the modes of learning words in LinguaLeo

- Word-translation-you are shown a word in English, you need to choose the correct option in Russian from 4 proposed.
- Translation-word-show the word in Russian, you need to choose the answer in English from the 4 proposed.
- Leo-Sprint-determine whether the translation to the word is correct or incorrect (exercise type false\true)
- Designer-given the word in Russian, you need to collect the letters of the translation in English.
- Word cards-this mode is similar to Anki, you are given English words, you need to specify "remember” or " do not remember", then the correct answer appears.
- Listening-words are pronounced in English, you need to type them correctly (also in English).

- Brainstorm-combined mode. Given a few words for review, after they need to work in several modes at once.

Self-education through the Internet takes place mainly through websites, desktop applications and mobile applications. Currently, online educational platforms are popular, thanks to which everyone can get education from world universities and business schools, for example, MIT, Stanford, University of Michigan and many more similar well-known universities. With the help of these educational services, people can listen to lectures and take master classes from professionals. Every day there are more and more such platforms. The most popular are Coursera, Udacity, Udemy, Universarium, post-Science, Intuit. The giants of these online platforms have both a website and mobile applications. Based on this, we can conclude that the most used are websites and mobile applications.

## 1.3 Defining the application type

Most people are always on the move, from this it is possible to present the first requirement to the application: the application to study the use of English verb tenses must be mobile.

There are a lot of mobile applications on the market, but there are no applications that translate words into Karakalpak from English. From what we can conclude, developing an application for this area, the mobile application will be in demand and quite promising.

***Application requirements***

It is known that when there is an application development it is necessary to put high requirements for it. The higher the requirements, the better the application will be after its implementation. That is why in this work will be presented the highest requirements for the developed application.

System requirements in General:

- the application should occupy no more than 100 MB of RAM of the device;

- the app must be free to function on devices with minimum power;
- the application should not crash;
- the application should continue to function after minimizing with the purpose of implementing the other functions of the device;
- full and error-free implementation of the declared functions;
- correct budget transfer from one month to another;
- when you delete information, the user shall clean the data from the database;
- low level of energy consumption.

Requirements for functions (tasks):

- view a list of words in Karakalpak and English
- instant translation of words

## 1.4 Analysis of applications for learning English

Currently, there are many mobile applications for learning English. Each application has its pros and cons and a different approach to learning English

This item will cover popular mobile applications for learning English.

Mobile application for learning English in the form of a game *Lingualeo*

Currently, it is one of the most popular services for learning English [4]. This type of service is presented both as a website and as a mobile application. Before you start this application, you must pass a test to determine the level of grammar, which consists of a test of knowledge of grammar rules. Next will be a set of tasks that are updated as they pass the study of grammar rules, vocabulary, training reading and understanding of the text, training understanding of audio materials

One of the main disadvantages of this application is that there are few free functions and to purchase full access to all functions you need to buy a Premium account. Also, another disadvantage of this mobile application, it does not show the rules of grammar, ie, the study takes place in the mode of tasks, which is inconvenient for beginners

**LinguaLeo**

Mobile application for learning words *Easy ten*

This mobile application is designed to replenish the vocabulary. The basis of this application is the study of new words and passing tests using these words [5] . The creators of the mobile application claim that words and tests alternate in a special sequence, optimal for memorization. Every day the user needs to learn 10 new words, only after that he can start to perform the following lessons.

The main disadvantage of this application is limited functionality, namely this application specializes only in the study of new words. The second disadvantage is the unavailability of some features for a free account, such as daily replenishment of new words. . In Pic 1.8


Pic 1.8 LinguaLeo

**Easy TEN**

Free mobile app for learning English *Duolingo*

The Duolingo mobile app is a free mobile app for learning English. Before starting to work with the application, the user must select a goal, which determines the time spent on learning the language in a day [6]. Next, you need to determine the level of knowledge, it is necessary to pass a qualification test. After that, the

user can go to the daily lessons, on the basis of which the score is set. on the day you need to reach a certain score to move on to the next lesson.

The main disadvantage of this application is the inability to learn English in real texts of native speakers. In Pic 1.9


Pic 1.9 Easy TEN

**Google Translate**

**Google Translate** app is the most popular translator for Android. When you first start you will find a handy tooltip and a thin system of personal settings. By default, transliteration from English to Russian is set, you can also quickly switch to other languages.

Handwriting and voice input are available. There is a text recognition function from the photo, it is necessary to allow the use of the camera of your smartphone. At the same time, the quality of translation is very high. It is worth noting that the utility translates words and without an Internet connection, it is enough to download the database you are interested in with dictionaries. There is a built-in SMS-translator that implements text recognition of incoming SMS.

You will be able to travel and communicate with people around the world, erasing the voice barrier! There is a powerful set of tools to recognize your speech and its instant voice translation in more than 90 languages. In conclusion, it should be said that Google Translator-convenient and absolutely free Android program, which is a great helper for beginners and Amateurs.

Key advantages of Google translator for Android:

- Traffic saving option;
- Offline mode supported;
- Saving translations to the PhraseBook;
- A function of correct pronunciation;
- Allows you to download language packs;
- Clear interface, simple operation;
- Function of translation of inscriptions, banners and signs;
- Compatible with Android Wear smart watch;
- More than 500 million downloads from Google Play Market;
- Ability to work without Internet access (offline mode);
- Advanced speech synthesis system (online only);
- Tool text-to-speech in real-time;
- The use of AI, which does not use the traditional algorithm, and automatically determines the subject of the text - the translation is carried out by context. In Pic 1.10

Pic 1.10 Google Translate

# CHAPTER II. ANDROID STUDIO DATA BASE AND APPLICATION DESIGN

## 2.1 About Android

The Android operating system is an open platform, which means that it is not tied to a single provider. This helps Android to conquer the market, as any manufacturer and provider can create and sell devices that support this operating system. Android source code is available for everyone to study or modify. This allows you to give a wide scope to create user-friendly interfaces and applications for Android devices [1].

Android OS can be used on devices with different screen sizes and other specifications, so it comes with a set of tools that help the application adapt to a specific device. Google's policy is tougher. For example, if the application requires a front-facing camera, then this application in the Android Market will see phones only with a front-facing camera.

**Mashups**

A mashup connects two or more services in a single application. For example, you can create a mashup that uses a camera and geolocation to place images on a map. This technique can often be found in social networks.

With the built-in Android API libraries, you can easily use the provided features to create your own application with the necessary functions. 3 Basics of Android programming

The Android application is written in Java, but XML documents are also required for development. The Java language is used here not in a full-featured version, but only in a small subset, which is sometimes called a Davlik virtual machine. This subset does not use Java classes that cannot or do not make sense when developing applications on mobile devices.

**Activities**

The Android app includes one or more activities (activities). You can think of an activity as a container that contains the user interface and the code that runs it.

**Intentions**

Intentions (intents) make up the message system on Android. The intention consists of an action that must be performed (view, edit, etc.) and data. An action is something that must be done in order to obtain the intention and the data with which to operate.

Intentions are used when launching activities and when communicating between different parts of the Android system. The application can receive or send intentions.

When the intent is passed, a message is actually sent to the system to do something, such as start a new activity in the current application or open another application.

Just sending an intention doesn't mean something will happen automatically. To do this, you must register the intent receiver, which receives the intent and tells the Android system what to do: perform a task in a new activity or run another application. If you have more than one sink to get the intent, you can create a tool that allows the user to select the desired action. Multiple sinks can be found with the same intent, so the user personally defines the action to be performed. For example, when you long press on the image in the gallery, a selection tool appears, which offers to send the image via e - mail or social networks, edit or delete, etc.
If the system cannot find a suitable intent and the selection tool was not created by the developer, the application will crash and produce a runtime error. It is therefore important to ensure that elections for intentions not aimed at other activities in this application are created.

**Widgets And viewports**

A viewport is a basic interface control in the form of a rectangular area where you can draw and handle events. Examples of viewports are: context menu (ContextMenu), menu (Menu), view (View), drawing surface (SurfaceView).

Widgets are more advanced elements of the user interface, such as check boxes with radio buttons, where you can select one of several possible States. Widgets are the controls that the user interacts with. The widgets are: button (Button), date picker (DatePicker), gallery (Gallery), check box (CheckBox), etc.

Thus, viewports and widgets are controls of the user interface, but the first are able to perform not one, but several functions. 4 Asynchronous calls

Before moving on to the concept of asynchronous calls, you need to understand what a thread is.

A thread is the execution of multiple operations in a single application at the same time. An asynchronous thread is a thread that runs independently of other threads in the background.

Asynchronous streams are used for tasks that take a long time to complete, such as downloading a file from the Internet, playing an audio recording, or watching a video clip, something that makes the user wait. If the user needs to wait for a task to be solved, the best way out is to create an asynchronous thread to allow the user to do something else at that time.

In most cases, experts recommend to make the background thread to perform those tasks that heavily load the processor, or run more than 5-6 seconds.

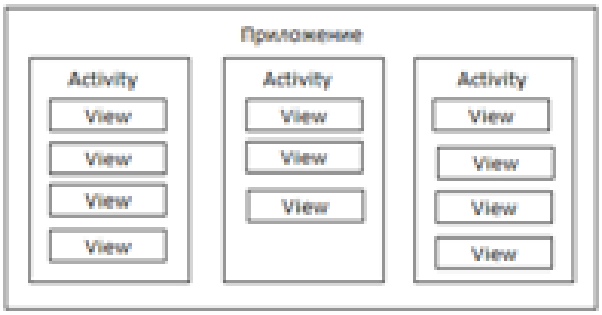
**Background services**

A service is an application that runs in the background and does not require a user interface. An example of a service on a computer is an antivirus program, and in Android OS, audio players that play audio recordings in the background, allowing the user to use other applications at the same time.

**The Architecture of an Android app**

An Android application consists of multiple operations (Activities) that take up the whole screen. The application switches between them depending on the task selected by the user.

Activities consist of viewports (View). The General structure of a standard Android application can be represented as a diagram in Pic 2




Pic 2 The Architecture of an Android app

## 2.2 Choice of tools and technologies

The developed application uses the following software tools and technologies:

**Java JDK (Java Development Kit)** – a set for developing applications in the Java language, which includes the Java compiler, libraries, utilities, documentation, etc.

**Android Studio** is a development environment from Google, which is the official development environment for Android applications based on IntellIJ IDEA.

**SQLite** is the default relational database used by Android.

**Java Development Kit**

JDK is a key part of the platform for creating Java applications. It is based on the Java compiler

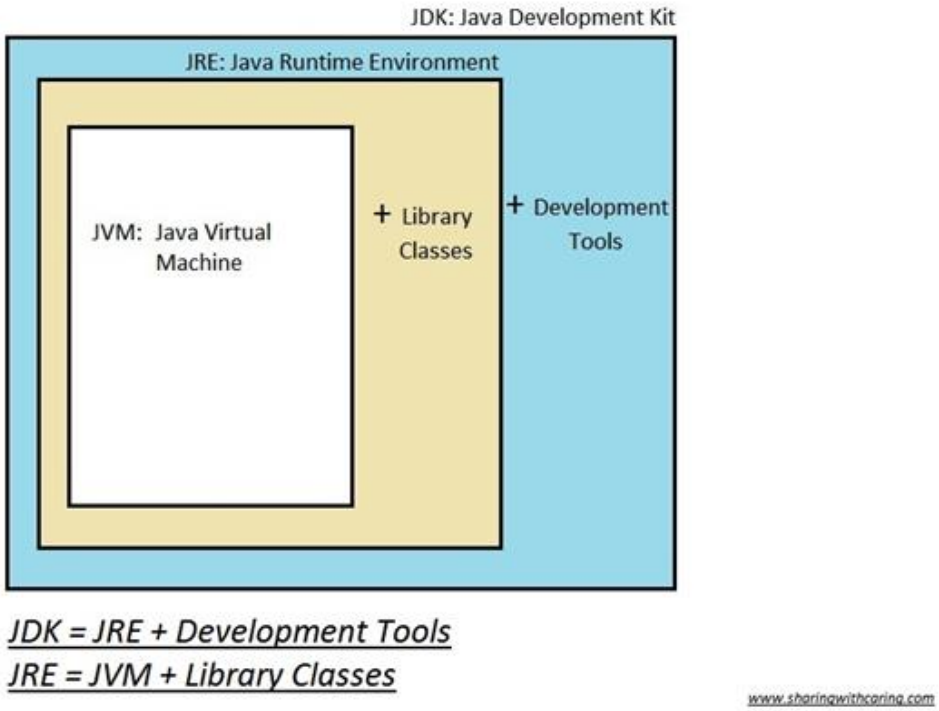
JDK is one of the three main packages used in Java programming. These also include the Java Virtual Machine and Java Runtime Environment.It is

important to distinguish between these three technologies and to understand how they are related:

- The JVM is a part of the Java platform that executes programs
- The JRE is a Java element located on the disk that creates and runs the JVM
- The JDK allows developers to create Java programs that can be run and run through the JVM and JRE

Novice Java developers often confuse JDK and the JRE. The difference is that the JDK is a package of software development tools, whereas the JRE is a package of tools for running Java code.

The JRE can be used as a separate component to easily run Java programs, but it is part of the JDK. JDK requires JRE because running programs is an integral part of their development in Pic 2.1




Pic 2.1 Java Development Kit

- Technical definition: a JDK is an implementation of a Java platform specification that includes a compiler and class libraries
- Generic definition: JDK is a software package that you download to create Java applications

***JDK and Java compiler***

In addition to the JRE, which is the environment used to run Java applications, each JDK contains a Java compiler. A compiler is a program that can accept source files with an extension .java, which are plain text, and turn them into executable files with the extension .class

Installing and configuring the JDK is not difficult. When you download the JDK, you must choose which version of Java you want to use. Java 8 is currently the most commonly used version. Java supports backward compatibility, so just download the latest version

***JDK***

In addition to the Java version, you must select a package (platform). The following platforms are available in Java: Java Enterprise Edition (Java EE), Java Standard Edition (Java SE), and Java Mobile Edition (Java ME)

Novice developers sometimes can't figure out which package is right for their project. Typically, each version of the JDK contains Java SE tools. For example, Java EE is a standard platform (SE) with additional tools useful for developing enterprise applications such as Enterprise JavaBeans or Object Relational Mapping support

If you are a novice developer, you should not worry about choosing the right version of the JDK, as you can switch to another package without problems if necessary

***JDK version compatibility***

Since the JDK comes with a compiler, the JDK you use determines which version of Java you can use in your development. For example, if you want to use the new functionality introduced in Java 8, at least Java 8 JDK is required for correct compilation. Otherwise, the javac command will report a syntax error in your code

***Java EE***

You need to use Java EE if you are going to create web applications. Java EE the JDK includes a Java Servlet that supports the HTTP requests. Any Java EE

JDK implementation also requires a special container, which is the server that runs the applications. Glassfish is a reference implementation of Oracle's Java EE server. Other popular implementations are Tomcat and Jetty

***Installing the JDK***

When you run the JDK installer, you need to install two components: Development Tools and Source Code

Installing development tools gives you direct access to the JDK. The source code installation contains sources of public classes from the Java Core Api. Setting this option will allow you to refer to the source code of the classes when developing your applications

Install all offered components and accept the default values. JDK, JRE and class source codes will be installed on your operating system. Default installation path C:\Program Files\Java

***JDK on the command line***

Installing the JDK and JRE adds the java command to your command line. You can verify this by running the java-version command on the command line, which should output the installed version of Java to the console (in some cases, after installing Java, you need to restart the system)

***Javac command***

The javac command is located in the /jdk directory, but is not automatically added to the PATH system variable (which is the set of paths to the directories where the executable files are located) during installation. We can install javac by ourselves or install the IDE (integrated development environment) that contains this command.

***Android Studio***

Android Studio includes the most productive tools for creating high-quality and effective applications for different types of Android devices, including phones, tablets, as well as Android Auto, Android Wear and Android TV devices. Since this is the official development environment from Google, Android Studio has

everything you need to create an application: an intelligent editor, a debugger, as well as performance analysis tools, emulators, and more.

Basic possibilities

- Intelligent editor with advanced auto-completion, refactoring and code analysis.
- Instant launch allows you to quickly check for changes, set parameters, and run work cycles by entering code and changing the resources available to the app, on your device, or in the emulator.
- Fast and multifunctional Android emulator with virtual accelerometer, operating temperature meter, magnetometer and other sensors.
- Support for all Android platforms: phones and tablets, as well as Android Wear devices, Android Auto and Android TV.
- A flexible Gradle-based build system that automates application code generation, dependency management, and customizable APK file configurations.
- Code templates for implementing standard functions.
- User-friendly layout editor with drag-and-drop elements and prototyping mode to develop applications intuitively.
- New layout constraint Manager (backward compatible with Android API level 9) for developing large and complex layouts in a single-level, simplified hierarchy.
- Source code analyzers to detect problems in the application code related to performance, usability, version compatibility, etc.
- Support for C / C++ in code modification mode and the ability to debug using a low-level command set (LLDB), which allows the application to use interface components for direct access from Java.
- Built - in support for Firebase SDK, Firebase Test Lab, Firebase App Indexing and Google Cloud Platform.

- APK analyzer to view APK files and determine the proportion of individual components of the application in its total volume.
- The writer of the Espresso tests (beta version) to create UI tests by recording interactions with the application and subsequent output of software code tests.
- Layout inspector to view the hierarchy of views of an application during its run.
- GPU debugger (beta) to capture the OpenGL ES command stream on an Android device and run It in Android Studio for later analysis.

***SQLite***

SQLite is a library written in C language that implements SQL mechanism of working with data, in other words, database engine.

SQLite is not a client library that only allows you to connect an application to a database server, SQLite itself is a database server.

SQLite library writes data directly to a file on disk, and allows you to read, update and search data based on the SQL query language, mainly focusing on the standard SQL 92. The main advantages of using SQLite

Distributed free of charge.

Easy installation.

In PHP 5, SQLite support is built automatically (SQLite 2.8.14).

Ease of administration.

And since SQLite stores data in regular files, there is no need for additional administrative tools. Each user has its own database (in any number created by the user!) and access rights are implemented automatically by the file system of the server.

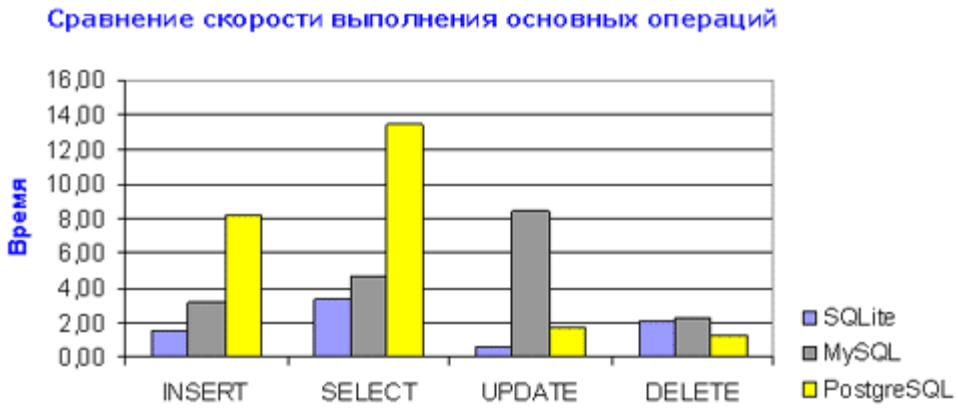
Ease of use.

Unlike other databases, SQLite is an untyped database. When you create a table, you only need to specify the field names, not their type, because SQLite stores all

Data in a row format. The only difference in type is relevant only in the case of data sorting and this difference is played within the SQLite itself.

Performance.

Since the database engine and its interface are implemented as a whole, a huge advantage of SQLite is high performance – for most typical tasks, an application built on SQLite runs faster than using MySQL, 2-3 times faster and 10-20 times faster than PostgreSQL! And despite the fact that the amount of server memory that it allocates for SQLite is very, very small. In pic 2.2




Pic 2.2 According to testing - [www.hwaci.com/sw/sqlite/speed.html](www.hwaci.com/sw/sqlite/speed.html)

Easy portability between platforms, web servers and applications.

Database files are compatible with different platforms (Windows, UNIX). To transfer a database to a web server, you only need to transfer 1 file. The data is also backed up by copying the database file.

Object-oriented interface.

Another equally important advantage of SQLite is the ability to use a powerful object-oriented interface to SQLite, which allows you to build highly efficient, easily extensible applications.

The ability to store data in a database of up to 2 terabytes.

SQLite allows you to store strings and binary data of unlimited length.

Limitations of using SQLite

First of all, SQLite is designed for small and medium-sized applications. Especially important is the use of SQLite in the case when mainly carried out operations of writing and reading data. However, with extremely active data access or frequent sorting, SQLite is slower than its competitors because of the built-in file locking mechanism (only when data is modified) and the need to check the type of fields to choose the sorting method.

## 2.3 The design of the prototype GUI

You must create an intuitive graphical user interface for your application.

The basic structure when creating an interface:

- Activities (Activities)
- Resources (XML files) - include layouts, strings, images, styles
- File AndroidManifest.xml-contains information about configuration settings
- The View class is the base class for all user interface components. Responsible for drawing images and handling events.
- File R.java – responsible for identification of resources.

It is worth remembering that the application may contain several activities (screen forms), one of which is defined as the home and is displayed when you first start the application. Also the activities of one application are independent of each other.

There are 2 ways to create widgets:

- An XML layout file that describes graphical elements and their characteristics.
- Dynamically create widgets in screen form class code.

Both methods have their advantages and disadvantages, so in practice they are used together, which was done in this application.

***Application architecture***

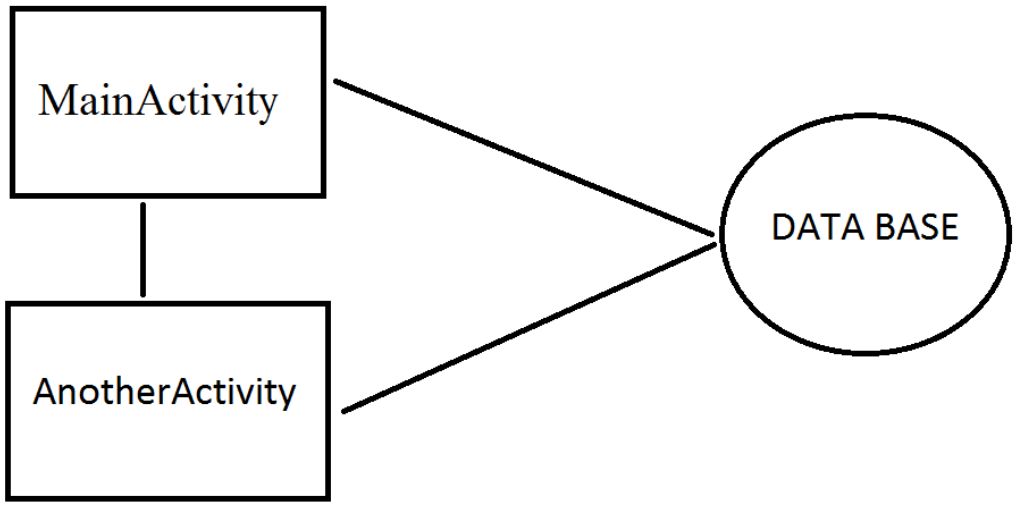
The following structures were identified in the developed application:

- LoginActivity activity, which starts the initialization screen of the user

- MainActivity-the activity that starts after LoginActivity

Both of these structures are associated with the model to load data from the database

In General, the structure of the application is shown in Pick 2.3




Pic 2.3 The structure of the application

***Application launch***

Main scenario

In the main interface of the system, the user selects the application and launches it. The user initialization screen is started, then the main application screen. The application displays an empty line where the user must enter the word to be translated then the application checks the database whether this word exists:

- when finding the word application displays a new window translation of the word
- when not finding the word output to the screen an empty cell

***INTEGRATION (KOTLIN)***

Kotlin is a statically typed programming language that runs on top of the JVM and is developed by JetBrains. It is also compiled into JavaScript and other platforms through the LLVM infrastructure. Kotlin is fully compatible with JAVA, so there was no problem to integrate it into the project.[19-20]

The goal of integrating the MarvinJs library into the Android application in the Kotlin programming language was to simplify the logic and reduce the methods for retrieving data from the library. The Kotlin programming language is compiled in the same language as the MarvinJs library was developed. In this regard, it was suggested that the integration of code into the application should be easier and faster. However, the development encountered the same problems as in the JAVA programming language. Despite the fact that Kotlin is compiled in the JavaScript programming language, it is closely related to the JVM(Java Virtual Machine), which is poorly adapted to obtaining data from the JavaScript code of the MarvinJs library.[19-20]

Despite the difficulties that have appeared on the integration of the MarvinJs library, the Kotlin language has a small advantage in the development of this approach. Integration classes and logic have become more readable and understandable to other developers. Lambda expressions have appeared that simplify code writing and reduce its size.[19-20]

Below is a piece of code in Kotlin and a similar piece of code on:

JAVA:

```
public class MarvinKotlinView : WebView {
  private var mWebView: WebView? = null
  constructor (context: Context): super(context) {
     init()
  }
fun init() {
  View.inflate(context, R.layout.marvin_view, this)
  mWebView = findViewById(R.id.marvinView) as WebView
  (mWebView as WebView).setWebViewClient(MyWebViewClient())
```

```
  (mWebView as WebView).setWebChromeClient(MyWebChromiumClient())
…
public class MarvinView extends WebView {
  private WebView mWebView;
  public MarvinView(Context context) {
     super(context);
     init();
  }
private void init() {
  inflate(getContext(), R.layout.marvin_view, this);
  mWebView = (WebView) findViewById(R.id.marvinView);
  mWebView.setWebViewClient(new MyWebViewClient());
  mWebView.setWebChromeClient(new MyWebChromiumClient());
...
```

Despite these advantages of the Kotlin language. It does not eliminate the problem of getting data from the library code. Based on this, and taking into account that to use the programming language Kotlin need to install an additional plugin for the IDE and if such a plugin is not the developer, the application code will not be able to compile to work on devices. Not yet to be released Android Studio 3.0 the decision was made to use the integration library in JAVA. After the release of the IDE of the third version, when Android Studio will be able to support projects in both JAVA and Kotlin languages, it makes sense to leave the implementation in the Kotlin language

# CHAPTER III. APPLICATION DEVELOPMENT

## 3.1 Choice of development environment

To develop an application for Android, you must use certain programming environments. For Android development from Google, there is an official development environment called Android Studio. In addition to the official IDE has several analogues, no less powerful and easy to develop mobile applications.

Android Studio is a relatively new development environment for Android applications, based on the platform Intellij IDEA of JetBrains (authors IntellijIdea, PhpStorm, AppCode, ReSharper), which was announced at the world conference Google I\O 2013

## 3.2 Database design

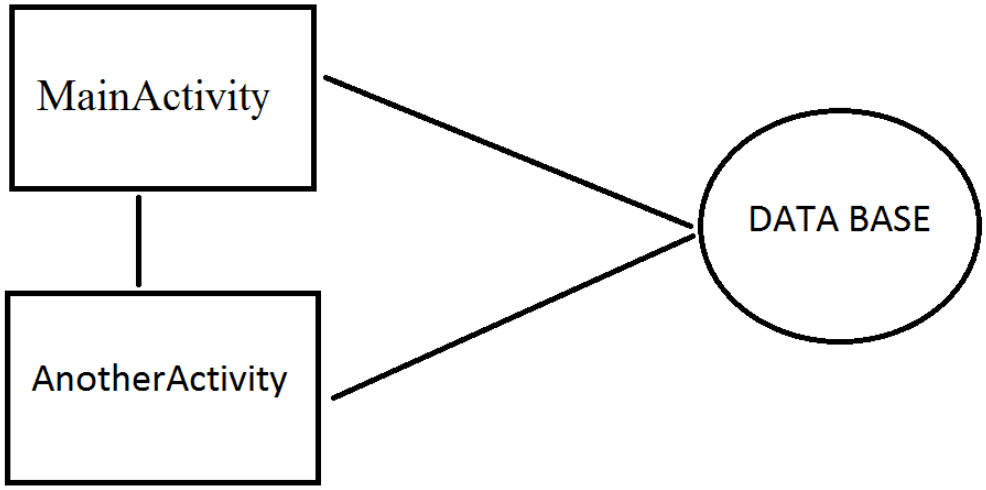
### Logical model

As a result of the analysis of the subject area, one object relation was identified. Let's imagine this relationship as a table with attributes.

| Field name | Comment's |
|---|---|
| Colors | Color field |
| Numbers | Numbers field |
| Family | Family field |

### Physical model

MySQL database was chosen for database management due to its wide range of functionality and flexibility in operation. The final physical model of the base the data is shown in Pic 3




Pic 3 The structure of the application

In the application, when connecting to the database, we specify the database name and version. The following situations may occur:

1) DB does not exist. This can be for example in the case of the first installation of the program. In this case, the application must create the database itself and all the tables in it. And then it already works with the newly created database.

2) the database exists, but its version is outdated. This may be the case if the program is updated. For example, a new version of the program needs additional fields in old tables or new tables. In this case, the application should update the existing tables and create new ones if necessary.

3) the database exists and its version is up to date. In this case, the application successfully connects to the database and works.

As you know, the phrase "application must" is equivalent to the phrase "developer must", i.e. it is our task. To handle the situations described above, we need to create a class that inherits sqliteopenhelper. Let's call it DBHelper. This class will provide us with methods to create or update the database when it is out of date or out of date.

onCreate - method to be called if the database we want to connect to does not exist

onUpgrade - will be called in case we are trying to connect to a database of a newer version than the existing one In Pic 3.1, Pic 3.2 and Pic 3.3

```java
package ru.startandroid.develop.p0341simplesqlite;

import android.app.Activity;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;

public class MainActivity extends Activity implements OnClickListener {

  final String LOG_TAG = "myLogs";

  Button btnAdd, btnRead, btnClear;
  EditText etName, etEmail;

  DBHelper dbHelper;

  /** Called when the activity is first created. */
  @Override
  public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.main);

    btnAdd = (Button) findViewById(R.id.btnAdd);
    btnAdd.setOnClickListener(this);

    btnRead = (Button) findViewById(R.id.btnRead);
    btnRead.setOnClickListener(this);

    btnClear = (Button) findViewById(R.id.btnClear);
    btnClear.setOnClickListener(this);
```

Pic 3.1 Creat Data base

```java
    // создаем объект для создания и управления версиями БД
    dbHelper = new DBHelper(this);
  }


  @Override
  public void onClick(View v) {

    // создаем объект для данных
    ContentValues cv = new ContentValues();

    // получаем данные из полей ввода
    String name = etName.getText().toString();
    String email = etEmail.getText().toString();

    // подключаемся к БД
    SQLiteDatabase db = dbHelper.getWritableDatabase();


    switch (v.getId()) {
    case R.id.btnAdd:
      Log.d(LOG_TAG, "--- Insert in mytable: ---");
      // подготовим данные для вставки в виде пар: наименование столбца - значение

      cv.put("name", name);
      cv.put("email", email);
      // вставляем запись и получаем ее ID
      long rowID = db.insert("mytable", null, cv);
      Log.d(LOG_TAG, "row inserted, ID = " + rowID);
      break;
    case R.id.btnRead:
      Log.d(LOG_TAG, "--- Rows in mytable: ---");
      // делаем запрос всех данных из таблицы mytable, получаем Cursor
      Cursor c = db.query("mytable", null, null, null, null, null, null);

      // ставим позицию курсора на первую строку выборки
      // если в выборке нет строк, вернется false
      if (c.moveToFirst()) {
```

Pic 3.2 Connect Data base

```
        Cursor c = db.query("mytable", null, null, null, null, null, null);

        // ставим позицию курсора на первую строку выборки
        // если в выборке нет строк, вернется false
        if (c.moveToFirst()) {

          // определяем номера столбцов по имени в выборке
          int idColIndex = c.getColumnIndex("id");
          int nameColIndex = c.getColumnIndex("name");
          int emailColIndex = c.getColumnIndex("email");

          do {
            // получаем значения по номерам столбцов и пишем все в лог
            Log.d(LOG_TAG,
                "ID = " + c.getInt(idColIndex) +
                ", name = " + c.getString(nameColIndex) +
                ", email = " + c.getString(emailColIndex));
            // переход на следующую строку
            // а если следующей нет (текущая - последняя), то false - выходим из цикла
          } while (c.moveToNext());
        } else
          Log.d(LOG_TAG, "0 rows");
        c.close();
        break;
      case R.id.btnClear:
        Log.d(LOG_TAG, "--- Clear mytable: ---");
        // удаляем все записи
        int clearCount = db.delete("mytable", null, null);
        Log.d(LOG_TAG, "deleted rows count = " + clearCount);
        break;
      }
      // закрываем подключение к БД
      dbHelper.close();
    }

```

Pic 3.3 Connect Data base

In the Activity - onCreate method, we define objects, assign handlers, and create a dbHelper object of the DBHelper class to manage the database. The class itself will be described below.

Next, look at the Activity – onClick method, in which we process button clicks.

The ContentValues class is used to specify the table fields and the values that we will insert into these fields. We create a cv object and use it later. Next, we write the values from the input fields to the variables. Then, using the getWritableDatabase method, connect to the database and get the SQLiteDatabase object. It will allow us to work with the database. We will use its insert methods – insert record, query – read, delete – delete. They have a lot of different input parameters, but we are still using the minimum.

Next, look at what button was pressed:

btnAdd – add an entry to the mytable table. We fill the cv object with pairs: field name and value. And (when you insert a record into a table) the corresponding values will be inserted into the specified fields. We fill in the name

and email fields. id we will be filled automatically (primary key autoincrement). Call the insert method – pass it the name of the table and the cv object with the inserted values. The second argument of the method is used when an empty row is inserted into the table. We do not need it now, so pass null. The insert method returns the ID of the inserted string, we save it to rowID and output it to the log.

btnRead – read all records from mytable table. The query method is used for reading. On entrance it is powered by a table name, a list of the requested fields, the criteria for selecting, grouping, sorting. Since we need all data in all fields without sorting and grouping - we use null everywhere. Only the name of the table specified. The method returns us an object of the Cursor class. It can be considered as a table with data. The moveToFirst method – makes the first entry in Cursor active and at the same time checks whether there are any entries in it (i.e. whether something in the query method is selected). Next, we get the ordinal numbers of the columns in Cursor by their names using the getColumnIndex method. These numbers are then used to read the data in the getInt and getString methods and output the data to the log. Using the moveToNext method, we iterate through all the rows in Cursor until we reach the last one. If records were not, we see in log a message – 0 rows. At the end, we close the cursor (free the resources it occupies) with the close method, since we do not use it anywhere else.

btnClear – clears the table. The delete method deletes records. At the entrance, pass the name of the table and null as conditions for deletion, which means everything will be deleted. The method returns the number of deleted records.

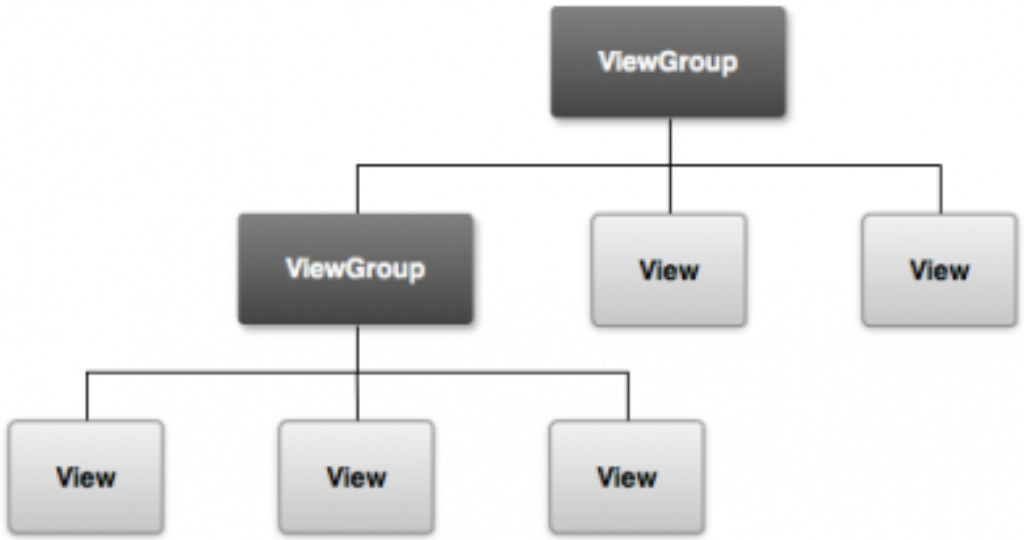
### 3.3 Creating an application user interface

The graphical user interface for the Android app is built using the view hierarchy and ViewGroup objects. View objects are typically UI widgets, such as buttons or text boxes and ViewGroup, as well as invisible containers that define how child elements will be used, such as in a grid or vertical list.

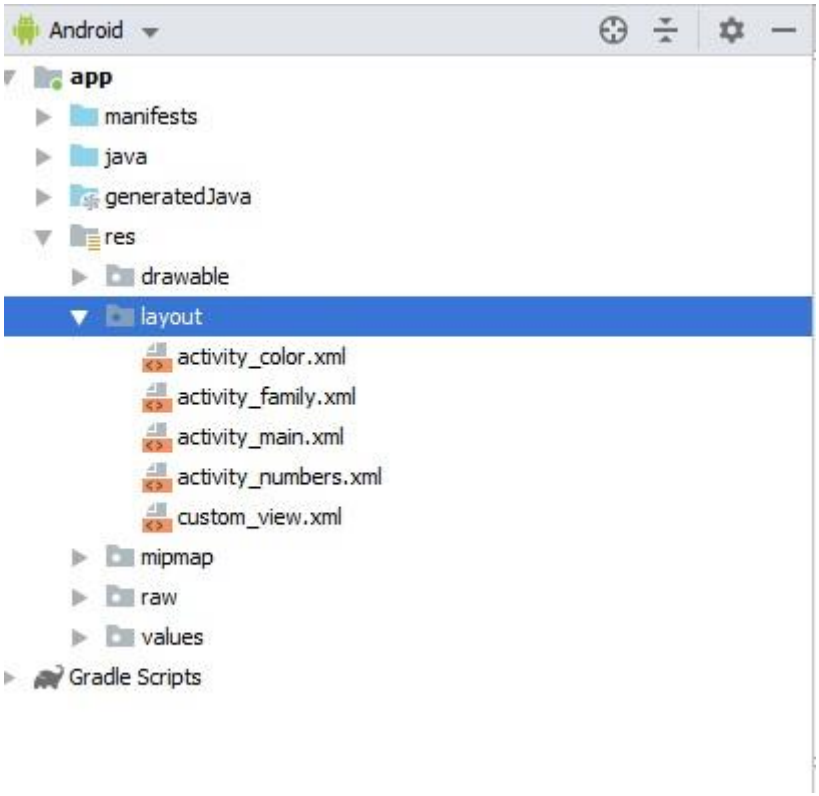
Android provides an XML dictionary that matches the View and ViewGroup subclasses, so you can define your own ??user interface in XML using a hierarchy of user interface elements.

Alternative layouts

Declaring a layout UI in XML rather than executing code is useful for several reasons, but this is especially important so you can create different layouts for different screen sizes. For example, you can create two versions of a layout and tell the system to use a "small" screen in some cases, and a "large"screen in others In Pic 3.4 and Pic 3.5

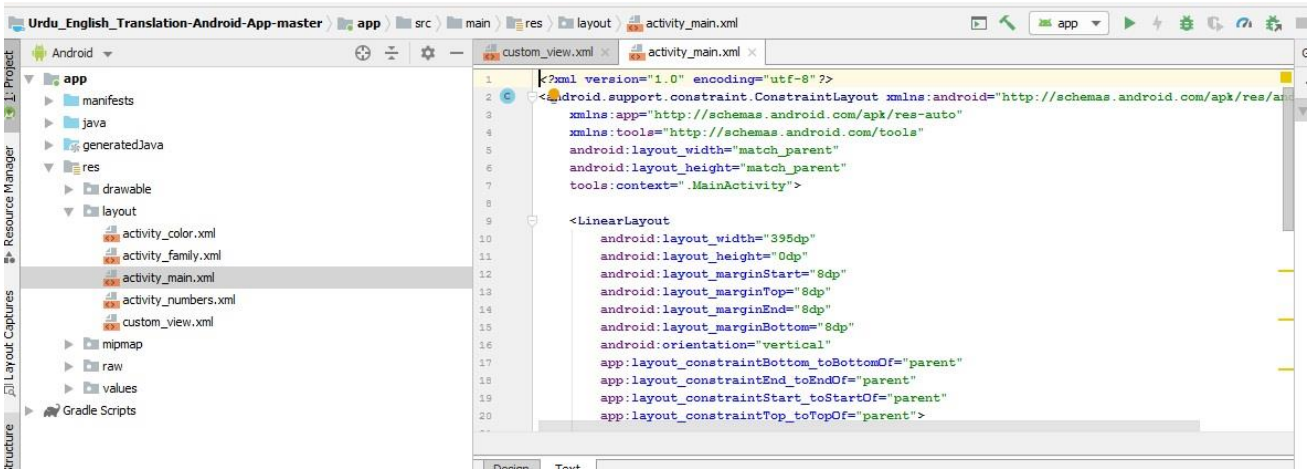



Pic 3.4 The structure of the interface



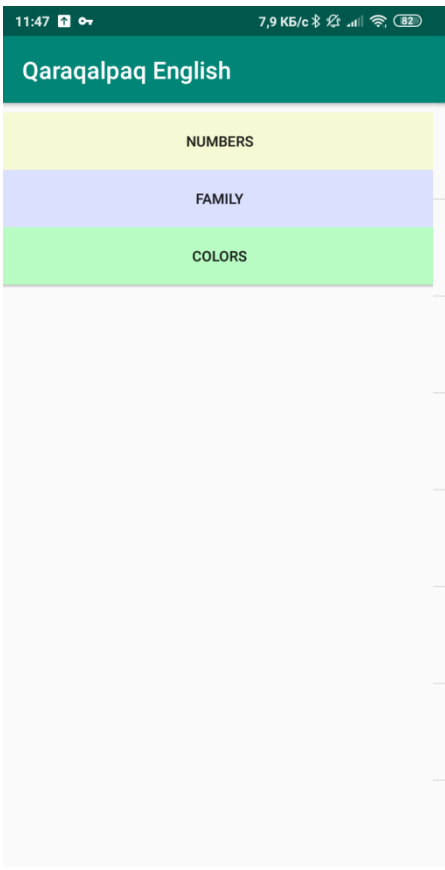

Pic 3.5 Activities

A layout in XML that includes a text box and a button. when the button is pressed, sending the content to the text box to another activity in Pic 3.6

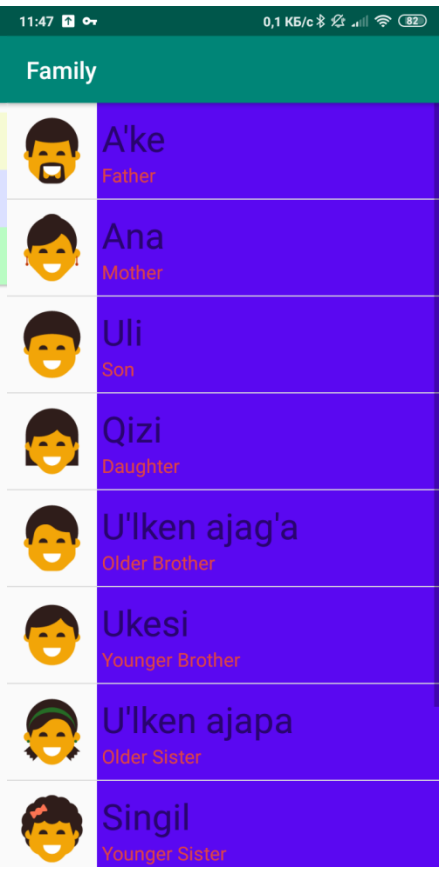



Pic 3.6 The structure of the Activities

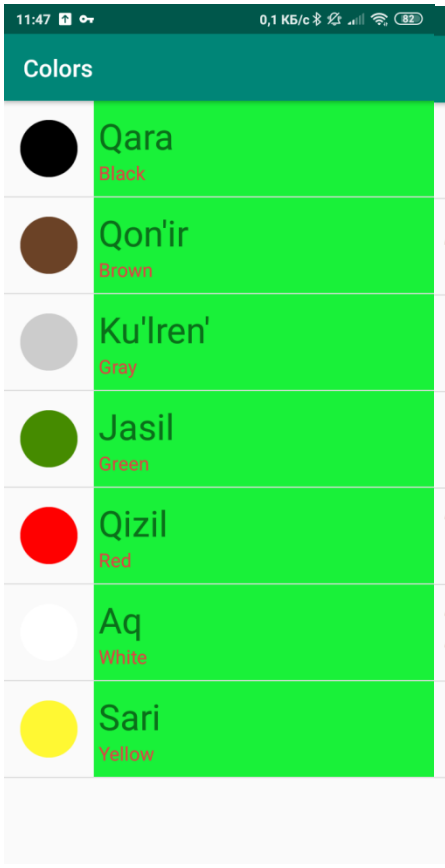
The result obtained in the development of its application interface in Pic 3.7 ,Pic 3.8, Pic 3.9 and Pic 3.10



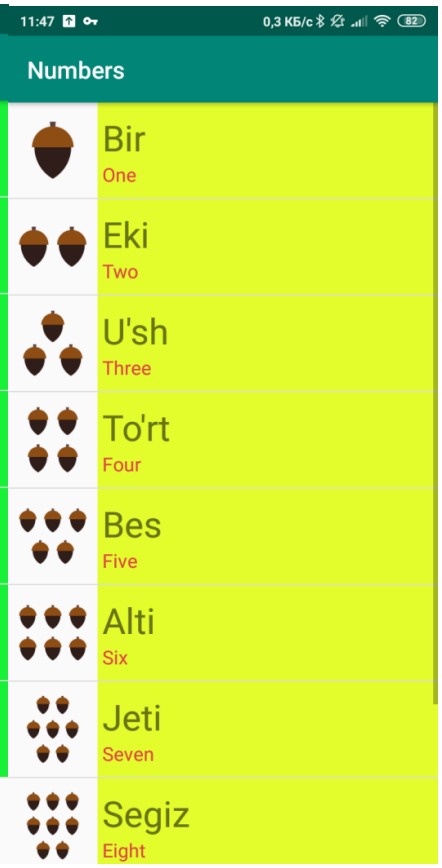

Pic 3.7 App interface




Pic 3.8 App interface

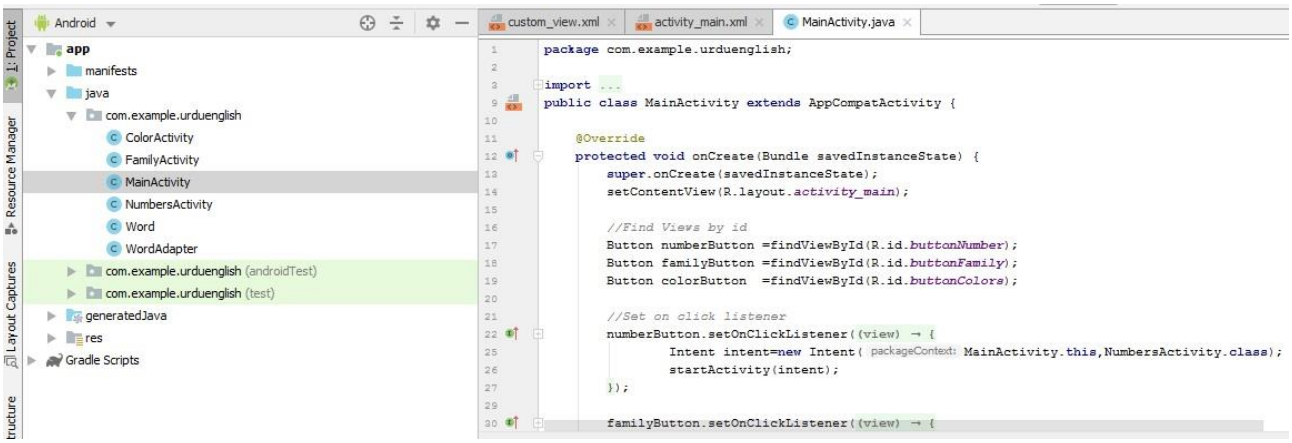



Pic 3.9 App interface



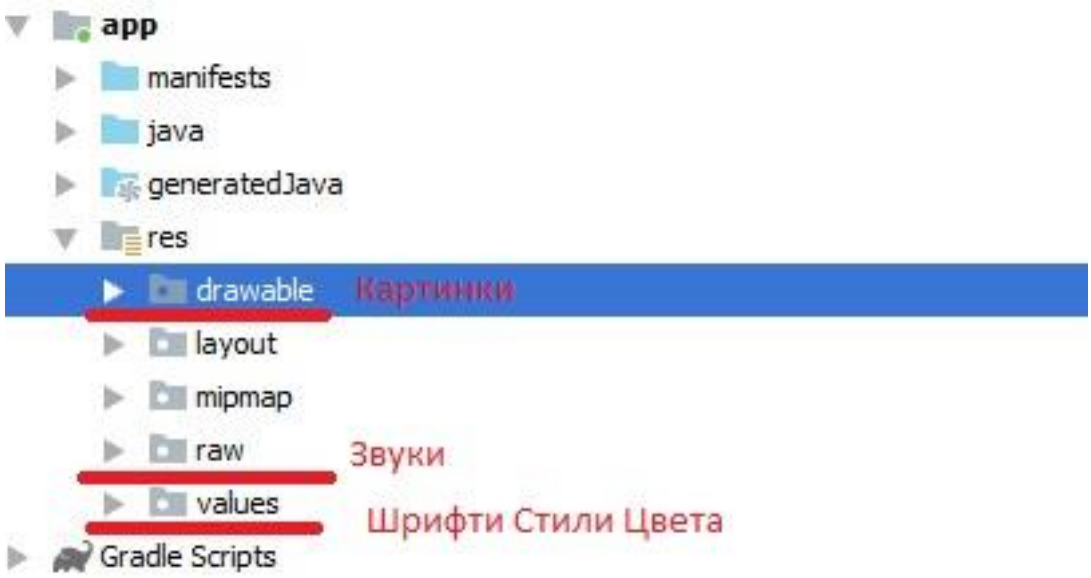

Pic 3.10 App interface

It is the structure of the application written in Java in Pic 3.11




Pic 3.11 Code in Java

Resources : pictures,colors,sounds that are used in application Pic 3.12




Pic 3.13 Application resources

# CONCLUSION

Raising the issue of insufficient application in the Karakalpak language for learning English, we can not say about the relevance of the development of software applications in our region, corresponding to the subject of this problem

In the course of this thesis, the problems were considered,related to the automation of the process of quick and easy information acquisition users of mobile phones based on the Android operating system.

When performing the work, the analysis of existing analogues was carried out on market of software, software and implementation technologies mobile applications, the choice of DBMS, made logical and physical database models, describes the process of developing a graphical interface mobile application.

As a result of the thesis solved all the tasks and achieved the goal, which is to create a mobile application for create invoices with your Android smartphone to reduce the time spent on the exchange of information.

The program has a simple interface, which is easy to handle people any age, fast data processing and no hard data is supported performance requirements, system architecture.

As a result of the diploma project have been improved knowledge in the field of programming mobile applications in the language "Java". There were studied new features of the development environment "Android Studio", acquired skills use of scientific and technical information

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# APPENDIX

## Listing 1

```
package com.example.urduenglish;

import android.content.Intent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.util.Log;
public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        //Find Views by id
        Button numberButton =findViewById(R.id.buttonNumber);
        Button familyButton =findViewById(R.id.buttonFamily);
        Button colorButton  =findViewById(R.id.buttonColors);

        //Set on click listener
        numberButton.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent intent=new
Intent(MainActivity.this,NumbersActivity.class);
                startActivity(intent);
            }
        });

        familyButton.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent intent=new
Intent(MainActivity.this,FamilyActivity.class);
                startActivity(intent);
            }
        });

        colorButton.setOnClickListener(new
View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent intent=new
Intent(MainActivity.this,ColorActivity.class);
                startActivity(intent);
            }
```

```
        });
    }}
```

## Listing 2

```
package com.example.urduenglish;

import android.content.Context;
import android.media.AudioManager;
import android.media.MediaPlayer;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ListView;
import android.widget.Toast;

import java.util.ArrayList;

public class FamilyActivity extends AppCompatActivity {

    MediaPlayer mediaPlayer;
    AudioManager audioManager;
    AudioManager.OnAudioFocusChangeListener
mOnAudioFocusChangeListener=new
AudioManager.OnAudioFocusChangeListener() {
        @Override
        public void onAudioFocusChange(int focusChange) {

            if(focusChange==AudioManager.AUDIOFOCUS_GAIN){
                mediaPlayer.start();
            }
            else if(focusChange ==
AudioManager.AUDIOFOCUS_LOSS){
                //When Audio Focus is lost we release media
player resources
                releaseMediaPlayer();
            }
            else if(focusChange ==
AudioManager.AUDIOFOCUS_LOSS_TRANSIENT){
                mediaPlayer.pause();
                mediaPlayer.seekTo(0);
            }

        }
    };
    //we release the media player resources when sound is
completely played
    private MediaPlayer.OnCompletionListener
mOnCompletionListener= new MediaPlayer.OnCompletionListener() {
        @Override
        public void onCompletion(MediaPlayer mediaPlayer) {
```

```
            releaseMediaPlayer();
        }
    };
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_family);

        //Setting up the Audio Manager to get Audio Service
        audioManager= (AudioManager)
getSystemService(Context.AUDIO_SERVICE);

        final ArrayList<Word> arrayList=new ArrayList<Word>();
        arrayList.add(new
Word("Father","A'ke",R.drawable.family_father,R.raw.father));
        arrayList.add(new
Word("Mother","Ana",R.drawable.family_mother,R.raw.mother));
        arrayList.add(new
Word("Son","Uli",R.drawable.family_son,R.raw.son));
        arrayList.add(new
Word("Daughter","Qizi",R.drawable.family_daughter,R.raw.daughter
));
        arrayList.add(new Word("Older Brother","U'lken
ajag'a",R.drawable.family_older_brother,R.raw.older_brother));
        arrayList.add(new Word("Younger
Brother","Ukesi",R.drawable.family_younger_brother,R.raw.younger
_brother));
        arrayList.add(new Word("Older Sister","U'lken
ajapa",R.drawable.family_older_sister,R.raw.older_sister));
        arrayList.add(new Word("Younger
Sister","Singil",R.drawable.family_younger_sister,R.raw.younger_
sister));
        arrayList.add(new
Word("Grandmother","Aje",R.drawable.family_grandmother,R.raw.gra
ndmother));
        arrayList.add(new
Word("Grandfather","Ata",R.drawable.family_grandfather,R.raw.gra
ndfather));

        WordAdapter wordAdapter=new
WordAdapter(this,arrayList,R.color.familyActivity);
        ListView listView=findViewById(R.id.listViewFamily);
        listView.setAdapter(wordAdapter);

        listView.setOnItemClickListener(new
AdapterView.OnItemClickListener() {
            @Override
            public void onItemClick(AdapterView<?> adapterView,
View view, int position, long l) {
                //Release any media player resources before
playing any sound
                releaseMediaPlayer();
```

```
                //Initialize the object of type Word to get the
item clicked
                Word word=arrayList.get(position);

                //Here we request audio focus to play sound
(STREAM_MUSIC) for small duration (AUDIOFOCUS_GAIN_TRANSIENT)
                int result = audioManager.requestAudioFocus(
mOnAudioFocusChangeListener,audioManager.STREAM_MUSIC,audioManag
er.AUDIOFOCUS_GAIN_TRANSIENT);

                if(result==AudioManager.AUDIOFOCUS_GAIN){
                    //Assigning the resources to media player
                    mediaPlayer=
MediaPlayer.create(FamilyActivity.this,word.getSoundResourceId()
);
                    //Start the playing sound
                    mediaPlayer.start();
                    //Release media player when sound is played
completely

mediaPlayer.setOnCompletionListener(mOnCompletionListener);
                }            }        });
    }
    protected void onStop() {
        super.onStop();
                releaseMediaPlayer();
    }

    private void releaseMediaPlayer() {
        // If the media player is not null, then it may be
currently playing a sound.
        if (mediaPlayer != null) {
                        mediaPlayer.release();

            mediaPlayer = null;

audioManager.abandonAudioFocus(mOnAudioFocusChangeListener);
        }
    }
}
```

## Listing 3

```
package com.example.urduenglish;

import android.content.Context;
import android.media.AudioManager;
import android.media.MediaPlayer;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.util.Log;
```

```
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.ListView;

import java.util.ArrayList;

public class NumbersActivity extends AppCompatActivity {
    MediaPlayer mediaPlayer;
    AudioManager audioManager;
    AudioManager.OnAudioFocusChangeListener
mOnAudioFocusChangeListener=new
AudioManager.OnAudioFocusChangeListener() {
        @Override
        public void onAudioFocusChange(int focusChange) {

            if(focusChange==AudioManager.AUDIOFOCUS_GAIN){
                mediaPlayer.start();
            }
            else if(focusChange ==
AudioManager.AUDIOFOCUS_LOSS){
                //When Audio Focus is lost we release media
player resources
                releaseMediaPlayer();
            }
            else if(focusChange ==
AudioManager.AUDIOFOCUS_LOSS_TRANSIENT){
                mediaPlayer.pause();
                mediaPlayer.seekTo(0);          }         }     };
        private MediaPlayer.OnCompletionListener
mOnCompletionListener= new MediaPlayer.OnCompletionListener() {
        @Override
        public void onCompletion(MediaPlayer mediaPlayer) {
            releaseMediaPlayer();         }    };
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_numbers);
             audioManager= (AudioManager)
getSystemService(Context.AUDIO_SERVICE);
        final ArrayList<Word> arrayList=new ArrayList<Word>();
        arrayList.add(new
Word("One","Bir",R.drawable.number_one,R.raw.one));
        arrayList.add(new
Word("Two","Eki",R.drawable.number_two,R.raw.two));
        arrayList.add(new
Word("Three","U'sh",R.drawable.number_three,R.raw.three));
        arrayList.add(new
Word("Four","To'rt",R.drawable.number_four,R.raw.four));
        arrayList.add(new
Word("Five","Bes",R.drawable.number_five,R.raw.five));
        arrayList.add(new
```

```
Word("Six","Alti",R.drawable.number_six,R.raw.six));
        arrayList.add(new
Word("Seven","Jeti",R.drawable.number_seven,R.raw.seven));
        arrayList.add(new
Word("Eight","Segiz",R.drawable.number_eight,R.raw.eight));
        arrayList.add(new
Word("Nine","Tog'iz",R.drawable.number_nine,R.raw.nine));
        arrayList.add(new
Word("Ten","On",R.drawable.number_ten,R.raw.ten));

        //Creating & Setting up WordAdapter to populate list
view
        WordAdapter wordAdapter=new
WordAdapter(this,arrayList,R.color.numbersActivity);
        ListView listView=findViewById(R.id.listViewNumbers);
        listView.setAdapter(wordAdapter);

        listView.setOnItemClickListener(new
AdapterView.OnItemClickListener() {
            @Override
            public void onItemClick(AdapterView<?> adapterView,
View view, int position, long l) {
                //Release any media player resources before
playing any sound
                releaseMediaPlayer();
                //Initialize the object of type Word to get the
item clicked
                Word word=arrayList.get(position);
                //Here we request audio focus to play sound
(STREAM_MUSIC) for small duration (AUDIOFOCUS_GAIN_TRANSIENT)
                int result = audioManager.requestAudioFocus(
mOnAudioFocusChangeListener,audioManager.STREAM_MUSIC,audioManag
er.AUDIOFOCUS_GAIN_TRANSIENT);
                if(result==AudioManager.AUDIOFOCUS_GAIN){
                    //Play Sound
                    //Assigning the resources to media player
                    mediaPlayer=
MediaPlayer.create(NumbersActivity.this,word.getSoundResourceId(
));
                    //Start the playing sound
                    mediaPlayer.start();
                    //Release media player when sound is played
completely

mediaPlayer.setOnCompletionListener(mOnCompletionListener);
                }            }        });    }
    @Override
    protected void onStop() {
        super.onStop();
        //Release media player resources
        releaseMediaPlayer();
    }    /**     * Clean up the media player by releasing its
```

```
resources.
     */
    private void releaseMediaPlayer() {
        // If the media player is not null, then it may be
currently playing a sound.
        if (mediaPlayer != null) {
            // Regardless of the current state of the media
player, release its resources
            // because we no longer need it.
            mediaPlayer.release();

            // Set the media player back to null. For our code,
we've decided that
            // setting the media player to null is an easy way
to tell that the media player
            // is not configured to play an audio file at the
moment.
            mediaPlayer = null;

            //Abandon Audio Focus so that other apps k use it

audioManager.abandonAudioFocus(mOnAudioFocusChangeListener);
       }    }}
```

### Listing 4

```
package com.example.urduenglish;

import android.content.Context;
import android.media.AudioManager;
import android.media.MediaPlayer;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ListView;

import java.util.ArrayList;

public class ColorActivity extends AppCompatActivity {
    MediaPlayer mediaPlayer;
    AudioManager audioManager;
    AudioManager.OnAudioFocusChangeListener
mOnAudioFocusChangeListener=new
AudioManager.OnAudioFocusChangeListener() {
        @Override
        public void onAudioFocusChange(int focusChange) {

            if(focusChange==AudioManager.AUDIOFOCUS_GAIN){
                mediaPlayer.start();
            }
            else if(focusChange ==
```

```
AudioManager.AUDIOFOCUS_LOSS){
                //When Audio Focus is lost we release media
player resources
                releaseMediaPlayer();
            }
            else if(focusChange ==
AudioManager.AUDIOFOCUS_LOSS_TRANSIENT){
                mediaPlayer.pause();
                mediaPlayer.seekTo(0);              }         }
};
    //we release the media player resources when sound is
completely played
    private MediaPlayer.OnCompletionListener
mOnCompletionListener= new MediaPlayer.OnCompletionListener() {
        @Override
        public void onCompletion(MediaPlayer mediaPlayer) {
            releaseMediaPlayer();
        }
    };
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_color);

        //Setting up the Audio Manager to get Audio Service
        audioManager= (AudioManager)
getSystemService(Context.AUDIO_SERVICE);

        final ArrayList<Word> arrayList=new ArrayList<Word>();
        arrayList.add(new
Word("Black","Qara",R.drawable.color_black,R.raw.black));
        arrayList.add(new
Word("Brown","Qon'ir",R.drawable.color_brown,R.raw.brown));
        arrayList.add(new
Word("Gray","Ku'lren'",R.drawable.color_gray,R.raw.gray));
        arrayList.add(new
Word("Green","Jasil",R.drawable.color_green,R.raw.green));
        arrayList.add(new
Word("Red","Qizil",R.drawable.color_red,R.raw.red));
        arrayList.add(new
Word("White","Aq",R.drawable.color_white,R.raw.white));
        arrayList.add(new
Word("Yellow","Sari",R.drawable.color_mustard_yellow,R.raw.yello
w));

        WordAdapter wordAdapter=new
WordAdapter(this,arrayList,R.color.colorsActivity);
        ListView listView=findViewById(R.id.listViewColors);
        listView.setAdapter(wordAdapter);

        listView.setOnItemClickListener(new
AdapterView.OnItemClickListener() {
```

```
            @Override
            public void onItemClick(AdapterView<?> adapterView,
View view, int position, long l) {
                //Release any media player resources before
playing any sound
                releaseMediaPlayer();

                //Initialize the object of type Word to get the
item clicked
                Word word=arrayList.get(position);

                //Here we request audio focus to play sound
(STREAM_MUSIC) for small duration (AUDIOFOCUS_GAIN_TRANSIENT)
                int result = audioManager.requestAudioFocus(
mOnAudioFocusChangeListener,audioManager.STREAM_MUSIC,audioManag
er.AUDIOFOCUS_GAIN_TRANSIENT);

                if(result==AudioManager.AUDIOFOCUS_GAIN){
                    //Play Sound
                    //Assigning the resources to media player
                    mediaPlayer=
MediaPlayer.create(ColorActivity.this,word.getSoundResourceId())
;
                    //Start the playing sound
                    mediaPlayer.start();
                    //Release media player when sound is played
completely

mediaPlayer.setOnCompletionListener(mOnCompletionListener);
                }            }        });    }
    protected void onStop() {
        super.onStop();
        releaseMediaPlayer();
    }

    private void releaseMediaPlayer() {
        // If the media player is not null, then it may be
currently playing a sound.
        if (mediaPlayer != null) {
            // Regardless of the current state of the media
player, release its resources
            // because we no longer need it.
            mediaPlayer.release();
            mediaPlayer = null;

            //Abandon Audio Focus so that other apps k use it

audioManager.abandonAudioFocus(mOnAudioFocusChangeListener);
}    }}
```

**Listing 5**

```
package ru.startandroid.develop.p0341simplesqlite;
 import android.app.Activity;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;

public class MainActivity extends Activity implements
OnClickListener {
  final String LOG_TAG = "myLogs";
   Button btnAdd, btnRead, btnClear;
  EditText etName, etEmail;
   DBHelper dbHelper;
   /** Called when the activity is first created. */
  @Override
  public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.main);
     btnAdd = (Button) findViewById(R.id.btnAdd);
    btnAdd.setOnClickListener(this);
     btnRead = (Button) findViewById(R.id.btnRead);
    btnRead.setOnClickListener(this);
     btnClear = (Button) findViewById(R.id.btnClear);
    btnClear.setOnClickListener(this);
     etName = (EditText) findViewById(R.id.etName);
    etEmail = (EditText) findViewById(R.id.etEmail);
         // создаем объект для создания и управления версиями БД
```

```
    dbHelper = new DBHelper(this);
 }    @Override
  public void onClick(View v) {
     // создаем объект для данных
    ContentValues cv = new ContentValues();
         // получаем данные из полей ввода
    String name = etName.getText().toString();
    String email = etEmail.getText().toString();
     // подключаемся к БД
    SQLiteDatabase db = dbHelper.getWritableDatabase();
         switch (v.getId()) {
    case R.id.btnAdd:
      Log.d(LOG_TAG, "--- Insert in mytable: ---");
      // подготовим данные для вставки в виде пар: наименование
столбца - значение
            cv.put("name", name);
      cv.put("email", email);
      // вставляем запись и получаем ее ID
      long rowID = db.insert("mytable", null, cv);
      Log.d(LOG_TAG, "row inserted, ID = " + rowID);
      break;
    case R.id.btnRead:
      Log.d(LOG_TAG, "--- Rows in mytable: ---");
      // делаем запрос всех данных из таблицы mytable, получаем
Cursor
      Cursor c = db.query("mytable", null, null, null, null,
null, null);
       // ставим позицию курсора на первую строку выборки
      // если в выборке нет строк, вернется false
      if (c.moveToFirst()) {
         // определяем номера столбцов по имени в выборке
        int idColIndex = c.getColumnIndex("id");
        int nameColIndex = c.getColumnIndex("name");
        int emailColIndex = c.getColumnIndex("email");
         do {
```

```
            // получаем значения по номерам столбцов и пишем все в
лог
            Log.d(LOG_TAG,
                "ID = " + c.getInt(idColIndex) +
                ", name = " + c.getString(nameColIndex) +
                ", email = " + c.getString(emailColIndex));
            // переход на следующую строку
            // а если следующей нет (текущая - последняя), то
false - выходим из цикла
          } while (c.moveToNext());
        } else
          Log.d(LOG_TAG, "0 rows");
        c.close();
        break;
      case R.id.btnClear:
        Log.d(LOG_TAG, "--- Clear mytable: ---");
        // удаляем все записи
        int clearCount = db.delete("mytable", null, null);
        Log.d(LOG_TAG, "deleted rows count = " + clearCount);
        break;    }
      // закрываем подключение к БД
      dbHelper.close();  }  class DBHelper extends
SQLiteOpenHelper {
       public DBHelper(Context context) {
        // конструктор суперкласса
        super(context, "myDB", null, 1);    }
       @Override
      public void onCreate(SQLiteDatabase db) {
        Log.d(LOG_TAG, "--- onCreate database ---");
        // создаем таблицу с полями
        db.execSQL("create table mytable ("
            + "id integer primary key autoincrement,"
            + "name text,"
            + "email text" + ");");    }
       @Override
```

```
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int
newVersion) {    }  } }
```