



Student Name:		Khakimov Ramziddin	
Student Number:		B1803481	
Course:		BSc (Hons) in Computer Information Systems for Business	
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Module Leader:		Dr. Lum Kum Meng	
Module Tutor:		Dr Eugen Castro	
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# Food delivery application for the Mix Burger

Author: Khakimov Ramziddin

ID number: b1803481

E-mail: b1803481@mdis.uz

Management Development of Singapore in Tashkent  
Bangor University

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Supervisor: Rizwan Syed

# Acknowledgment

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## Statement of Originality

The work presented in this dissertation is entirely from the studies of the individual student, except where otherwise stated. Where derivations are presented and the origin of the work is either wholly or in part from other sources, then full reference is given to the original author. This work has not been presented previously for any degree, nor is it at present under consideration by any other degree awarding body.

**Khakimov Ramziddin**



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# Abstract

The schedule of a modern person sometimes does not allow you to fully do basic things, cook lunch or go for it. And more and more people need a quick solution to such problems. This project is aimed at solving one of these problems: ordering and delivering food.

When people do not have time to cook food, or they are at work and there is no such opportunity, then an online order of food for home or work will come to the rescue. And today many people use such services.[1]

By the way, every modern person uses mobile devices, a computer and the Internet. And to order food, it is not difficult to make a couple of clicks and the food freshly prepared by the chefs is already coming to you. This allows you to reduce the time for cooking, which facilitates a person's schedule and give time to other things.

Currently, this niche is gaining momentum in Uzbekistan. Food delivery has become commonplace and familiar for many people. And this is the demand and relevance of this diploma project. More and more people need such services, and there are more and more such online solutions. [2]

As we see, this is in demand, and we come to the conclusion that there is a great demand for such projects.

In this graduation project, I tried to incorporate the most useful and relevant functions for such a solution. Implement the very concept of ordering and delivery. It is as simple as possible to do this for an ordinary person who

is hungry and wants to order food for lunch or dinner after a long working day.

All attention is paid to high-quality and easy interaction of the client with the site. As I said above: a couple of clicks and the food is already on its way.

The goal of this project is not to create something new that would make a boom in the world of software development, but to create what people lack, a solution to the most necessary needs.

The relevance of this thesis on the topic "Food delivery program Mix Burger" in its demand.

Food was, is and will be in demand. There is always a demand, which means that it is also relevant

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# Introduction

## Background of study

I live in a small town near Tashkent, and in our town there has always been an urgent problem of food delivery at home, since previously there was only one fast food cafe in the whole city that made delivery. After the start of quarantine due to Covid 19, this problem became even more urgent because the delivery service had only one number and it was busy all the time. And recently I came up with the idea to create an application for this cafe, so that people do not have to hang on the line and wait for the operator to be released, so that users could quickly deliver food to their homes with a few clicks on their smartphone

## Situation analysis

At the moment, there are quite a lot of problems with food delivery at home, which will be described below:

For example, a person drives home late from work tired, and wants to eat very much, and of course he is reluctant to stop by a fast food cafe and wait in line to order food, then wait another 10-15 minutes to pick up his food, and also he does not want to stop by the curb to call the delivery service and so on also, wait about 10-15 minutes until his order is accepted, then you also need to explain the delivery address. The application that I am creating now will allow the user to stop for just two minutes to make his order and go home safely, there will be no need to wait in line, there will be no need to explain the address, the program will do everything automatically for him. Another relevant problem at the moment is in order to find out whether the food is ready or not, you need to call the delivery service again and again it takes a very long time and this program will allow the user to view at what stage of delivery the order is, also with a couple of clicks on the smartphone screen.

## The statements of Objectives

Business:

1. Automate the process of ordering and delivering food to your home
2. Attract more customers by using the app
3. Help customers quickly choose the food they want
4. Ability to update food and prices online
5. So that users know what stage of delivery their order is at

Technical:

1. Create a program that includes information about food
2. Order and pay for these orders
3. Use the search by program products
4. Ability to add and remove products

# Significance of study

I chose this project for several reasons, such as this project is a great opportunity to improve my knowledge and level of programming applications for Android and iOS. Before I started creating this project, I didn't develop anything for these platforms, but it was always interesting for me to study mobile application development, first I learned how to create simple applications, then I started doing additional research and gradually created these applications and brought them to an advanced level. Also thanks to this project, I learned the Dart programming language [3] and the Flutter framework [4], which is a set of development tools containing all the libraries and tools, as well as documentation, that is, everything necessary to create software. The Flutter framework is cross-platform and allows you to write applications for both Android and IOS. Google positions it as an alternative to the JavaScript language with strict typing, high performance and flexibility. The main idea of flutter revolves around widgets – the entire user interface consists of 21 combinations of various widgets, each of which defines a structural element, for example, a button or a menu of stylistic elements (font or color scheme, layout aspect, margins, etc.). Applications are built from them, as from a design kit. I also used Firebase as a database in my application. Firebase[5] is a cloud database that allows users to store and receive stored information, and also has convenient means and methods of interacting with it. Firebase stores text data in JSON format and provides convenient methods for reading, updating and retrieving data. Firebase can also help with registration and authorization of users, storage of sessions (authorized users), media files, to which it easily provides access thanks to cloud storage. The only reason I was initially interested in Firebase was the flexibility and speed of deployment in the project. Firebase allows you to maintain this speed. There is no need to be distracted by any other things (creating a database, writing an API[6] for receiving and receiving data). The entire server part falls on the shoulders of this service. Thanks to such a powerful tool, you can throw off the functionality of any module with reading, saving data in one evening and show the customer a functional example.

## Scope and Delimitation

This project will unite users, food deliverers and sellers. As well as the owner who will be able to edit and delete users, suppliers and sellers through the administrative panel. I believe that this project will solve all the problems associated with food delivery in this company. Orders will be delivered to suppliers automatically, they will only have to accept or not accept this or that order. Also in the future, I plan to introduce payment using the Click and Payme payment systems, add login by fingerprint and face id. These applications save time for all users, and also save all personal information of users in the database, this is good because users will not need to re-enter their data into the application

## Literature review

According to the social survey report and analytical data on the use of social networks, e-commerce, Internet and mobile devices around the world [7] "Digital technologies of 2021: the latest information about the digital state" of the We are social and Hootsuite teams, approximately 67% of the world's total population currently uses a mobile phone. At the same time, data from the leading global marketing company GWI[8] show that 9 out of 10 users prefer mobile Internet, but also 60% use a laptop or desktop computer to access the Internet. It is also



worth paying attention to the report of the research company Canalys, which says that global smartphone shipments increased by 27% compared to last year, and the market share occupied by Android OS in Russia is 75.35%. Therefore, we can say that mobile technologies have proven themselves in the global market and are amenable to growth trends, respectively, mobile applications are in demand. A mobile application is software for mobile devices written for a specific OS. Mobile devices are convenient in that they provide quick access to content, payment, communication, navigation, banking services, and many other services.

## Business Cycle

Before I chose the "Mix Burger Food Delivery Application" project, I had several other ideas, such as an electronic queue system in banks in Uzbekistan, but when I came to negotiate with banks, they refused me saying that for this they would have to grant me access to their system, and they could not do it. Then I thought to make an application for online purchase of goods, something like AliExpress, Wildberries or Zoodmall, but since there are a lot of these applications on the market, I decided to make a food delivery application, met with the owner of the fast food cafe "Mix Burger" and we agreed with him, we discussed with him what should be in this the application was compared with analogues, compared all the pros and cons and came to a common opinion.

## Business methodology

### SWOT analysis

SWOT[9] analysis is a planning method and a tool for assessing external and internal factors that determine how a company or an individual product will develop in the market

SWOT analysis can be called a method of objective assessment of any situation, which is based on 4 important parameters:

- S — strengths;
- W — weaknesses;
- O — opportunities;
- T — threats.

### Strengths

1. Adding products - the seller can add and remove through the application, and these products immediately automatically appear in the user's application.
2. The user does not need to enter a username and password every time he enters the application, the login is carried out automatically.
3. The user does not need to specify his address every time, the address is determined automatically using Google maps.

## Weaknesses

1. Payment - at the moment, the application is not fully completed yet, and there is no way to pay with a plastic card, but in the future it will be possible to pay with Payme and Click.
2. Internet - This application must have internet access so that the user can order the product and track it.
3. The tracking system for the delivery of goods - at the moment, so the application is not fully finished yet, the tracking system does not work quite correctly
4. IOS operating system - at the moment, the application has been tested and works correctly only on the Android operating system, since it was not possible to test on the IOS operating system

## Opportunities

1. Changing the description and price of goods - in the future, the seller's application will be able to change the description and price of goods, because at the moment the goods can only be added or removed, but you can also change the description and price now, but only through Firebase
2. Adding a chat to the application - so that you can contact the consultant at any time and get an answer to any question

## Threats

1. Competition - after the start of quarantine due to the Covid 19 pandemic, a lot of restaurants and cafes switched to food delivery via the app. And competition in this market has grown to unprecedented heights. A popular fast food cafe Evos has opened in Chirchik, and KFC and Burger King are also planned to open.
2. Bugs and errors - no program on the Internet is immune from errors, and this project is no exception

Summing up, the SWOT analysis revealed internal and external variables of the Mix Burger application, such as strengths and weaknesses, opportunities and threats. The results of the SWOT analysis show that converting capabilities into strengths will improve the functionality and power of the application.

## Industry analysis

Industry analysis[10] is a type of market tool that is used to assess or evaluate the current state and future prospects of a particular industry. The analysis examines a number of different issues, including the impact of the economy on the growth of this industry, competition among companies operating in the industry, and even political events and influences that may affect the future. industry. If properly conducted, industry analysis can help businesses identify ways to gain market share, circumvent potential pitfalls that may soon arise in the economy, and generally increase the chances of continuing to work in the long term.

One of the main issues that must be taken into account in any analysis of the industry is the economic factor. This includes estimating the current cost of the raw materials used in the production process and where these costs may change in the future. Along with the cost of materials, the analysis will take into account the average values of other basic costs applicable in this industry, such as wages and handling costs. The idea is to provide benchmarks that every

business associated with the industry can use when assessing the state of their own operations, which in turn encourages them to look for ways to make any changes necessary to remain competitive.

Another important aspect of industry analysis is the current relationship between supply and demand in this industry. Here the idea is to collect information that helps to understand what is happening with the consumption of goods and services offered to consumers. If the market for these products is currently bloated, which means that many more units are available than consumers are willing to buy, industry participants can adjust their production quotas accordingly. If the analysis shows that the demand for products is constantly increasing, and stocks of finished products are decreasing, this can also serve as an incentive for companies in the industry to shift production levels up from current quotas.

The sphere of competition is also an integral part of any industry analysis. This is especially important for new companies that are trying to establish a presence in the market. If a small group of businesses currently make up the entire industry, this new company will be able to capture market share by lowering prices, assuming that the business can offer quality and volume that consumers will find acceptable. From this perspective, industry analysis can provide the basic details needed to launch and grow a business in a given industry, based on an understanding of the current nature and composition of that industry.

Industry analysis is not just about how things are in a particular industry today. The analysis is also about what will happen in the future, based on factors such as demand, supply, changes in consumer tastes, changes in government regulation and even changes in the state of the economy as a whole. When the data used in the analysis is complete and accurate, the chances of predicting the future of the industry are much higher, which gives participants involved in the industry a much higher opportunity to succeed. It also includes Porter's Five forces[11] (Figure 1.1)

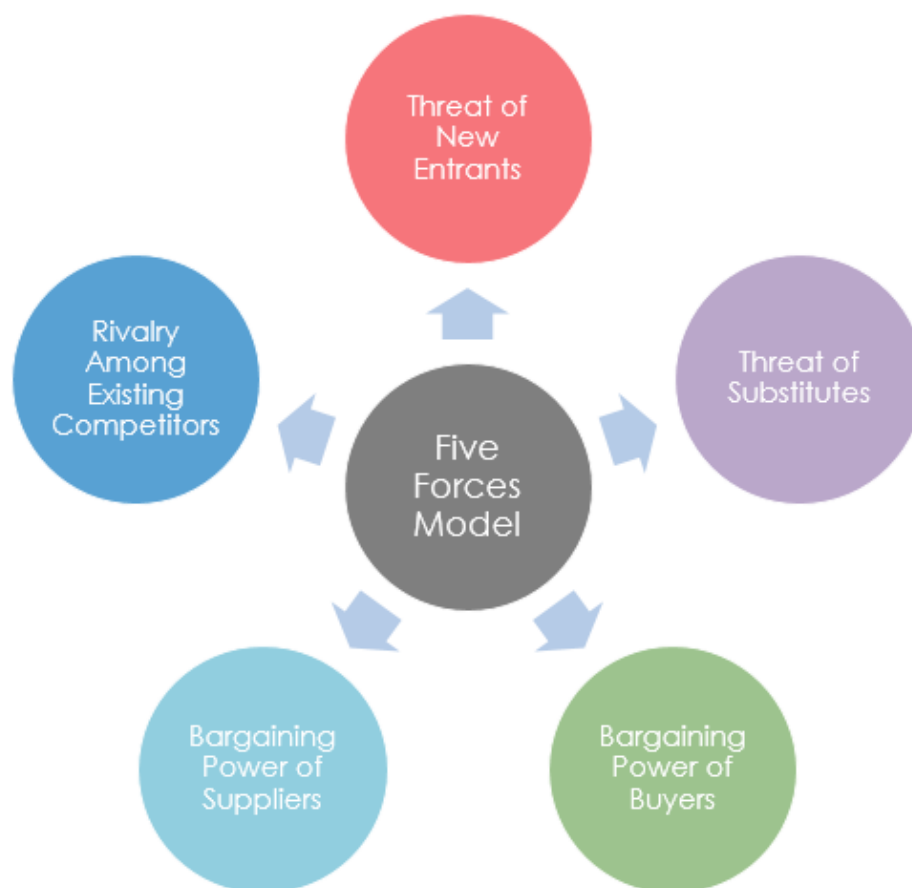


Figure 1.1 Porter's Five Forces

## Rivalry among existing Competitors

### **Number of competitors in the market:**

There are a number of competitors on the market. Recently, about 2 popular online food delivery services have appeared in the city, such as Evos, Chef Club. Also, as mentioned earlier, such popular services as KFC, Burger King enter the market. In terms of the coverage of restaurants in Chirchik, Mix Burger is currently ahead of other companies, because it has been on the city market for more than 10 years.

Moreover, there is a high level of competition in the industry as a whole.

### **Market growth prospects:**

In terms of growth, the industry has good prospects in the near future, as this industry is growing by about 10% year-on-year. But the level of competition in the industry creates equal conditions for all companies, and a number of companies are trying to enter this industry.

### **Availability of a substitute:**

There is a high availability of replacement services in the city due to the presence of 2 well-known companies in this industry. They are always working on promotional offers for customers so that substitute products are available in the industry.

### **Exit barrier:**

The exit barrier in this industry is very low. If a company believes that it will not do business, it needs some kind of legal procedure to terminate the business if the business does not have any huge credit in the market

## Threat of Substitutes

### **Potential development of substitute products:**

Companies in this industry are doing their best to develop a different number of potential substitute products. For example, Mix Burger guarantees free delivery of goods in the city, when ordering in the amount of 70,000 soums. On the basis of such advertising offers, substitute products are being developed.

## Bargaining power of suppliers

### **Switching cost:**

The cost of switching suppliers in this industry is high. They need to set up an app and pay legal fees to start a business. On the other hand, they don't need any investments in delivery channels, rather they collect their commissions from the market. As for the cost of switching, the bargaining power of suppliers in the industry is small.

### **Availability of replacement input data**

There are many substitutes coming from companies in this food delivery industry. For example, a user uses an application to deliver food and parcels.

## Bargaining power of buyers

### **Volume of buyers:**

In this food delivery industry, the number of customers is gradually growing. The number of orders increases every year by about 10 times. But there is no way to bargain here.

### The cost of switching the buyer:

In this industry, the customer has no switching costs. To change the company, customers just need to install the app of the right company for free and use it. In this case, the client has a low level of negotiation costs.

### Food substitutes:

There are many substitute products on the market, such as Evos, KFC, Burger King, Street 77. From this point of view, clients have a high level of bargaining power.

## PESTLE analysis

There is no rejecting that the food business is one of the most grounded on the planet — all things considered, everybody necessities to eat! To be sure, there is a few fascinating elements with regards to this area, for instance, an expansion in labor costs, which makes it hazy how productive the food business will remain.

In this PESTLE analysis[12], we will take a gander at the political, economic, social, technological, legal and environmental elements influencing the food business; specifically, we will take a gander at what latest things can mean for the two restaurateurs and food wholesalers.(Figure 1.2)

P	E	S	T	L	E
POLITICAL	ECONOMICAL	SOCIAL	TECHNOLOGICAL	LEGAL	ENVIRONMENTAL
Example: <ul style="list-style-type: none"><li>• Current tax policy</li><li>• Brexit</li><li>• Trade policies</li><li>• Political stability</li><li>• Government policy</li></ul>	Example: <ul style="list-style-type: none"><li>• Inflation rate</li><li>• Exchange rates</li><li>• Economic growth</li><li>• Interest rates</li><li>• Disposable income</li><li>• Unemployment rate</li></ul>	Example: <ul style="list-style-type: none"><li>• Lifestyle attitudes</li><li>• Cultural barriers</li><li>• Population growth</li><li>• Population age</li><li>• Health consciousness</li><li>• Target demographics</li></ul>	Example: <ul style="list-style-type: none"><li>• Level of innovation</li><li>• Automation</li><li>• Technological awareness</li><li>• Cybersecurity</li><li>• Technological change</li><li>• Internet availability/speed</li></ul>	Example: <ul style="list-style-type: none"><li>• Employment laws</li><li>• Discrimination laws</li><li>• Health and safety</li><li>• Copyright protection</li><li>• Consumer safety</li></ul>	Example: <ul style="list-style-type: none"><li>• Weather</li><li>• Climate change</li><li>• Environmental policies</li><li>• NGO pressure</li><li>• Recycling</li><li>• Pollution</li><li>• Sustainability</li></ul>

Figure 1.2 PESTLE Analysis

## Political

Legislatures all over the planet have a costly administrative system for each part of the food business. This incorporates the tidiness of the business kitchen, the norms of food stockpiling and transportation, and, surprisingly, the necessities for laborers in the food business.

Unquestionably, this makes the food business one of the most rigorously managed ventures of all. On the positive side, this guarantees that customers won't be presented to unacceptable nourishment, however administrative intricacies unquestionably decrease the productivity of the food business.

## Economic

As a general pattern, the total populace is just getting more extravagant. That implies that people in the lower, center, and privileged societies all have more cash to spend on extravagances — including eatery food. Thus, the general income of the food business is developing, as individual treats and eat out more regularly. This emphatically affects all edges of the space, including restaurateurs, food merchants, and the singular specialists who assume a part in these organizations.

Dispensable salaries are developing on purpose: workers are bringing in more cash nowadays. In general, the expense of employing laborers is expanding across all enterprises. This is brought about by a developing interest for representatives, yet additionally increasingly high government assumptions for least wages. As in numerous different ventures, the impact of expanding work costs is straightforward: less edge for the proprietor of the business, and consequently less benefit.

## Social

These days, researchers find out about the connection among food and our bodies than any time in recent memory. There's an unmistakable connection between the food we eat and our own wellbeing, and buyers are aware of this. Thus, numerous people are searching for better ways of energizing their bodies. This doesn't be guaranteed to affect the food business, however it implies that organizations should adjust to remain significant. For instance, inexpensive food organizations will probably need to get away from customary, fatty broiled food varieties towards better options like plates of mixed greens.

Beside having a superior handle of what sorts of food are and aren't sound, customers are likewise more proficient about their singular dietary limitations. For instance, numerous people presently figure out the pessimistic effect of gluten in those with Celiac illness. This has prompted purchasers expecting more noteworthy comprehension for the benefit of the people who work in the food business. By and by, this isn't really something terrible, however it implies that the food business should make changes to keep clients blissful.

## Technological

We're seeing different kinds of mechanization increasingly more in the food business. Maybe the best model is the utilization of self-checkout screens at inexpensive food scenes like McDonalds, yet it's not alone! As of late, web-based entertainment stages went off the deep end as viral film of a lodging's robot concocting omelets started to spread. As we track down additional ways of utilizing innovation — incorporating robots — in the food business, there will be less requirement for workers. In general, this is something beneficial for the business, as it will permit organizations to further develop benefit and lessen the probability of human blunder.

## Legal

As addressed in the Political part of this PESTLE examination, the food business has exclusive expectations for wellbeing matters. Specifically, there are scores of rules in each country on how food ought to be shipped, put away, and ready — remembering headings for what temperatures different food types can reach, how they ought to be cleaned, etc. While this is for sure generally a Political issue, it turns into a Legal matter on the off chance that any of these guidelines are at any point penetrated. Accordingly, those in the food business should be very mindful so as to guarantee that they stay inside the limits of these principles to forestall exorbitant claims.

## Environmental

In addition to the fact that there is developing mindfulness for the wellbeing repercussions of the food we eat, yet additionally for the natural repercussions of the food we eat. One especially dangerous nutrition type according to a natural perspective is meat. The development of meat — particularly red meats — utilizes colossal measures of water and makes a critical carbon impression. No less, the meat business is destroying a lot of timberland to make new space for ranches. The consequence of this is that an ever increasing number of people are changing to plant-based diets, and states are gradually taking interest. By and by, this isn't really a negative for food organizations, however they should perceive the effect of this change in the long haul.

## Final Thoughts

This PESTLE investigation of the food business is absolutely an intriguing one. It's a blend of up-sides, negatives, and vulnerabilities. From one viewpoint, customers have more to spend on food and robots can decrease costs. Then again, the space is painstakingly directed and work costs are expanding. Likewise, eaters' weight control plans are turning out to be progressively more unambiguous. Obviously, the food business is staying put, yet it appears to be the people who win should comprehend what shoppers truly need to eat in the 21st 100 years.

## Demand analysis

[13,14] Food conveyance versatile application is a clever stage for eateries, franchisees, and other food-offering owners to offer a helpful approach to giving buyers a wide scope of choices through a solitary web-based portable entrance. The matter of conveying eatery dinners at buyers' place has gone through a great deal of progress from phone based requesting framework to takeout counters, and presently sites and portable applications. The food conveyance versatile application offers admittance to single or various eateries through a solitary web-based entrance, where buyers can look at menus, costs, offers, and surveys given by experienced customers. Moreover, the portable applications are being produced for food conveyance suppliers who go about as a mediator between a café and a purchaser. These food conveyance portable applications offer different benefits, including cost reserve funds, high net revenues, exceptional yield on speculations (ROI), high client maintenance, and worldwide reach. This has permitted key market players to expand their market presence in neighborhood as well as worldwide business sectors with high development viewpoints.

High web entrance and expansion in reception of cell phones help the development of the worldwide food conveyance versatile application market. What's more, changing way of life in

non-industrial nations decidedly influences the development of the food conveyance versatile application market. Nonetheless, absence of rapid network in creating and immature districts and vulnerability of undertakings in fostering their own applications hamper the food conveyance portable application market development. In actuality, ascend in venture on digitalization and expansion in unions and joint efforts of different eateries with the application designers are supposed to offer profitable open doors for development of the food conveyance portable application market during the estimate time frame.

## COVID-19 Impact Analysis

The food conveyance[15] versatile application market size has filled essentially as of late; however, because of the episode of the COVID-19 pandemic, the market is supposed to encounter a sharp decrease in 2020. This is because of legislatures carrying out lockdown in most of nations and stop in go across the globe to forestall the spread of the infection. Following the recuperation from the COVID-19 pandemic, the food business is supposed to fill in the following coming years. Different firms worldwide have executed a work-from-home culture for their staff, bringing about ascent popular for prepared to eat food, as most would consider to be normal to increment development on the lookout.

From a monetary point of view, online food conveyance has been censured for high commissions it charges cafés and sketchy working circumstances for conveyance individuals while giving position and deal open doors. According to a social viewpoint, online food conveyance influences the connection among purchasers and their food, while impacting general wellbeing results and traffic frameworks. Ecological effects incorporate, the age of stressing measures of waste and its high carbon impressions. Partners should consider how best to alleviate the negative and advance the positive effects of online food conveyance to guarantee that it is feasible, in each sense.

## Functionality

### Program requirements

For the proper functionality of the program, the phone on which the mobile application is launched is sufficient to have Android version 5.0 and the Internet. The Dart programming language, Flutter SDK, Firebase, and various packages[16] were used to develop the mobile application. Development environment: Android Studio.

### Login and homepage

The start page at the entrance to the application is a form for registration or login, after successful authorization in the user application, the main menu opens in which the user's name and menu are indicated so that the user can immediately place an order (Figure 2.1). The seller's application also opens the main screen, which shows how much he earned on orders, and the menu, there is also a button to add a menu, the dishes themselves are inside the menu, you can also add a dish there (Figure 2.2). In the deliverer's application, a menu opens in which there are available orders, orders that are on the way, orders that have not yet been delivered, history, total



earnings, and an exit button (Figure 2.3). In the Admin panel, users, sellers and deliverers are listed, and there is an opportunity to block them during the transition.(Figure 2.4)

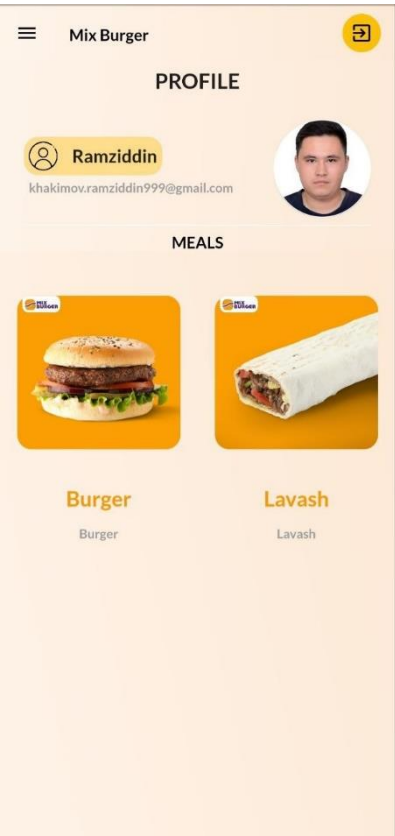


Figure 2.1

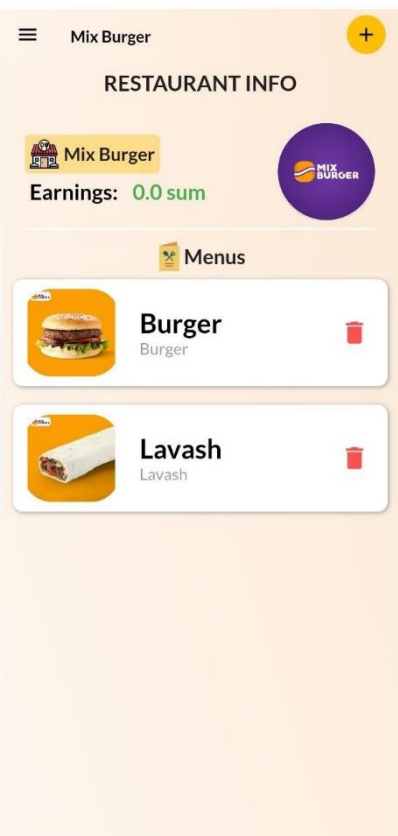


Figure 2.2

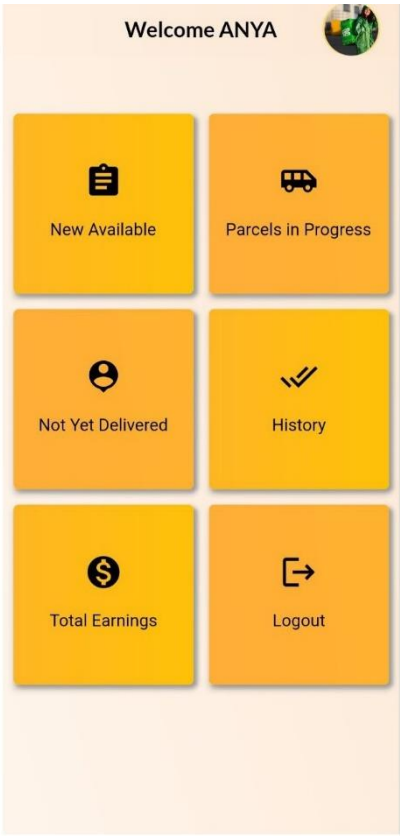


Figure 2.3

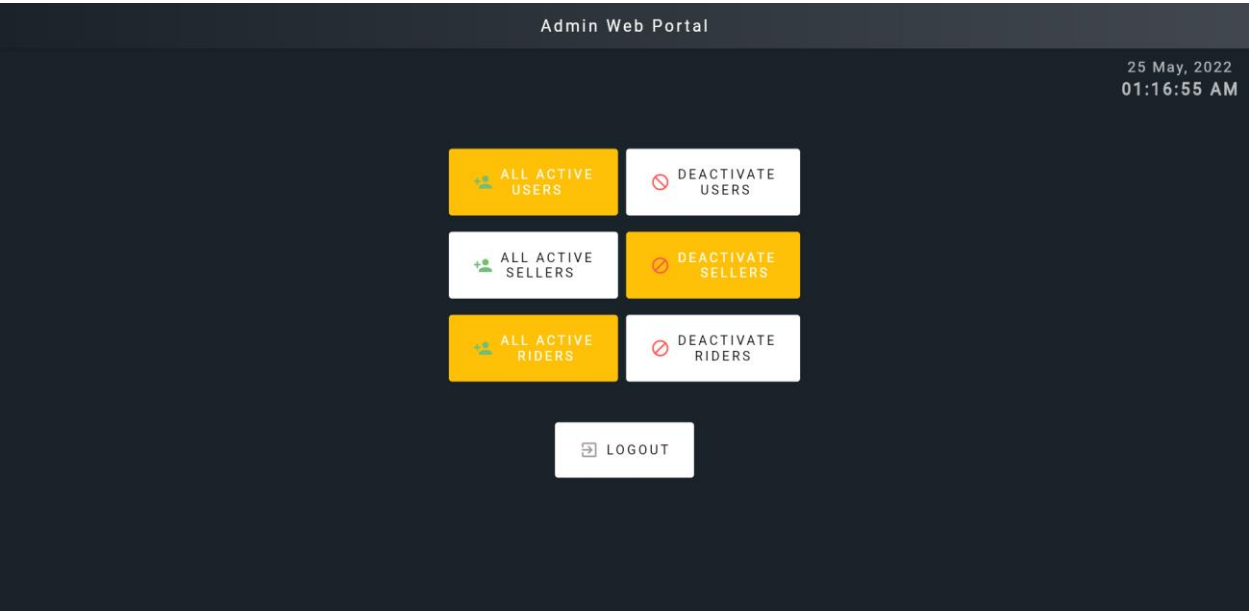


Figure 2.4

# Technological Approaches

Before I started creating the project, I had the choice to create an application only for android in the Kotlin programming language, to create a cross-platform application in ReactNative or in Flutter. To make this choice, I looked at the statistics [17] of the output, downloads and profitability of applications on the Andoid and iOS operating system, and concluded that in 2021, more applications were released on android than on iOS, 225,000 (Android) versus 63,000 (IOS), (Figure 2.5). There were also 152% more downloads of applications on android than on iOS, 38,294,000,000 versus 10,995,000,000 respectively (Figure 2.6). And I was already thinking of choosing Kotlin, judging by the statistics, but at the last moment I saw another statistic that indicated that the profitability on iOS is much higher than on Android, by 82% (Figure 2.7). And then I finally decided that I would develop a cross-platform application, but there was also another choice between ReactNative[18] and Flutter. But in the end I chose Flutter.

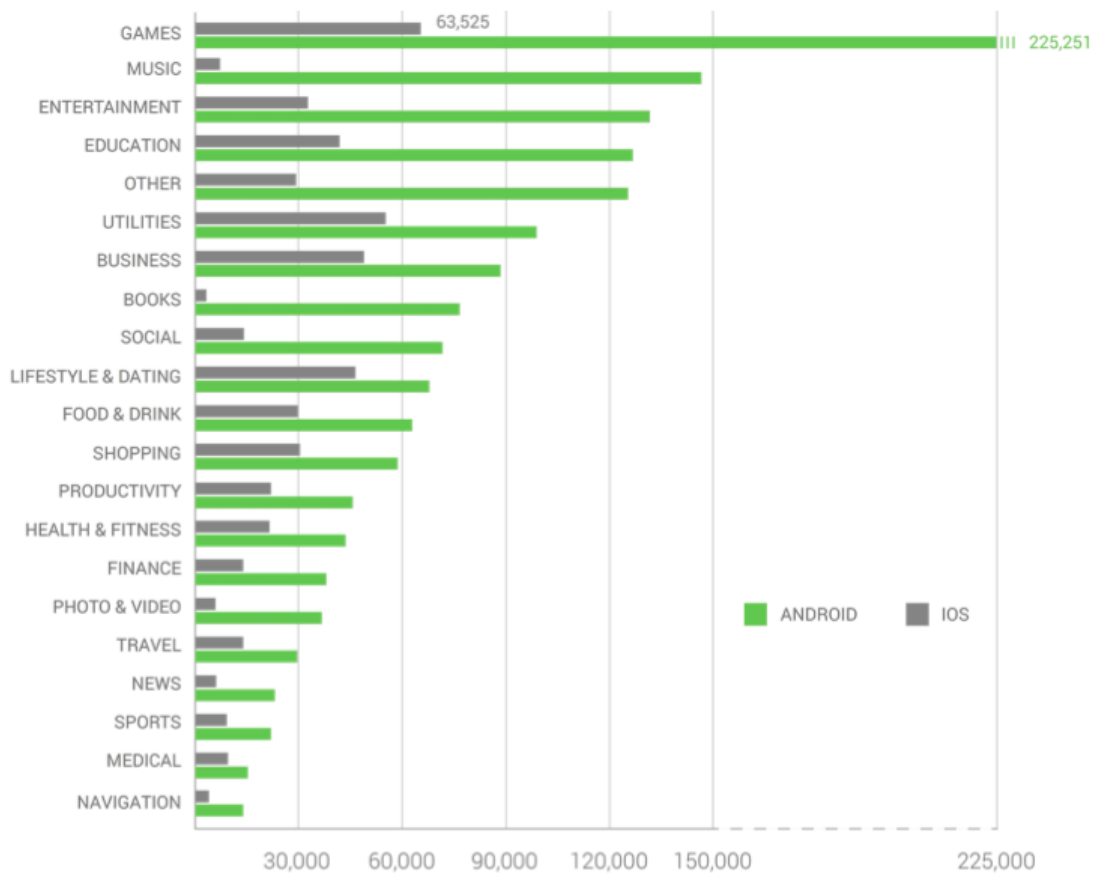


Figure 2.5 Apps Released by Platform

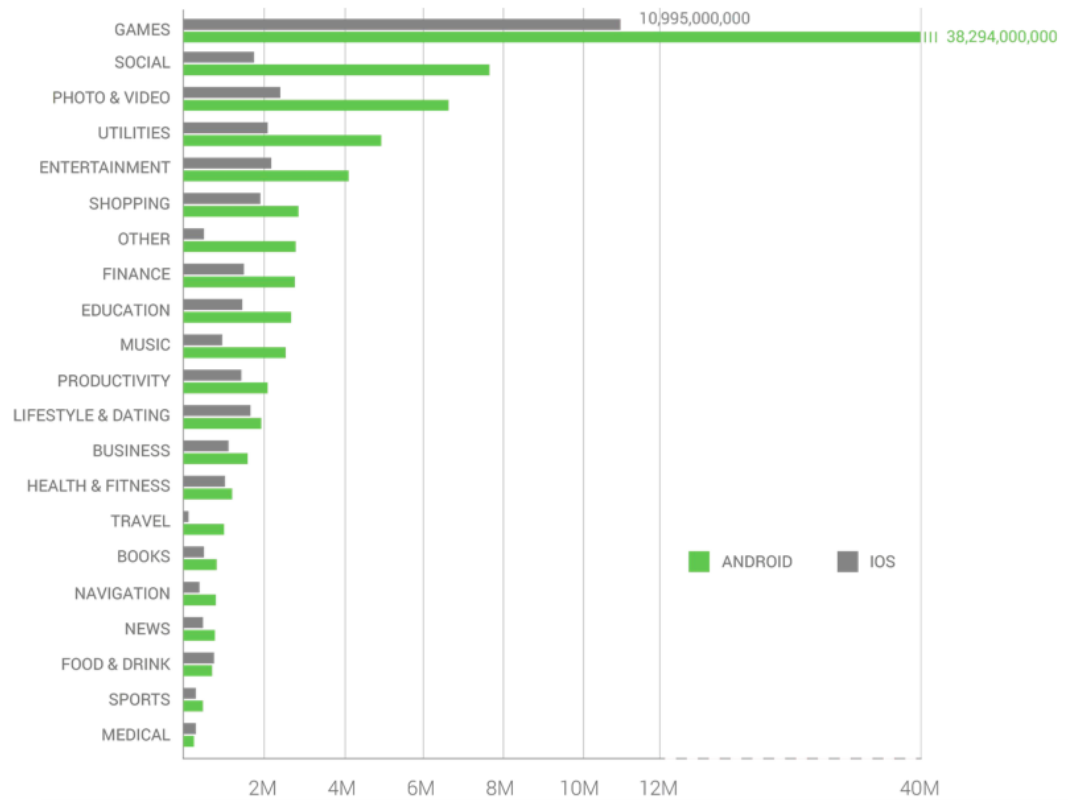


Figure 2.6 Apps Downloads by Platform

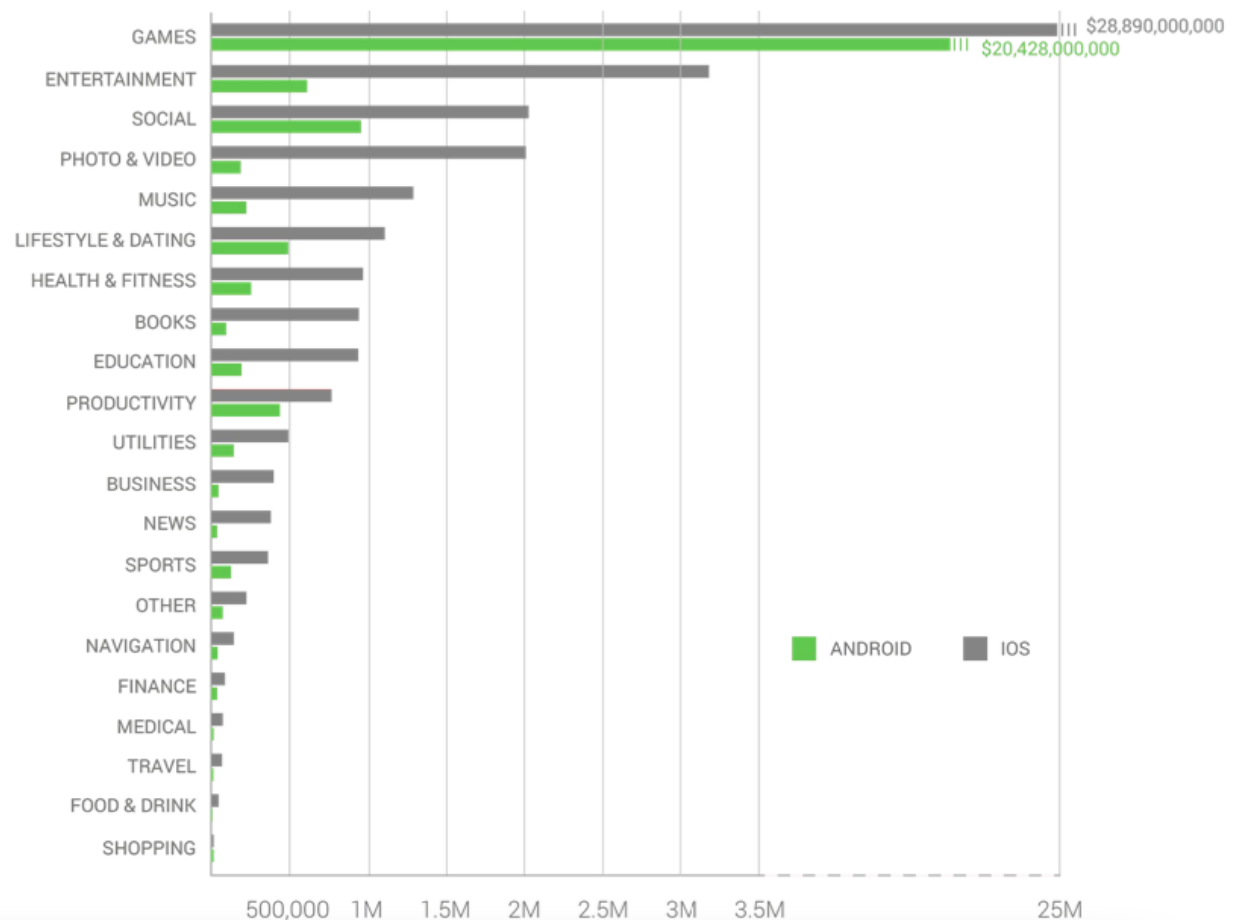


Figure 2.7 Apps Revenue by Platform

# React Native

## What is React Native

React Native [18] is a popular JavaScript-based mobile application platform that allows you to create mobile applications with its own interface for iOS and Android. The framework allows you to create applications for different platforms using the same code base.

React Native was first released by Facebook as an open source project in 2015. In just a couple of years, it has become one of the best solutions used for mobile development. Instagram, Facebook and Skype are used to support some of the world's leading mobile apps, including Instagram, Facebook and Skype. We will discuss these and other examples of React Native-enabled applications later in this post.

There are several reasons for React Native's global success.

First, with React Native, companies can create code only once and use it to run their iOS and Android apps. This means a huge saving of time and resources.

Secondly, React Native was built on the basis of the React JavaScript library, which was already extremely popular when the mobile platform was released.

Thirdly, the framework allowed interface developers, who previously could only work with web technologies, to create reliable, ready-to-work applications for mobile platforms.

Interestingly, like many revolutionary inventions, React Native was developed as a response to a big technological mistake. Here is some pros and cons of React Native (Figure 2.8)



Figure 2.8 React Native

## Advantages of React Native [19,20]

- **Common code base.** In fact, you are developing 2 separate versions of the application (for iOS and Android). Yes, there are two versions of the application, but the code in them is 65-70% the same. The common code minimizes the number of bugs during development (the amount of code will be almost 2 times less) and greatly simplifies the support of the product in the future. For startups, this translates into additional days and weeks that can be spent on activities with an asterisk — for example, on working out a marketing strategy, analyzing monetization methods and planning future iterations of product development.

- **As similar as possible to the native one.** Unlike other cross-platform solutions like Cordova, Ionic or Titanium, which mimic the browser environment (it's like a website that pretends to be a mobile application), React Native uses native APIs.
- **TypeScript support.** Static typing = fewer bugs + simple project support and the ability to easily create an application from a template. Now we use TypeScript on all our projects, it's very good.

## Disadvantages of React Native [20]

- **It is difficult to adapt to all androids** — too large a pool of devices, a lot of different resolutions and shells. In fact, this is more of a problem of android development than React Native itself.
- **Minimum viable product (MVP).** If you plan to test a business hypothesis and need a functional solution with cool visualization, React Native is an excellent choice. The ability to simultaneously enter the Android and iOS markets will allow you to quickly collect the first feedback.

## Flutter

### What is Flutter

Flutter [4,21,22] is a free and open—source set of mobile user interface development tools created by Google and released in May 2017. Simply put, using Flutter, it is possible to create your own mobile application with a single array of code. This means that you can use a single programming language and a single code base to create two applications (iOS and Android).

Flutter is aimed at two important things:

- **SDK (Software Development Kit):** A set of tools that will help you develop applications. It includes tools for compiling code in native machine code (code for iOS and Android).
- **Framework (Widget-based User Interface Library):** A collection of functional user interface elements (buttons, text inputs, sliders, etc.) that can be personalized to personal preferences.

To develop with Flutter, a programming language called Dart is used. It is also Google's language, created in October 2011, but has improved significantly in recent years.

Dart focuses on the development of web page layout; it can be easily used to create mobile and web applications

Flutter is a modern platform. It makes it much easier to create mobile apps. If you have used Java, Swift or React Native, then you should know: Flutter is a little different. (Figure 2.9)

Also thanks to Flutter, you can change your code and see the results in real time. This is called Hot-Reload. It takes quite a bit of time to update the application itself. Some significant modifications can reboot the application, but if you work as a designer, for example, changing the size of elements, then this is possible simply in Hot-Reload mode! Here is some pros and cons of Flutter

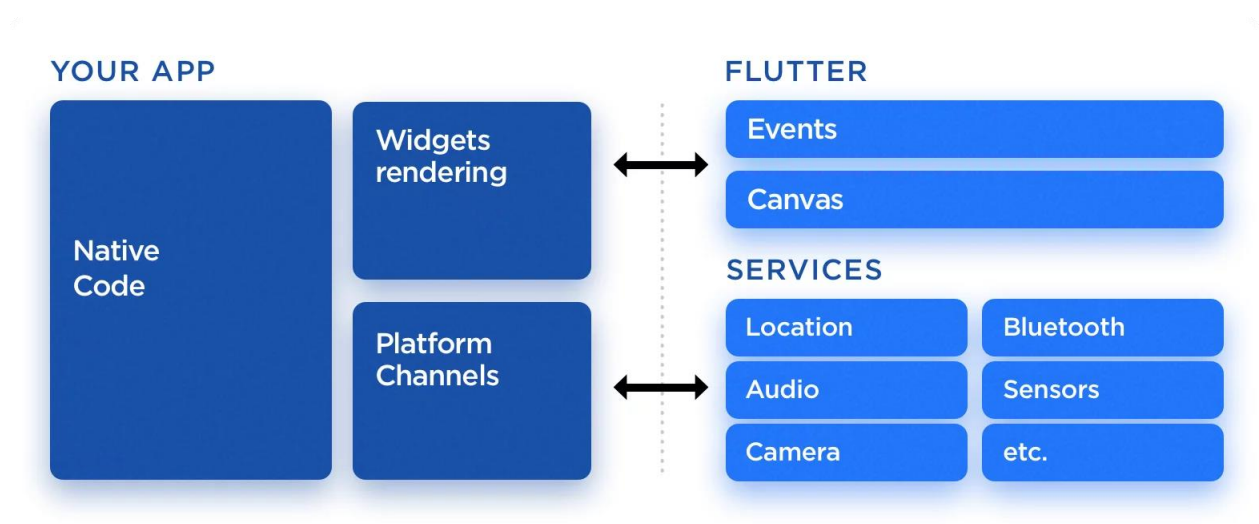


Figure 2.9 Flutter

## Advantages of Flutter [22]

1. **Perspective and active development.** A mobile application is being created in the Dart programming language with a description of the graphical interface and all the logic of work. The result of the work is added to the native application, as well as pictures, fonts, and the like (of course, this process is automated).  
At the same time, a single screen is created in the native part of the application, where the Dart virtual machine is loaded, which executes Flutter.
2. **Own graphics engine (no need to make the interface separately for Android and iOS).** The first thing that catches your eye is the way of creating screens, which is significantly different from those used on Android and iOS. In Android, logic and interface are separated: logic is set by code, and the interface is set by layout in xml. On Flutter, all this is set using code. Although here a special style is used for the interface – interface elements are created nested inside each other. This is a bit like layout, a very similar way works in React Native. At the same time, there is no possibility of direct access to the elements. To change something on the screen, you either need to update the entire screen, or use special controllers that were added to the widget in advance during its creation.
3. **The potential to go beyond mobile devices.** With Flutter, you can go far beyond developing Flutter apps for mobile devices. There is also Flutter for the Internet and Flutter Desktop Embeddings. For example, at this year's I/O conference, Google presented a technical preview version of Flutter Web, which allows you to run pure Flutter applications in the browser without changing the source code. Watch the video from the conference:  
This important event marks the transition of Flutter from a cross-platform mobile application platform to a full-fledged cross-platform development tool.

## Disadvantages of Flutter [22]

1. **The final installation package is larger because the Dart virtual machine is added to it.** So there are Flutter files and there are virtual machines that are added depending on what is being compiled – iOS or Android.

The virtual machine has its own graphics engine, it draws the application interface with all the transitions between screens, dialogs, fragments, etc. In this, development under Flutter is significantly different from development with Xamarin and React Native, which use real Android and iOS components. In the case of them, it is impossible to use platform-specific components (if there is such a need, you have to create two UI options). With Flutter, when choosing a design, it is enough to focus on one platform (for example, Android). When building a project for iOS, you will see the standard Android interface. It will look a little strange and unexpected, but it is quite workable (the interface can be modified later).

2. **The interface is created using code, which is why the line between logic and design is much thinner.** This approach makes it easier to split screens into separate components. In fact, any block of nested interface elements can be moved to a separate widget in just a couple of steps, and this is much easier than creating custom Views and fragments.

## Development Tools

### What is firebase

Firebase [5, 23,24] is a platform for developing mobile applications from Google, which has the most advanced features for developing, redesigning and improving applications.

Firebase is, at its core, a set of tools that developers can use to create and modify applications depending on their needs.

The goal of Firebase is to solve three main problems of developers:

- Quickly create an app
- Release and provide reliable health monitoring
- Engage users,

Developers using this platform get access to services with which they can develop their products, and this allows them to focus directly on providing a quality product.

Some of the most popular features of the Google Firebase platform include databases, authentication, push notifications, analytics, file storage, and more.

Since the services are in the cloud, developers can scale their products in stages without experiencing any problems. Firebase is currently among the best application development platforms trusted by developers around the world. (Figure 3.0)

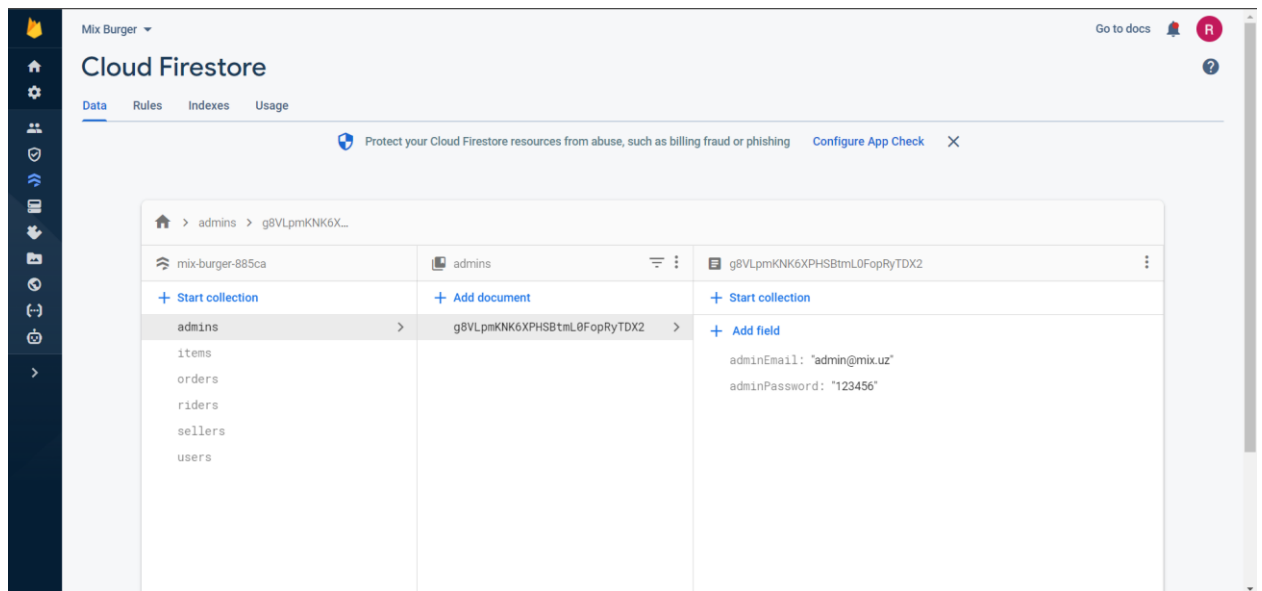


Figure 3.0 Firebase Cloud Firestore

## Firestore history

The history of Firebase [24] is quite fascinating, and, like many startups, has many ups and downs behind it. Firebase originates from Envolv, a company founded in 2011 by Andrew Lee and James Tamplin.

The company offered developers an API to facilitate the integration of online chats for websites. After that, the founders of Envolv discovered that their chat service was being used to send messages unrelated to chats.

The developers used the platform to synchronize application data in real time. Lee and Tamplin decided to separate the architecture used for real-time synchronization from the chat system, which led to the creation of Firebase in 2011. The platform itself was publicly launched in April 2012.

The first Firebase product launched was the Firebase Realtime database. This is an API for data synchronization of applications running on Android, Web and iOS devices. Application developers can use this platform to create real-time applications compatible with various platforms.

Firebase initially received over \$1 million in funding in 2012 from sponsors including companies such as Greylock Partners, New Enterprise Associates, Flybridge Capital Partners and Founder Collective. The company also received Series A funding of \$5.6 million in June 2013 from Flybridge Capital Partners and Union Square Ventures.

Firebase Authentication and Firebase Hosting were launched in 2014 by Firebase, becoming the leading company providing development services for mobile devices (MBaaS).

Firebase became part of Google in October 2014. The tech giant then acquired Divshot, a web hosting platform, after which it was merged with Firebase.



# Advantages of Firebase [25]

## Free initial plan

In order to start using Firebase, you don't have to pay anything, it allows users to log in using their Google account.

Firebase offers a free initial plan called Spark, it has many features that are often enough to get started. If the development requirements increase, then you can choose the Blaze plan.

Getting started without any initial costs is certainly a great opportunity that Firebase provides, and this is one of the reasons for the popularity of the platform. The Spark plan does provide a good free limit on reading and writing to the database.

Another advantage of Firebase is that the Blaze plan takes into account the free limits that the Spark plan provides.

For example, let's assume that you rent 20 GB of storage on a Blaze plan. The free plan provides 10 GB, which means that Firebase will charge you only 10 GB.

## Development Speed

Firebase is a great option for application development, which can save time on development and reduce the time for applications to enter the market.

Typically, each developer should have access to the server and host to create and maintain databases and server services.

Therefore, to create applications, it is necessary to have a developer's backend and frontend. And this is true even for very small applications, where the backend and frontend must interact with each other at different stages.

The presence of frontend and backend developers often leads to errors and problems that ultimately affect the quality of applications being developed and increase the cost and complexity of development.

However, using Firebase and Firestore services allows frontend developers to manage all the work themselves and reduce the time required to complete it.

In addition, Firebase provides a huge number of ready-to-use services that allow developers to avoid creating template code, inventing a bicycle and writing a backend from scratch.

So that you understand, here are some simple examples: notifications, registration system and analytics.

## All platforms in one place

Firebase also provides developers with a full range of products that they may need during the development process.

Firstly, there are two database options, these are Firestore and Firebase Realtime Database.

Firebase allows you to easily and simply perform cloud media storage and provides application development without using a server using integrated cloud solutions.

Firebase fully covers all stages of application development, and the platform contains all the necessary tools for creating, releasing and monitoring applications. In addition, as the final stage in the development of applications, the platform provides tools for attracting and retaining.

## Works on the Google platform

Firebase is powered by Google, one of the most well-known and trusted brands in the technology world.

Since its purchase by Google, Firebase has gone through a number of upgrades and improvements and is now a very reliable platform. It takes full advantage of Google's cloud and many other services.

Firebase is now part of Google's cloud platform, perfectly combined with other Google cloud services and integrated with many third-party services.

Since the acquisition of Firebase, Google has been actively investing in the platform, making the product more reliable every day.

## Developers can focus on the frontend

Developers all over the world opt for Firebase, because it allows them to focus on creating code for the frontend of mobile applications.

Firebase reduces the amount of development of template code for the backend, speeding up the completion time of application development.

Firebase makes application development convenient and helps to reduce costs.

Using Firebase also allows developers and companies to standardize the backend development environment into a single and easy-to-learn technology.

Using templates for the backend reduces the amount of training required to support it, and allows front-end developers to perform most of the actions.

## It's serverless

Scaling servers is always not an easy task! In particular, scaling a database cluster is a very difficult task, and optimizing performance to ensure smooth operation under huge workloads requires experienced engineers.

Firebase solves this problem and provides an environment in which there is absolutely no need to monitor servers.

Firebase comes with an architecture in which there are no servers and in which payment is made based on requests, in which there is no need to manage the server infrastructure or even worry about it.

It is different from a regular server, which must always function.

Firebase clients are charged only when the server is in use.

As a result, there are much fewer problems associated with scaling, due to the greater efficiency of the environment.

Developers have more freedom thanks to the approach to DevOps processing, installation, infrastructure and capacity utilization planning.

## Machine Learning

Machine learning is on the threshold of upcoming global changes in the information technology sector. In many ways, the changes have already begun.

According to Gartner, 30% of companies will use machine learning in their processes. (10)

Firebase also has advantages because it offers developers the opportunity to use machine learning technologies.

Machine learning can be used by both iOS and Android developers, regardless of their experience. Firebase comes along with a machine learning suite with clear and easy-to-use APIs for use on mobile platforms, for example, for text recognition, face recognition, image labeling, barcode scanning, etc. Developers can choose between cloud or embedded APIs depending on their application development requirements.

## Disadvantages of Firebase [25]

### Does not have open source code

Firebase is not an open source project for mobile app development, which makes it unsuitable for some developers.

Users cannot change the source code of Firebase due to the fact that it is closed. Many developers who like Firebase features end up using other platforms precisely because of this limitation.

Although the platform is not open source, it is important to say that many libraries and SDKs are available on GitHub.

This may be the biggest limitation of Firebase, which prevents the community from improving the product, increasing its flexibility and the possibility of using independent hosting for developers who cannot afford the cost of Firebase.

### Dependence on the Supplier

Another important deterrent to using Firebase is the fact that you are completely dependent on one vendor.

This is a significant problem that stops some developers from choosing a platform. The lack of access to the source code may not suit some developers.

For example, for large applications, switching to other vendors is a difficult task, because for this you will have to create the entire backend from scratch.

### Slow queries

Not all databases are perfect for all use cases, and CloudFirestore is no exception.

While this is a great solution for scaling applications, providing support for offline queries and real-time updates, it also has limitations.

Here are some examples:

- The recording frequency has a limit of 1 time per second;
- There are no native aggregation queries;
- The maximum size of the API request is 10 Mib;
- Document size limit of 1 Mib;
- Maximum number of simultaneous connections 1M;
- Flexibility of requests;
- Queries reduce performance.

## This is not a cheap platform with a difficult to predict price

Firebase is a multifunctional platform for developing mobile applications, but at the same time it can be an expensive pleasure. She does offer a free plan, but there are some limitations on it. It is for this reason that some developers eventually agree to a separate hosting with the ability to use Digital Ocean, AWS or Google Cloud.

Firebase adds value to IaaS, but that convenience comes at a price. Honestly, a separate hosting of the application will cost less than using Firebase.

Therefore, before switching to Firebase, make sure that you correctly estimate the initial costs of installing a cluster from an IaaS provider and the current costs (servers + additional technical costs) for server maintenance compared to running the application directly on Firebase.

Another point that makes Firebase an expensive solution is that it is a patented technology.

Firebase has to compensate for the huge investment at the expense of its customer base. On the other hand, open source technologies can take advantage of the development capabilities of the entire community that supports this technology and provide a more affordable solution.

Firebase provides services at a price based on real consumption, and there is no way to limit the final price. The platform does not have fixed pricing plans, and tracking the use of resources can be a difficult task.

Estimating the cost of Firebase may be difficult for some users, especially when scalability cannot be predicted. Firebase pricing is complex, and has separate pricing for each service.

The threshold limitation of platform costs can be quite complex, and there is no way to limit or set a hard limit on the account.

Previously, Firebase offered a plan called Flame. It was a plan with a fixed price of \$25 per month, but it was canceled in January 2020.

The change in the pricing structure caused inconvenience for some users, and the transition to pay-as-you-go increased payments for some customers.

Also note that a structure based on real consumption is not necessarily a bad structure! Most IaaS providers, such as AWS or Azure, also use this principle.

The positive side is that you will consume only the resources that you use, and all your expenses will be very detailed.

## There are no dedicated Servers and Corporate Technical Support

Firebase users are not able to use dedicated servers or corporate support under existing contracts. The lack of dedicated servers is a significant limitation. The only way to use Firebase is to use their serverless architecture, which provides less flexibility, unlike a fully dedicated cluster structure.

In addition, the overall use of resources may not provide optimal performance due to the high load of neighbors.

A serverless environment is a great option for applications whose workload changes frequently. For example, there are sharp jumps and drops in the load during the day or week.

Imagine an application for booking tables in restaurants; a serverless environment will work great for this application because it guarantees that during peak hours, for example, on Friday and Saturday evenings, the required resources will be automatically allocated.

On the other hand, for example, there is an application whose workload will not fluctuate much, but individual security settings or server-level access may be required. A serverless structure is not suitable for this task, here dedicated hosting is a more suitable option.

Firebase does not offer corporate plans, contracts or maintenance, which is a serious problem for many potential customers. Although, of course, the Blaze plan can be considered a suitable option for highly professional developers.

## Software tools

### What is Android Studio

Android Studio [26] is an integrated development environment produced by Google, with the help of which developers have access to tools for creating applications on the Android OS platform. Android Studio can be installed on Windows, Mac and Linux. The IDE can be downloaded and used for free. It contains layouts for creating a UI, which usually starts work on the application. Studio contains tools for developing solutions for smartphones and tablets, as well as new technological solutions for Android TV, Android Wear, Android Auto, Glass and additional contextual modules. The Android Studio environment is designed for both small teams of mobile application developers (even in the number of one person), or large international organizations with GIT or other similar version control systems. Experienced developers will be able to choose the tools that are more suitable for large-scale projects. Android solutions are developed in Android Studio using Java or C++. The Android Studio workflow is based on the concept of continuous integration, which allows you to immediately detect existing problems. Continuous code review provides an opportunity for effective feedback from developers. This option allows you to publish the version of the mobile application in the Google Play App Store faster. To do this, there is also support for LINT, Pro-Guard and App Signing tools. (Figure 3.1)

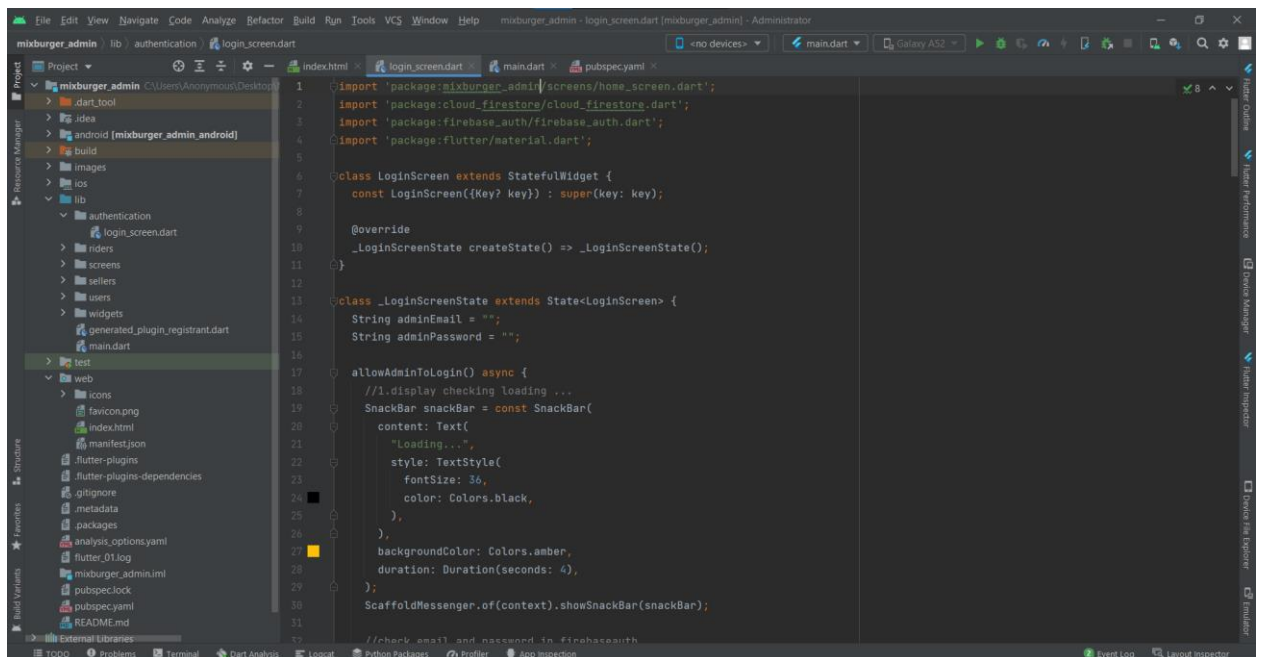


Figure 3.1 Android Studio

## Version Control

Version control [27], also known as source code management, is the practice of tracking and managing changes to software code. Version control systems are software tools that help development teams manage changes to the source code over time. In light of the complexity of development environments, they help development teams work faster and more efficiently.

Version control systems are most useful to DevOps teams because they help reduce development time and increase the number of successful deployments.

The version control software keeps track of all changes made to the code in a special database. If an error is detected, developers can go back and perform a comparison with earlier versions of the code to fix errors, minimizing problems for all team members. In almost all software projects, the source code is a treasure: it is a valuable resource that needs to be protected. For most software development teams, the source code is a repository of invaluable knowledge and understanding of the problem area, which they scrupulously collected and improved. Version control protects the source code from catastrophic failures, from accidental deterioration caused by the human factor, as well as from unforeseen consequences.

Software developers working in teams are constantly writing new source code and modifying existing ones. The code of a project, application, or software component is usually organized as a folder structure or a "file tree". One developer in the team can work on a new feature, and another at the same time change the code to fix an unrelated error, i.e. each developer can make their own changes to several parts of the file tree.

Version control helps teams solve similar problems by tracking every change made by each participant and preventing conflicts from occurring when working in parallel. Changes made to one part of the software may not be compatible with changes made by another developer working in parallel. Such a problem should be detected and solved according to the regulations, without creating obstacles to the work of the rest of the team. In addition, during software development, any change can by itself lead to new errors, and new software cannot be trusted until it passes testing. That's why the testing and development processes go hand in hand until the new version is ready. (Figure 3.2)

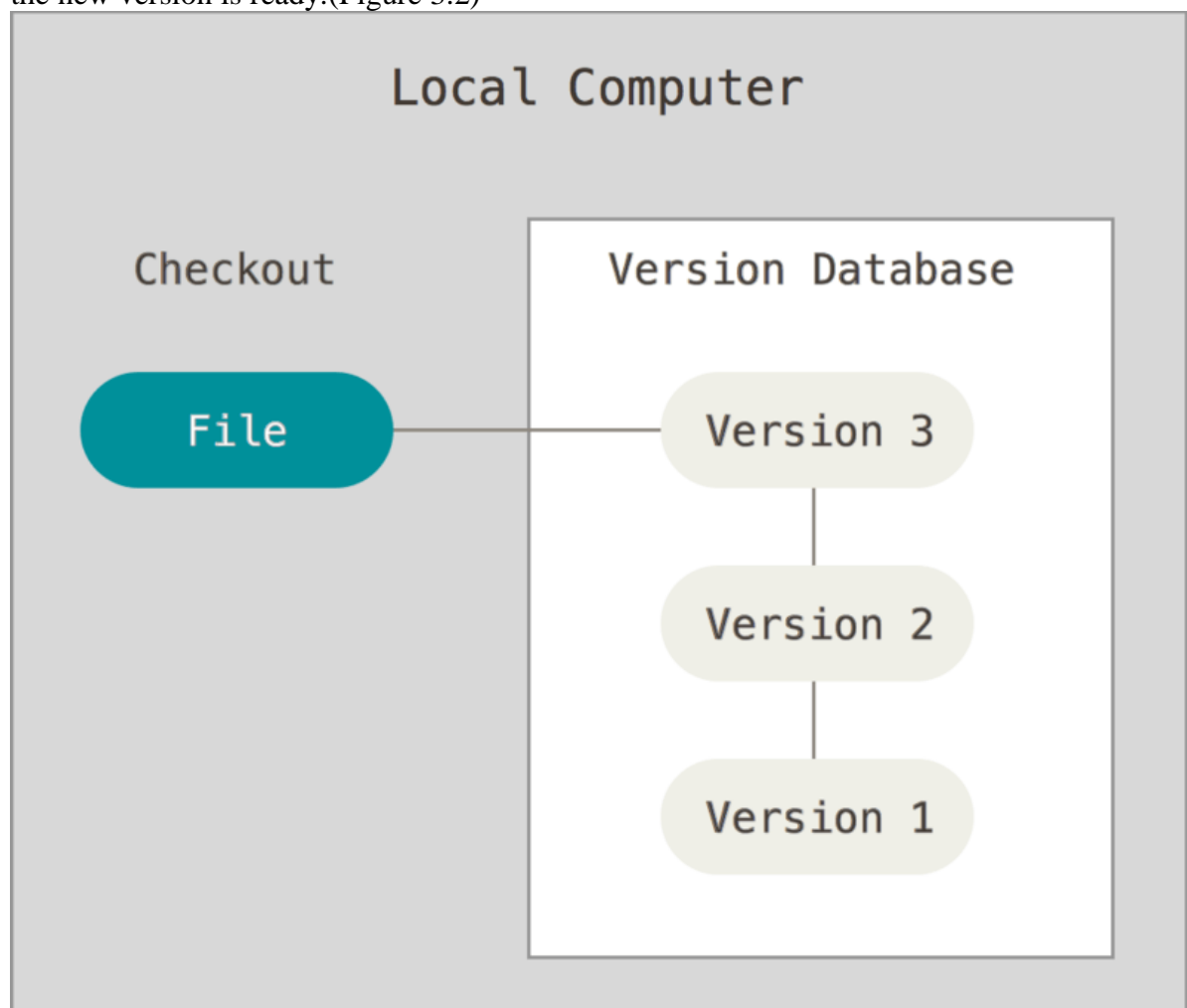


Figure 3.2 Version Control

# Testing

Throughout the history of application development, testing remains an integral part of every development process. At the same time, the availability of numerous device models, OS versions and additional application tests becomes a challenge.

However, the Firebase Test Lab [28] has taken a huge step to deal more effectively with all these complex aspects of application testing. It is an effective platform that allows developers to test their applications with a large number of configured devices at the same time.

Firebase Test Lab will allow you to select a list of different device configurations on which you can test your application. Each device configuration list will work with a specific range of device types, languages, and orientation configuration options.

You will perform all testing using virtual and physical devices located in the Google data center. This will allow the application to be tested immediately for a large list of devices without setting up various emulator sessions or buying devices.

After the test matrix of devices is determined, it will download the APK file of the application. It will start testing in just one click. All test devices in the matrix will simultaneously enter the performance verification phase.

Currently, Firebase Test Lab offers only three types of testing, including Game Loop, Instrumentation and Robo Testing.

Once testing is completed, session results will be provided, including screenshots, logcat output, performance data, and video playback.(Figure 3.3)

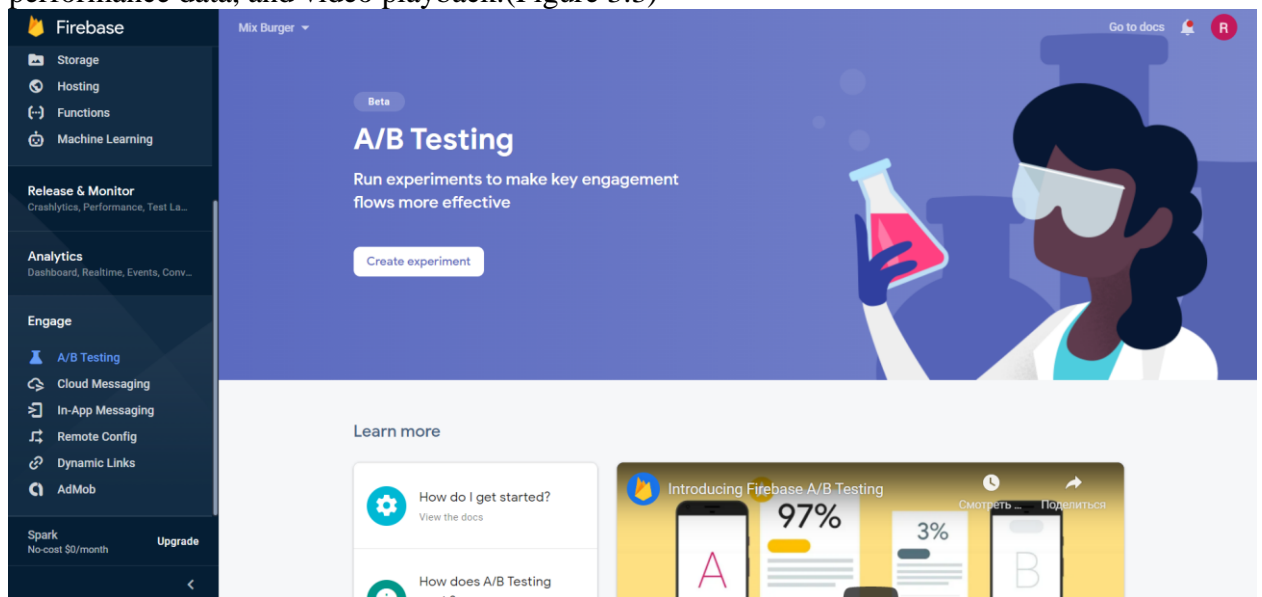
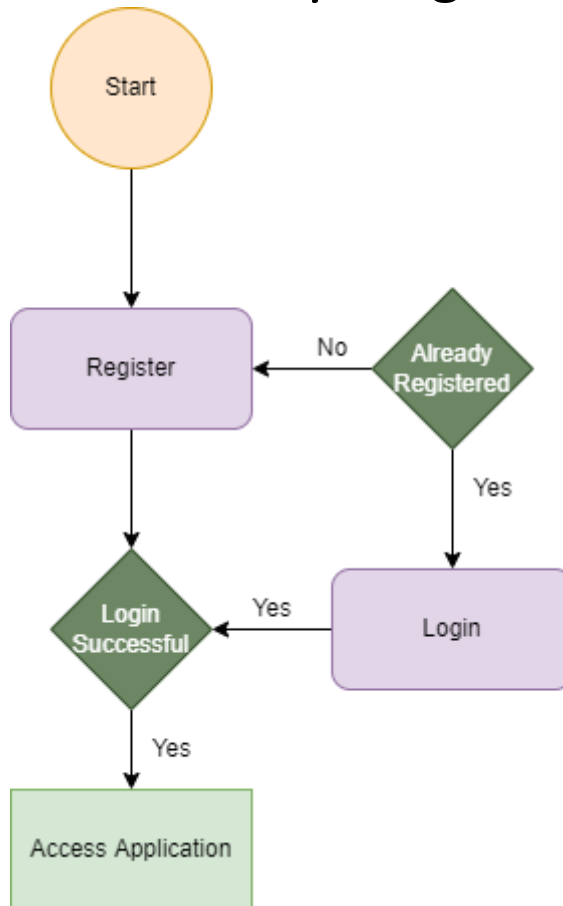


Figure 3.3 A/B Testing

# Documents

## Uml Activity Diagram



## The functional outcome

At the moment, approximately 75% of the final product has been fully completed. Learning the Dart programming language and the Flutter framework, as well as Firebase, took quite a lot of time.

## Results of Achieved Objectives

This project is a great opportunity for a student to start creating his portfolio, with one full-fledged project inside. Acquisition of new skills, self-study, programming, project management. It is also a great impetus for the development and start of a career in this field, because the knowledge and experience gained will definitely be useful in future work



# Conclusion

In this project "Mix Burger Food Delivery Application", both the business part of this project and the information technology part of this project were discussed.

In the Information Technology part of this project, the components of this project were described, such as:

- Frontend Part: Dart, Flutter SDK
- Backend Part: Firebase, Firestore Database
- Development Environment: Android Studio
- Testing: A/B Testing Firebase
- Version Control: Git

In the business part, all the problems, goals and possible solutions for the business were outlined, SWOT analysis, PESTLE analysis, including Porter's Five Forces, were also carried out. The market of mobile applications in Uzbekistan was also studied. It was revealed that the Android operating system occupies a large part of the market, but the IOS operating system makes a big profit, based on this, it was decided to make a project using Flutter. Competitors and their strengths and weaknesses were also identified, in addition, the strengths and weaknesses of this application were identified using several tools.

## Development in the future

In the future, a number of new features will be added to this application to improve the application, below is a list of future updates of the application:

- Payment with Payme and Click
- More detailed product tracking
- Added more products
- Language change to Russian/Uzbek

The most basic update will be the ability to change the language, because it will be more convenient for the majority of users to use the application in Russian and Uzbek. In second place is the addition of Click and Payme payment systems, because the majority of the population receives wages on the card and, accordingly, it will be more convenient to pay with a card.

## Resources

To create this project, the developer needed training in the Dart programming language and the Flutter Framework, as well as the implementation of Firebase in the application. Below is a list of courses thanks to which this project was completed:

- Flutter & Dart - The Complete Guide by Maximilian Schwarzmüller [31]
- The Complete 2021 Flutter Development Bootcamp with Dart by Angela Yu [30]
- Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart 2 by Alessandro Biessek [29]

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## Poster

# Mix Burger food delivery application



### Abstract

Mix Burger is a chain of fast food restaurants. The main goal and idea of the current application is to show customers more effective ways to order and deliver food to their homes.

### Project objectives

1. To attract more customers
2. To make a payment online
3. To have customers satisfaction
4. To order at any time

### Software Development Methodology

1. The collection of user data will be made using google firebase
2. This application includes 4 applications: User App, Seller App, Admin Panel, Reader App

### Resources

1. The OOP that is dart
2. Flutter Framework
3. Build FoodPanda & Uber Eats Clone App with Admin WEB Portal
4. The Complete 2021 Flutter Development Bootcamp with Dart by Angela Yu
5. Flutter & Dart - The Complete Guide

### Conclusion

1. The profitability of the business
2. Comfort for the users and seller
3. Innovative way
4. Saving of time

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