Qatar University

College of Engineering

Department of Computer Science and Engineering

Senior Project Report

QEye – Event Application Using Firebase

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This project report is submitted to the Department of Computer Science and Engineering of Qatar University in partial fulfillment of the requirements of the Senior Project course.

Declaration

This report has not been submitted for any other degree at this or any other University. It is solely our work except were cited in the text or the Acknowledgements page. It describes work carried out by us for the senior project. We are aware of the university policy on plagiarism and the associated penalties, and we declare that this report is the product of our own work.

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Abstract

Qatar has become one of the most tourist destinations in the world, which is going on developing more by time will raise the need for tourist facilities places with different fields not only for tourists but also for citizens. Many citizens complaining about the limited entertainment space around Qatar and others find that the only recreational opportunity is to travel. However, there are many entertainment places in Qatar that meet the different need of the people with their different cultures and interests. The problem is that these events might be hidden in a narrow frame of social media account which may not reach the huge percentage of people around Qatar. Another reason behind that is the ignorance of the unknown entertainment places around Qatar or the highlighting events that are not suitable for the Qatari and the Arab community.

The known methodology for advertising these events is that each organization advertise for itself about their events and you can reach these advertisements only by adding their social media account. Thus, everyone should collect a collection of organizations' accounts in each social media application or website to search for the event that might appeal for their needs. Moreover, in Qatar there are many applications on different events. however, it's doubtful that Qatari or even any Arab user will like these events.

This project aims to design an events application hoping to solve this issue by adding more speed and flexibility to the process. The objectives of our study are to ease the search of events, organizations and events location with all detailed information that answers the user queries. This application will highlight all the events in Qatar classifying them into organized categories for the user. Moreover, for the event organizer there will be the property of adding his event with all detailed information and locating it in the map in an easiest user reach.

This events application acts as a direct connection between the user and the event organizer to smooth the communication between these two entities. Our application offers solutions to the current processes as many functionalities were added and some modifications were made to it to be held in addition to short fallen easy-to-reach way. The application prototype will consist of positive aspects that the user needs in addition of shortfalls of the related works. This will enable the user to reach his desire and find his favorite event easily.

Acknowledgment

Our project "QEye – Event Application Using Firebase" improves our knowledge and gives us the opportunity of practicing most of significant courses we studied.

We would like to express our special thanks to our supervisor Dr. Mohamed Saleh for his patience and all his efforts that have supported and pushed us towards the best achievement of this work.

Special thanks also to our parents who encouraged us to reach the last stage and hand over our senior project report.

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1. Introduction and Motivation

Events and entertainment are the significant economic tributary to the post-oil stage which enhance the rate of tourism since it meets the need of the entertainment sector. The events search process takes a long time even in recent year with the high level of technology, since it is done manually by the person's effort and no system holds all these events in one place. These days, some applications and websites took this idea and start to store some events in one system so it would be easy for the user to reach. However, it didn't work successfully since it didn't meet people's need.

A mobile application system will offer an ordered view for all events happening in Qatar that suites the society to address the issue of finding the right places to visit. This project serves the needs of people and community by introducing what their country offers to entertain them, and this is going to be possible by improving the media propaganda and give these events the advertisements it deserves.

1.1. Problem statement

As Qatar become a tourist destination, the number of tourists is increasing annually which leads to the increase of these visitors' needs besides the citizens. According to the General Authority for Tourism's 2019 statistics, the number of tourists was 2.136 million person [1] which increased by about 17.4% compared with the previous years. As a result, the huge number of tourists besides the citizens with the limited highlighted events creates a problem with many negative effects, such a huge impact is that citizens revulsed the internal tourist and the reduction of foreign tourism.

Finding a suitable event that satisfy the desire became a real problem since no system handled this property and it turned into a need. To measure the extent of this problem, we shared an online survey with citizens and residents in Qatar. Two major questions in our survey (Figures 1, 2) proves that there is a real problem, and our system will resolve a solution for it.

In your opinion, will the development of such an application support the entertainment aspect in Qatar? / برأيك هل سيدعم تطوير مثل هذا التطبيق الجانب الترفيهي في قطر ؟
More Details

- Yes / نعم   139
- Maybe / ربما   24
- No / لا   2
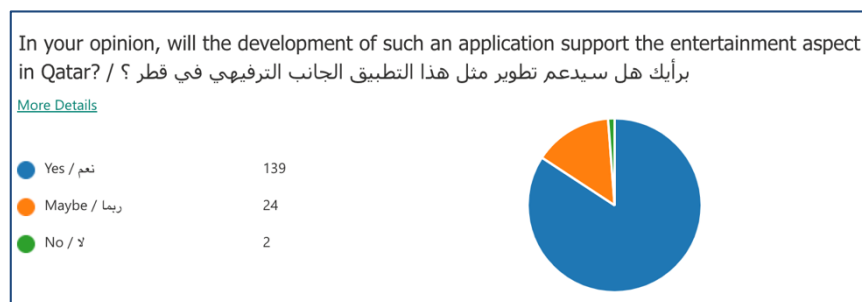
Figure 1: Statistics from survey

Will such an application help support the tourism trend and tourists in Qatar, especially with the hosting of the 2022 World Cup? / هل سيساعد مثل هذا التطبيق في دعم التوجه السياحي والسياح في قطر خصوصاً مع استضافة كأس العالم لعام ٢٠٢٢ ؟
More Details

- Yes / نعم   140
- Maybe / ربما   24
- No / لا   2
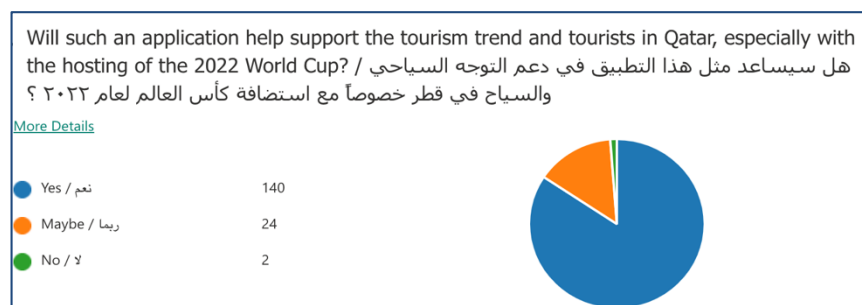
Figure 2: Statistics from survey

Local Media:

This problem went out of its frame as an issue for some groups and touched on the media talk. Below figures 3 to 8 show some of national newspapers headlines that negotiate this problem and some social media accounts that expressed their dissatisfaction with this issue.

Figure 3: Article from Al-Arab Newspaper

Figure 4: Article from Al-Arab Newspaper
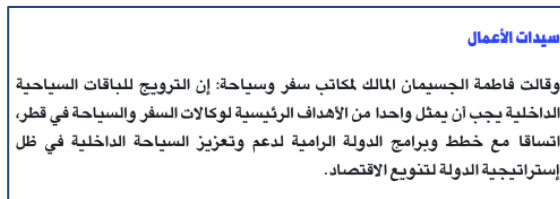
Figure 5: Article from Al-Sharq Newspaper

Figure 6: Article from Al-Watan Newspaper

Figure 7: Twitter tweet

Figure 8: Twitter tweet

Impact:

Boredom of local people from the existing entertainment places because the unawareness is one of the major causes of the decline in the local tourism, where people wait for vacations to travel for entertainment. As a result, the reliance on travel for entertainment will affect the local economy negatively which will cause bankruptcy for many institutions. In addition, foreign visitors will not repeat their visit to Qatar since they will visit all the highlighted famous places around Qatar with the ignorance of the renewed events.

Moreover, the highlighted events that are not suitable for the local community is a main reason behind ignoring these events which attract a specific and meager group. As shown in Figure 9, about 70% of survey answers prefer to attend some of the events that reached their desire.
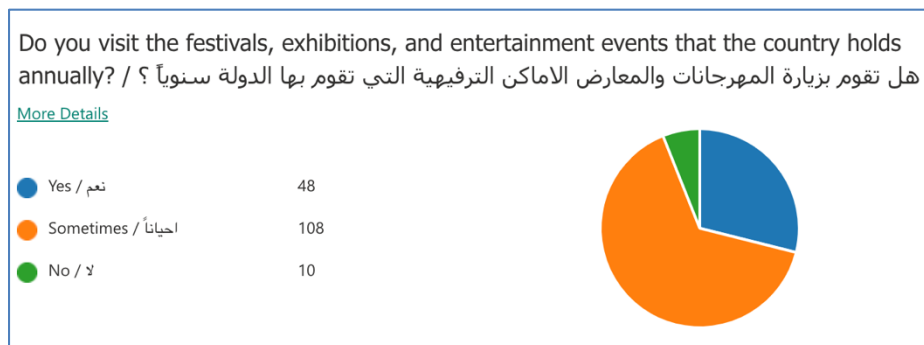
Figure 9: Statistics from survey

By reference to an article in Al-Sharq newspaper (Figure 5), Fatima Al-Jussaiman mentioned the importance of promoting the local tourism packages that enhance the local tourism. This article supports the tweet on twitter (Figure 8) that represents the lack of knowledge of the events between people, which affects the national affiliation.

Closing, the country's economy will be negatively affected by the decline in the local tourism since it is an important source of income and it is considered as the main interface of the country.

**Technical challenges:**

Since our project is all about software then we might face some technical issues such as:
1- Financial resources to create the system.
2- Coding errors that might crashed the system.
3- Internet connections that would delay our work.
4- Keeping the system up to date with the least versions.
5- Developing a high-level system that includes the user needs.

1.2. Project significance

Based on section 1.1, there are applications provided and exists to help people in finding events, but these applications do not serve as required and do not cover all the needs and facilities that people are looking for. Thus, a system needed to present all events in Qatar in an organized way that will reach the local and the international people. This system will guide the user to find his favorite event by just choosing the location that he wants to visit. As a result, this application will be the main

destination for people to explore Qatar which will enhance the local tourism as an answer for the local media call by making people enjoy their vacations locally.

This application will also be beneficial for all event organizers that want to show up their work and present it in our system, this will make it more reachable and saves the user time in searching.

1.3. Project objectives

The proposed mobile application will as it means to allow people to know the country better as well as providing the needed information on what citizens, residents and tourists are looking for.

The solution can be achieved through these objectives:

1. Design and implement an application that can show all events in Qatar.
2. Use Firebase for data storage.
3. Reach the most usable and flexible prototype.
4. Create a map that helps the user to navigate his favorite events.

2. Background and related work

2.1. Background

Reluctance to participate in local events might appear as a superficial problem but in fact it is a huge problem that causes deep problems. Many countries recognized the importance of supporting the local tourism and make it a priority. For example, United States pay approximately 60 million dollars in promoting for Expo 2020 which is only one event [5], since they understood deeply how this will affect the local tourism.

In addition, Al-Arab newspaper posted an article that shows that there is a desire among people to participate in events. Since people joined events with just one reachable way which promoting on social media which is a way of promoting but for a little period of time so it cannot be reliable.

مواقع التواصل الباب السحري لترويج فعاليات «السياحة»

ماهر مصيه 📅 الخميس 14 يوليو 2016 04:44 ص

وصل عدد متابعي صفحات الهيئة العامة للسياحة في موقعي التواصل الاجتماعي «فيس بوك» و «تويتر» إلى أكثر من 600 ألف متابع تقريبا؛ حيث تولي الهيئة أهمية بالغة لهذه الوسيلة الترويجية الأساسية بهدف التعريف بالفعاليات والأنشطة التي تقيمها، بالإضافة إلى التسويق للأماكن السياحية.

Figure 10: Article from Al-Arab Newspaper

For this reason, we decided to create this app to solve this issue with one permanent system that would be the first and the main destination for all people to track events. This events application aims to fill in the gaps of the events searching process around Qatar. It will map the user to his favorite events by choosing his interests and it will contain a map to choose the location then all events will appear depending on time schedule. All events can be easily added to the device calendar to get reminded automatically. Besides, event's owners can register to be able to add their events so they can inform the users.

As a result, the user will be satisfied with using an application that gives him all what he needs and satisfy his desire.

2.2. Related work

This section introduces results of investigations of related literature to the proposed system and all results will be presented with some critics. The aim of presenting the related work is to understand the state of the art related to our system as well as to identify strength and weaknesses of currently existed solutions hoping to identify features to focus on our system since we believe that we can have an add on value to what currently exist. Final findings are categorized in three different categories applications, websites and social media accounts.

Mobile Applications:

1- All Events in City

This application requests the city of the user to show all the events in that city. The user can explore all upcoming events in Qatar either by registering in the application or by logging in as a guest. Also, Top organizers around the user in the chosen city will be shown at the main page. Moreover, it allows the user to chat with friends in the same event. Besides, organizers can create events with all details. On the other hand, our application implements some of essential functionalities that are not offered in this application, one of them is that the user can choose a specific location inside his city to show up the events in there.
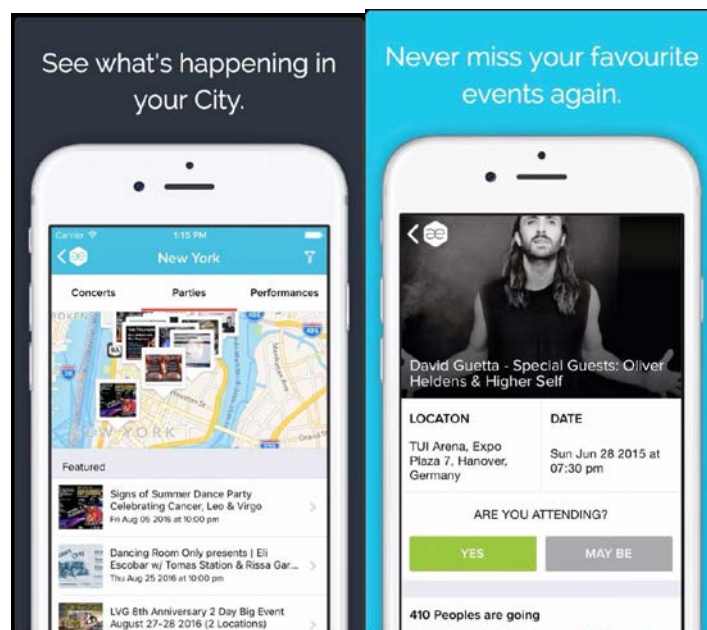
Figure 11: All Events in City mobile application

2- Qatar Events

Qatar events is a compact system that has both website and a mobile application. User can enter both without a need of registration, however registering on the application give the user more features like discounts. It has a comfortable user interface that categorize the events depending on time (today – this week – later). All events have pictures and brief information that satisfy all the user needs. In spite of that, the website is not well organized, and many users may not like it. Besides, the events' information shown in the application is not enough and it just displays the website link.
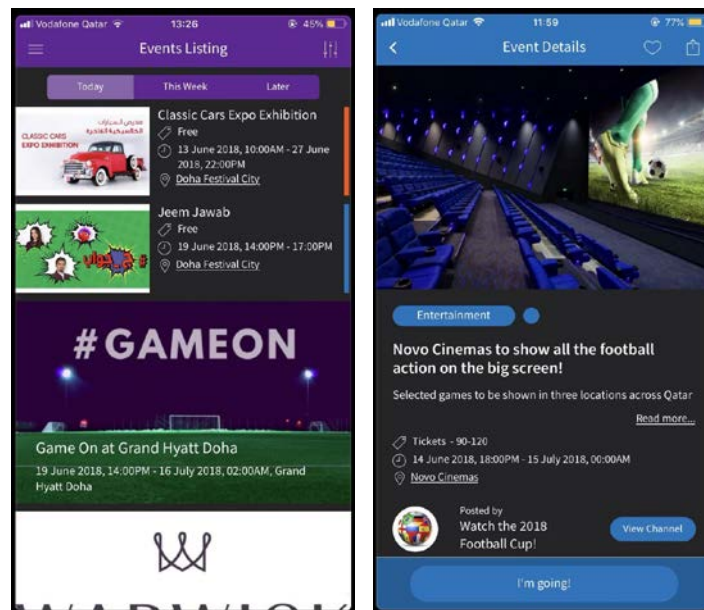
Figure 12: Qatar Events mobile application

3- Eventbrite

Eventbrite mobile application gives the user optional registration with a comfortable user interface. User can specify any location inside his city and browse the nearest events and he can specify the time and the mood to get specific events. It has the ability to contact the organizer without showing much
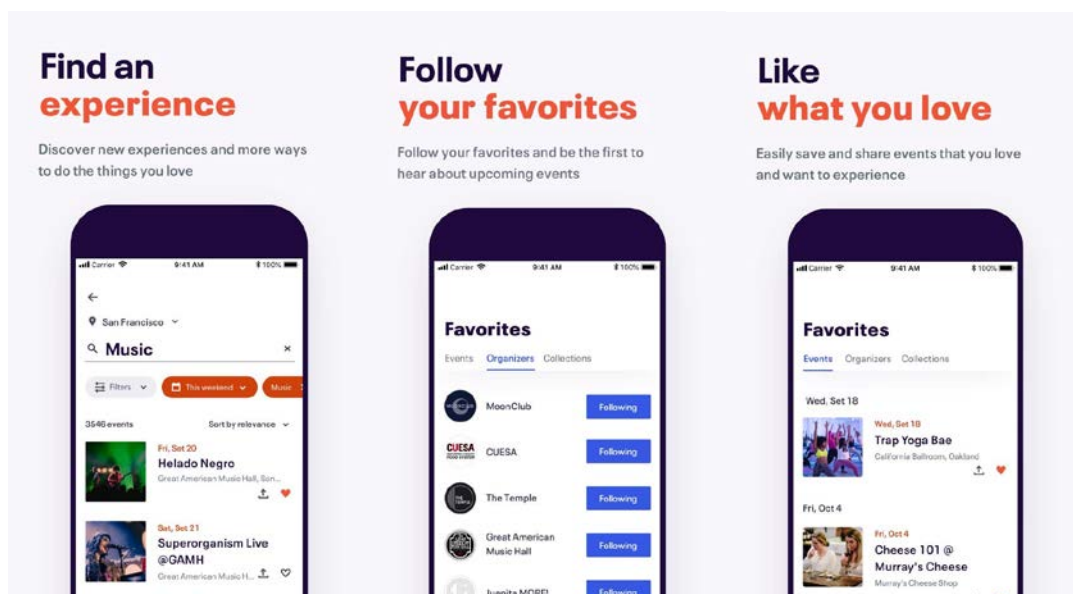
Figure 13: Eventbrite mobile application

of his details. Besides, Free events are more highlighted than the paid. Moreover, each advertise represented with the main language of the event. However, some significant features are not available, such that; it focuses more on the events that attracts tourists not citizens.

4- Fever

This application requires the user to register before selecting his city. It gives him the opportunity to define himself by choosing at least 3 interests, like: music, drinks and cinema so it can connect his interests with the events. All events are categorized in top events and other events depends on their purview. User can buy ticket online and chat with people in an event. All details for the event presented clearly and in a proper way. However, cities are very limited to the European area and it just show up paid events. Our system will mix between free and paid events and consequently it will be more probable to appeal varied genders and ages.
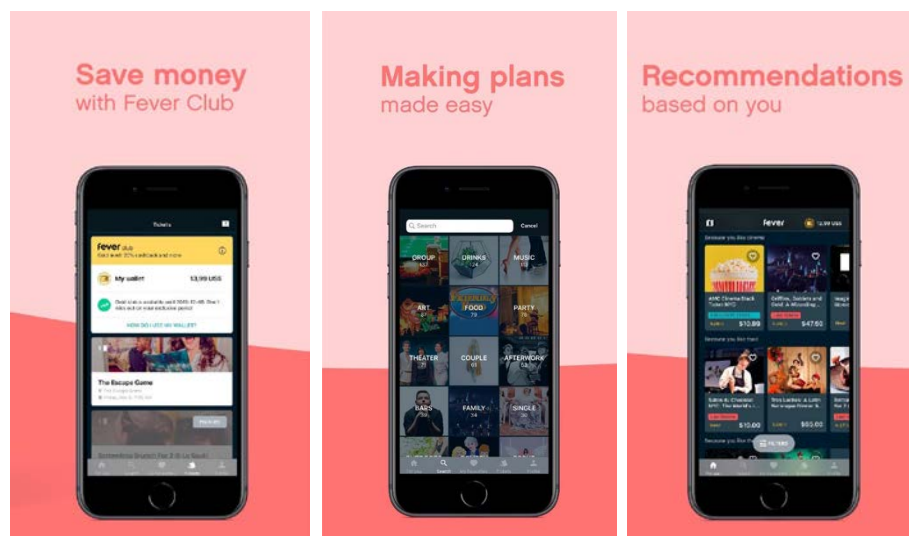
Figure 14: Fever mobile application

5- Whova

This application gives users the option to find an event by just adding any information relates to it. Users can register on events online only. However, many properties make this application not our best option since all events are educational, no contact information are given and registration only available online on the application.
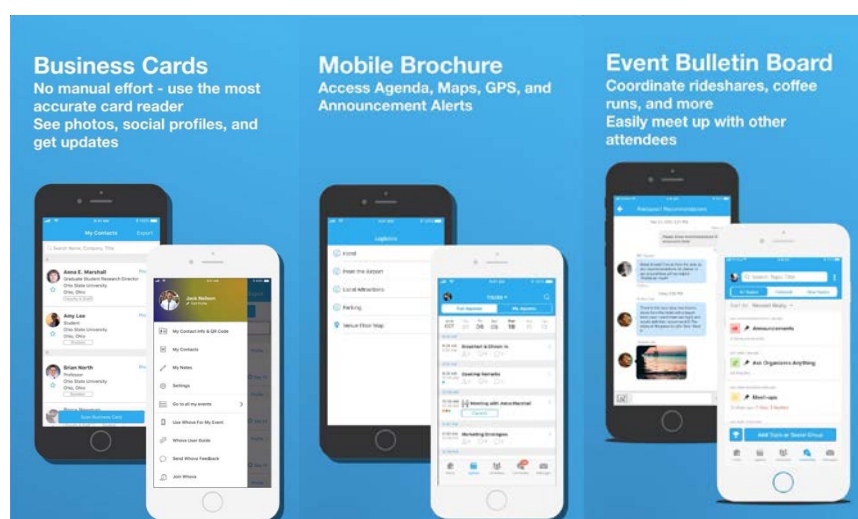
Figure 15: Whova mobile application

6- I am Qatar

This application will attract users to join since it is designed in a much modern and professional way. User can search his event either by time or category. It offers discounts for the paid events to the registered users. However, the application misses an important function which is the lack of details concerning contact details.
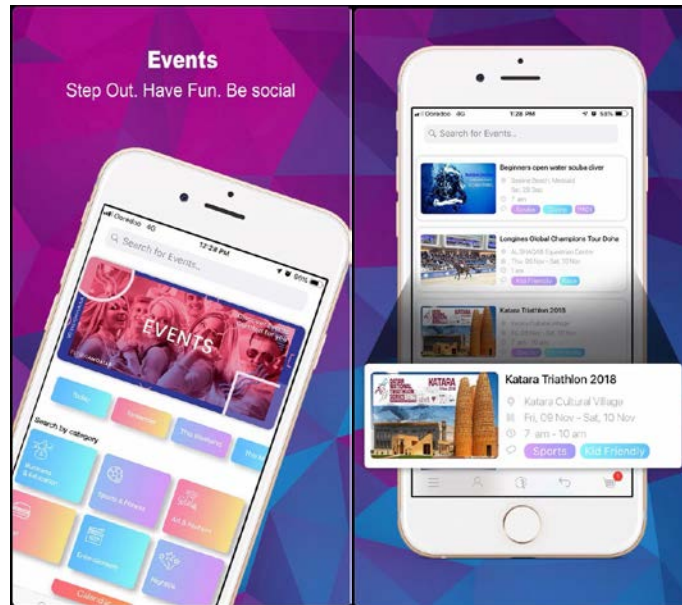
Figure 16: I am Qatar mobile application

	Mobile Applications (iOS)					
	All Events in City	**Qatar Events**	**Eventbrite**	**Fever**	**Whova**	**I am Qatar**
Reviews	4.4/5	3.8/5	4.9/5	4.8/5	4.7/5	4.0/5
Languages	E	E	E / FR +6	E / FR +3	E / FR +1	E
Age	12+	4+	4+	12+	12+	17+
Rating	252	10	303,506	9.7K	60K	4
Size	71.9 MB	7.8 MB	77.2 MB	75 MB	146.8 MB	41 MB
Compatibility	iPhone, iPad, iPod touch	iPhone, iPad, iPod touch	iPhone, iPad, iPod touch	iPhone, iPad, iPod touch	iPhone, iPad, iPod touch	iPhone, iPad, iPod touch
Requires	iOS 9.3	iOS 9.0	iOS 11.0	iOS 11.0	iOS 11.0	iOS 10.0
Top Charts	-	-	#75 Entertainment	-	#98 Business	-

Table 1: Mobile Applications comparison in iOS devices

	Mobile Applications (Android)					
	All Events in City	**Qatar Events**	**Eventbrite**	**Fever**	**Whova**	**I am Qatar**
Reviews	4.2/5	3.9/5	4.5/5	3.8/5	4.8/5	4.4/5
Size	7.3M	13M	19M	47M	395M	Varies with device
Installs	500,000+	10,000+	10,000,000+	1,000,000+	500,000+	10,000+
Current Version	10.1	1.2.11	8.5.1	5.4.31	7.5.0	Varies with device
Requires Android	4.1 and up	4.4 and up	5.0 and up	7.0 and up	6.0 and up	Varies with device
Ages	3+	3+	3+	12+	12+	3+
Updated	27/12/2019	17/9/2020	30/3/2021	29/4/2021	iOS 11.0	15/3/2021

Table 2: Mobile Applications comparison in Android devices

Websites:

1- Marhaba Qatar

Marhaba Qatar is a website that allows the user to pick a date in the calendar to show all events in this date. The user can add events in his google calendar to be reminded later. However, not many events are on the website and many important features not implemented. Two of these features are that no mobile application available for this system and it has a poor user interface.

According to the website checker, content is not very interested and valuable. Also, there are some problems with the access to search engines which affects the ranking. Even more, it has a fast-loading time and a high-speed performance. However, it is not very easily accessible from mobile devices since it doesn't include all mobile versions.
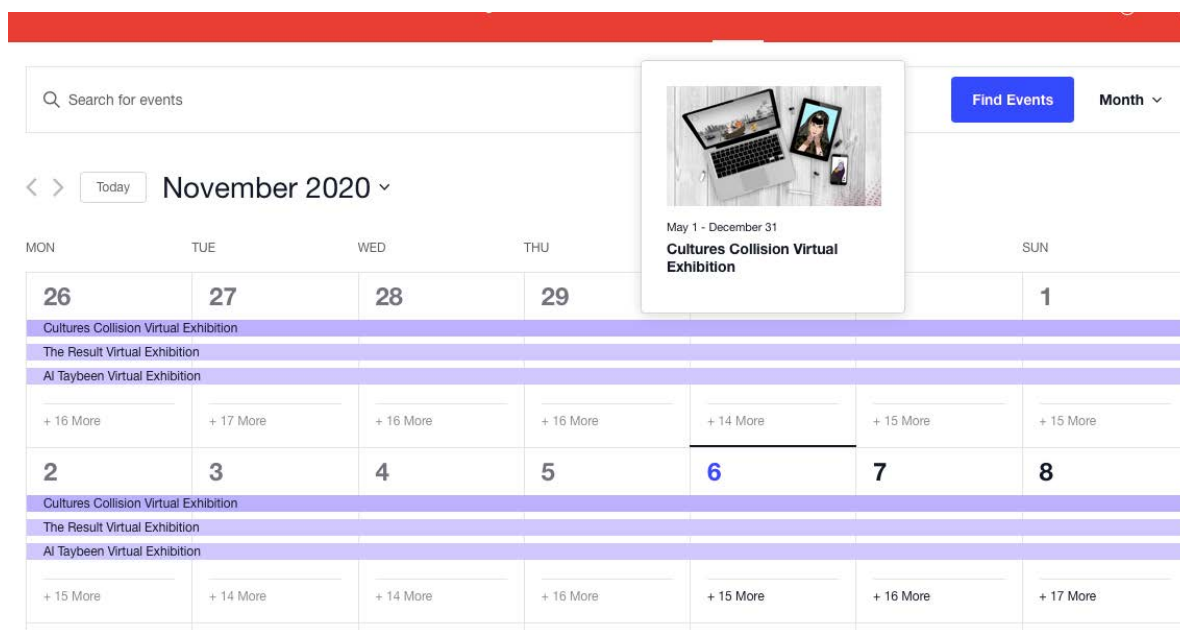

Figure 17: Marhaba Qatar website

2- I Love Qatar

This website gives the user the opportunity to filter the events depending on time and category. It also gives the ability to add his email for getting new events directly when added. Users also can submit events online by adding all event details. Although, some significant features are not implemented in this website. Some of these features are the old user interface and most of the events are educational and for young people.

Back to the website checker, content is in a good standing since it has some images without ALT, some not settled headings and not available links. However, it has a very good standing in SEO since it met most of the elements but might have an issue with the multiple versions of the page then canonical tag should be included to solve this. In addition, pages sizes were about 97KB which is not good for performance that affects the speed. Also, JavaScript files comes to the expense of loading time which affects the speed performance. One other thing, the website should support older browsers and update it to some mobile versions so it would be easily accessible to all.
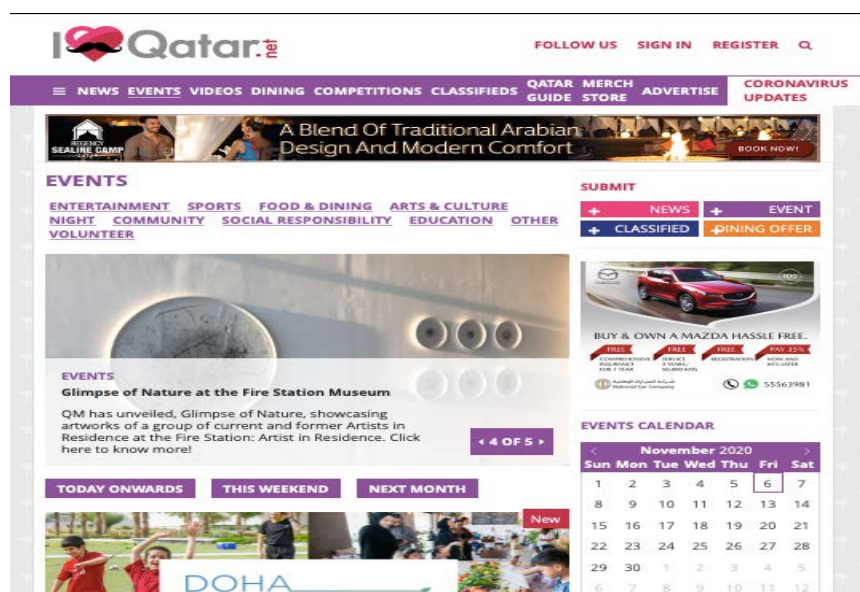
Figure 18: I Love Qatar website

3- Qatar Living

This website has a unique feature which is the ability to add reviews and comments below each event. It also locates the event on a map so it would be useful for the user to reach the event. However, Users might not like the website since it has old style interface, and no contact information are available.

Regarding the website checker, the content has a miss in the percentage of Text-to-Code which should ideally be no less than 25%. Moreover, only indexed pages can appear in the ranking of search engines which make the website less searchable. For the performance, found that page size more than 127KB with some errors in the JavaScript files which put the performance of the site in a very low speed. Even though, it is not very usable to access from mobile devices since it is not supporting all versions.

Figure 19: Qatar Living website

	Websites		
	Marhaba Qatar	**I Love Qatar**	**Qatar Living**
Content	29%	43%	57%
SEO	14%	86%	86%
Performance	100%	50%	50%
Mobile	14%	57%	57%

Table 3: Website comparison

As shown above on Table 2, we used a website checker [14] that analyze the general statistics for any official website. First element was the content which evaluate the main content of the website as number of words, unique content, images with ALT attributes, headings, clear languages and clear references links. SEO evaluates the website coding errors and the updates versions for the website pages. Moreover, the performance tests JavaScript files, CSS files, cookies and page size. Mobile element assesses how easy is the website accessible from mobile devices.

Social Media Accounts:

1- @world.qa

It is an Instagram account that categorizes all fixed events in Qatar titled by their type. User can choose any highlighted story depending on his mood, like beach or restaurant. All description and contact information are shown but in Arabic language only. It is very well organized in a modern style. However, it should be expanded in more practical and functional way to be easier to the user and to apply the multi-languages techniques.
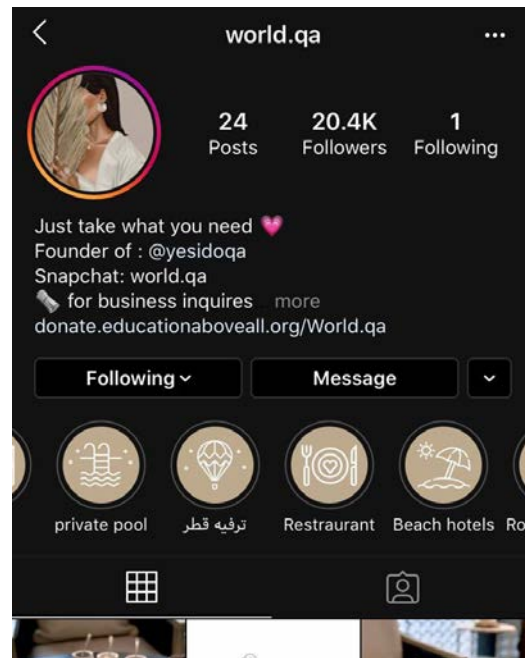
Figure 20: @world.qa social media account

	Social Media Account
	@world.qa
Application	Instagram
Followers	21.6K
Activity	Activate the account daily to react with followers – Adding events and activities weekly
Design	Very modern design
Date Joined	May 23, 2020
Based in	Qatar

Table 4: @world.qa account analysis

As seen, each project has both positive and negative sides. Some of existing features should be implemented in one application such as, picking a date in the calendar to find out the events. Moreover, adding comments and reviews helps the user to find out his favorite event. However, some features would affect negatively on our app like the old user interface and the unclear information beside the compulsory registration. We can improve this application by adding another feature which is a map that the user can just search for a place and all events inside and nearby this place would be shown. So, the user can find his desire with a comfortable mobile application.

3. Requirements analysis

3.1. Software development process

Our project will be build using the Scrum software development process. Scrum is the best model for an iterative and dynamic project since it works on building usable software to customer feedback. Scrum was chosen since it is very suitable to build the minimum plan for the system that is useful and usable enough to keep a space for creativity and development work in the future.
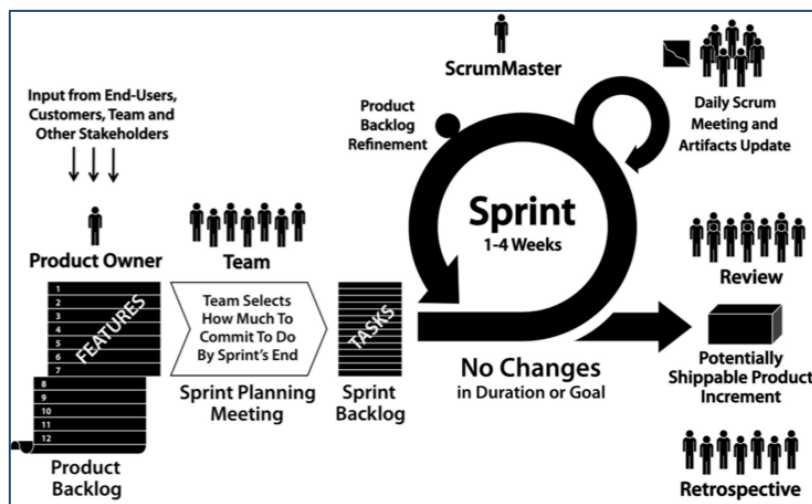
Figure 21: Scrum/Agile software development process

Scrum cycle depends on Sprints as a main part and considered as the heartbeat. Sprint is just a short period of time to complete a work for at most 4 weeks. Each sprint includes four steps that shown in Figure 22.

Figure 22: Scrum cycle

1- Sprint planning (What? How?):

As the first step, we had our first meeting to create a Backlog filled of the requirements that are arranged in order of priority for this project by studying the problem deeply with setting the needs. Sprint Backlog has a table for what we had done in the meeting and the tasks that would be done for a week until a next meeting.

2- Sprint (Daily Scrum Meetings):

In this phase, we revised the Sprint Backlog together as a team in daily meetings to discuss the accomplished tasks for each member and to study the next tasks that should be done before the next meeting. In addition, we tried to help each other to replenished and to solve any issues.

3- Sprint Review (Met Sprint Goals?):

After we done our tasks, we discussed it with our ScrumMaster which is our supervisor to demo everything that has been done and try to solve the unsolved issues together. Then we all agreed on the accomplished of the specific tasks.

4- Sprint Retrospective (Refine Approach?):

As a last step, we reviewed all the discussed tasks to make things smoother and to give the final check up on all tasks so it should be suitable for all people, relationships, tools and processes.

3.2. Functional requirements

Our system would do many major tasks which is represented in:

i. Users and event organizers should register and sign in the application.
ii. System should recognize the search engine inputs.
iii. System should give out a reservation ticket to the user.
iv. Specific events should appear when filtered by the user.
v. User's and events organizer's information should be stored in Firebase.
vi. Mobile must have internet connection.
vii. Firebase should be connected to Android Studio.
viii. System should push notifications when new events added.
ix. Application should be connected with device's calendar.

Figure 23. Use cases diagram

Actor Type	Brief Description
Event Organizer	An owner of an event that would like to post his event details in the application.
User	People who choose to register as a user in the application.

Table 5: Actor type summary

Use case	Brief description
UC01 : Register Organizer	Choose to register as organizer.
UC02 : Register User	Choose to register as user.
UC03 : Login	Users login to the system.
UC04 : Add Event	Add new events by organizers.
UC05 : Edit Event Details	Admin Updates the event details in the system.
UC06 : Update Event	Organizer updates the event details according to date, location, etc.
UC07 : Delete Event	Organizer deletes the event.

| UC08 : Identify Map Location	Organizer identifies the location of the event.
UC09: Edit Map Location	
UC010 : Add Advertisement	Admin add the advertisement made by organizer in the system.
UC011 : Add Promotion	Admin add the promotion made by organizer in the system
UC012 : Search Event	User search for events.
UC013 : Get Event Feedback	System asks for event feedback from the user.
UC0 14 : Provide Feedback	User provides feedback about the event.
UC015 : Logout	Users logs out from the system.

Table 6: Use cases summary
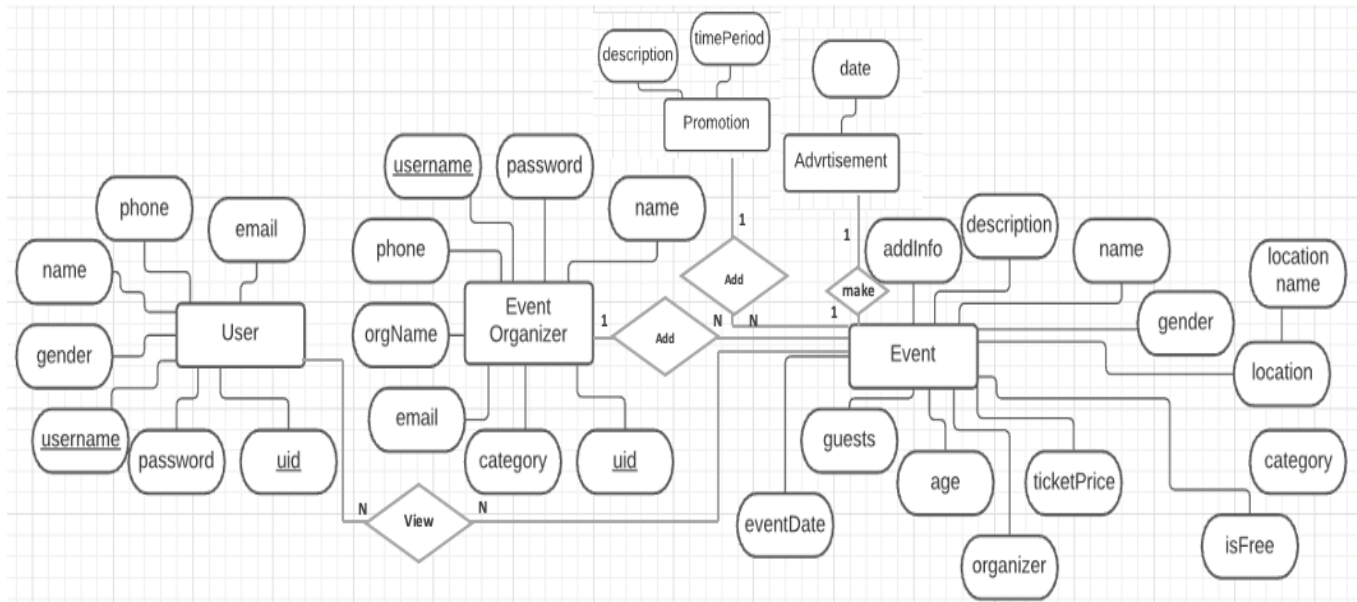
Figure 24: ERR diagram

3.3. Non-functional requirements

From the definition of functional requirements, we got a brief idea of what exactly they are, and we can also guess everything we need to develop, build and implement Kotlin language for programming. Why Non-functional requirement is needed? well we can only develop the application with functional requirements but without Non-functional requirement, the product would be buggy, unreliable and incomplete.

Among the non-functional requirements we found:

1. When the user opens the application, the application should be fast "New user registration should take less than 20 seconds".
2. The application should be able to display or recommend to the user general or shared information (gender, etc...).
3. The user should be able to install, rate and contact the responsible person via the application.
4. Users' info like personal contact should be protected and should not be accessible to unauthorized persons and there should not be a way for user to manipulate the application for their gain or bypass necessary means.
5. In order to have proper security the data must encrypted and then saved and again to read the data should be decrypted and then read.

Quality Attribute	Architecture Requirement
Performance	• The system should respond for 90% of requests within 10 seconds.
Availability	• The system should be available all the time 24\7 incase if any data changed in the Firebase database during the running of the application, so the system provides the necessary updates without the need of restarting it. • There should be a common plane where the user can access your application to install and look for regular updates give feedback (for example: Google Play Store).
Portability	• You can use the Application on android and we will be working on iOS.
Scalability	• Scalability: handling size changes. • The system is expected to handle up to 1 million users in next decade so it must cope with this huge increase.
Modifiability	• The system should support modifiability as more functionalities need to be updating all time.
Security	• All communications must be authenticated and encrypted for data user be safe. • User information such as personal contact must be protected.
Reliability	• Reliability: preforming the required functionalities successfully. • The application should not issue a wrong command to terminate the service. • To avoid losing data, it must be saved constantly on the Firebase database.

	• All data delivery outcomes must be known to concerned parties within 40 seconds. • Error can be recovered correctly.
Connectivity	• Mobile Application should be connected to the internet all the time, so it collects the updated data from the firebase database.

3.4. Assumptions

- Android studio always work successfully.
- Mobile devices always connected to internet.
- Firebase can store any amount of data.
- Application will not be crashed.
- Application will be always available.

3.5. Ethics

Code of Ethics	Perspective
IEEE: - To support colleagues in following code of ethics to ensure the code is upheld.	This project is a collective and collaborative work since every member will hold a group of tasks to work on and apply all code of ethics.
ACM: - Contribute to society and human well-being. **IEEE:** - To hold paramount the safety, health and welfare of the public.	This project will solve a big issue that people face to meet their needs with respect to code of ethics.
ACM: - Honor property rights including copyrights and patent. - Give proper credit for intellectual property. **IEEE:** - To avoid unlawful conduct in professional activities.	The idea for this project is completely new and unused as the way we will apply it and any work used is referenced.
IEEE: - To maintain and improve our technical competence.	Code of our system will be written in a professional way to prevent possible errors.
ACM: - Be fair and take action not to discriminate. **IEEE:** - To treat all persons fairly and with respect, to not engage in harassment or discrimination based on characteristics such as race, religion, gender, age or national origin.	Team members are just met together by random and all members working together happily without any kind of discriminations.

Table 8: Code of ethics

4. Solution Design

Our system based only on software part then it only has software solutions that can be done by the comparison between services.

This system will be mainly providing two services which are Availability and Local. Availability will be presented in showing a map to the user to select a location to list all the events in the selected location and near to it. Local services are to give the user the opportunity to see his country events that attracts him depending on his cultural tendencies.

We can compare these two services depending on their flexibility. Since the availability service is such more flexible than the local because the local is limited by organization, but the availability can be done at any time and in any organization with more flexibility. Moreover, the local service can be guarantee by the users that using availability once the percentage of the visitors for the cultural highlighted events raised up. However, the availability cannot be guaranteed since the users may find the events too far for them

Service	Flexibility	Guarantee of visitors
Availability	Yes	No
Local	Yes	Yes

Table 9: Comparison between services

In addition, according to the number of views on the events, there are some options that can be chosen that have different characteristics. As shown in Table 9, each account created will get a chance of earning points for each logging in and these points differs depending on the number of times. Moreover, the application will encourage people by giving rewards for the top active users as a free ticket for top events or a VIP tickets for events from the user's choice.

Number of times logging in per month	Ability to get free rewards	Range of earned points
0 - 4	No	5 - 20
5 - 14	Yes	21 - 70
15 <	Yes	71 <

Table 10: Comparison between number of times logging in and rewards

4.1. Overview

After studying the options above, we decided to choose the best solution regarding the needs of the users and to implement the project objectives. The selected solution consists of two main modules which are: Free rewards and Earn points. These two modules will help to implement the availability and local services for the user.

We relied on the survey that we had done to make a final decision to select the suitable solution for user's needs. As shown in Figure 24, since about 93% of the random sample of the survey chose that they prefer to attend events, so we chose to add points for users that will use our application to search events to give the maximum number people the chance to install the application and explore all the events.
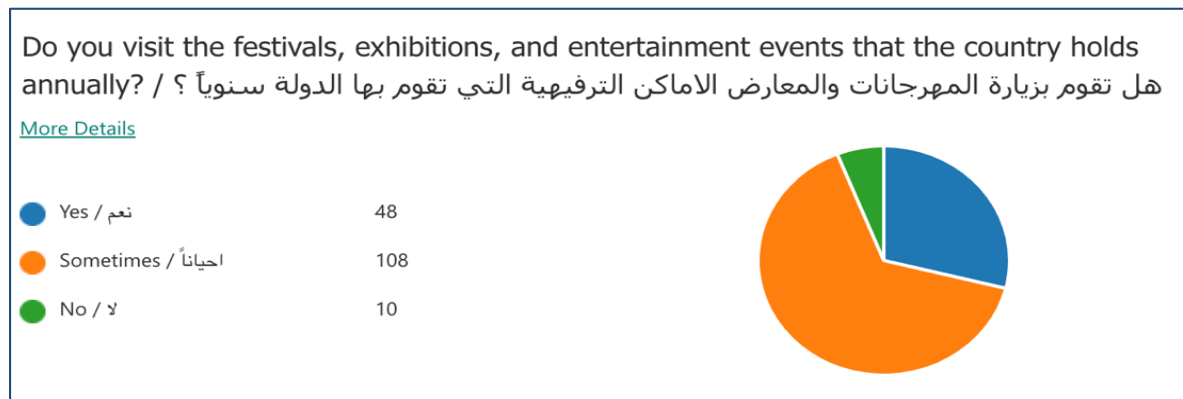
Figure 25: Statistics from survey

Our system solution would be establishing a mobile application that will use the Android Studio as a software to build the application. Also, Firebase database system will be used to store all the data connected to the main system components, which are: Users, Admins, Events' Organizers and Events.

4.2. Architecture Diagram

High Level Architecture

4.3. Structural model

We chose a layered approach since our app will contain information that should be stored in a database system, even more it is very easy to enhance and update layers separately with a little effect on other layers. At the top of our system would be the user interface layer that will include the XML with the embedded Kotlin code. The application layer will have the connection between the database and the user which will handle the services the user requests. This system would have many advantages, like the availability, efficiently and scalability. Availability is one of the significant benefits that servers in each tier can be replicated so that if any server fails, others will remain available until the failed server is restored. Scalability is also an important advantage of the layered approach so each layer can be scaled individually at any time without the need of calling other layers. For instance, if the developer gets many loggings in requests at the same time then the layered approach will help in minimize the chance of overloading the system.
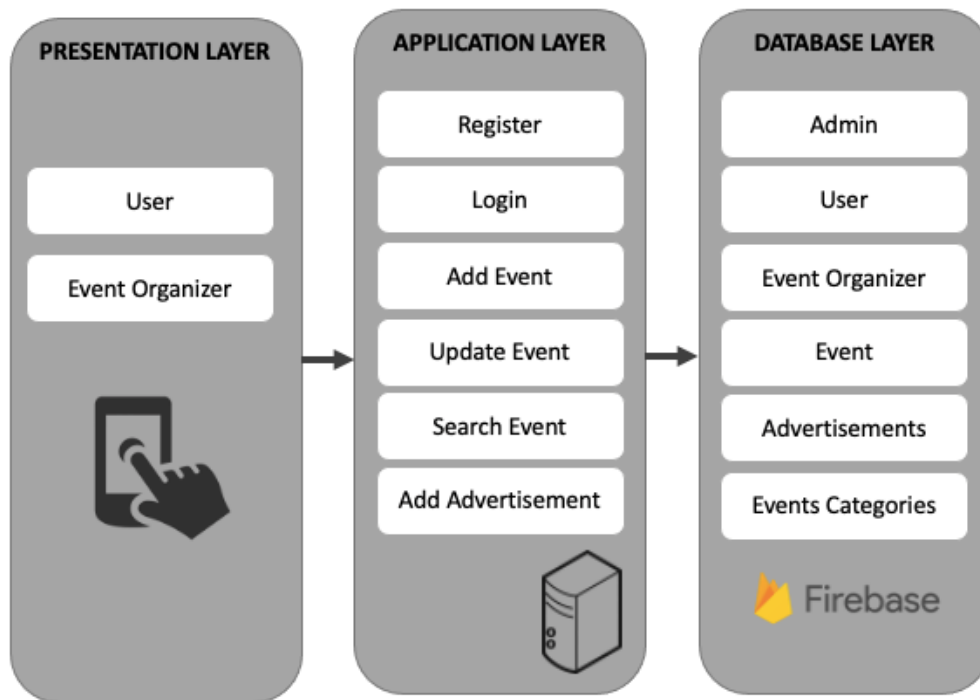
Figure 26: High level architecture

As a continuation to the layered approach, we selected the layered architecture since it organizes the system hierarchically such each layer will provide a service to the layer above it.

Presentation layer is the only visible layer which is the user interface that will handle the user interactions through screens. All the actions that the user does in the presentation layer will be sent to the application layer that handles the operations and determines the behavior of the whole application. Moreover, Database layer is the last layer at the architecture that store all the data needed on a cloud. For instance, if the event organizer added an event with an action on the application layer, then the adding event process will be handled by the application layer by checking the successful sign in, check the event details and requiring the organizer information. Finally, all data about this event will be saved into a cloud by database layer.

A lot of protocols explain the behavior of the layered architecture but in here, users and event organizers are clients of our application. Clients can access different components through the system controller and perform tasks depending on their roles and permissions. For example, user is not authorized to access the database layer as the permission privileged. However, admins can access it. Most of the system functionalities happened in the application layer and it links the user interface layer and the database layer which stores all data.

4.4. Behavioral model

The sequence diagram is a diagram that represents the interaction between objects in a sequential order. It describes the real steps of an action to be done, how to be done and in what order.
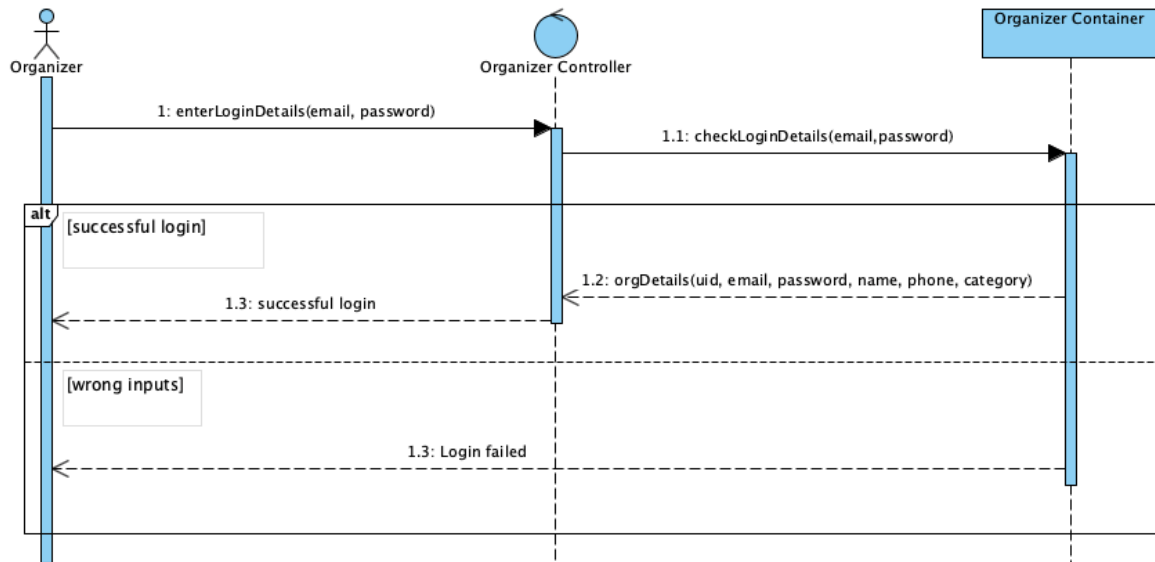
Figure 27: Organizer login
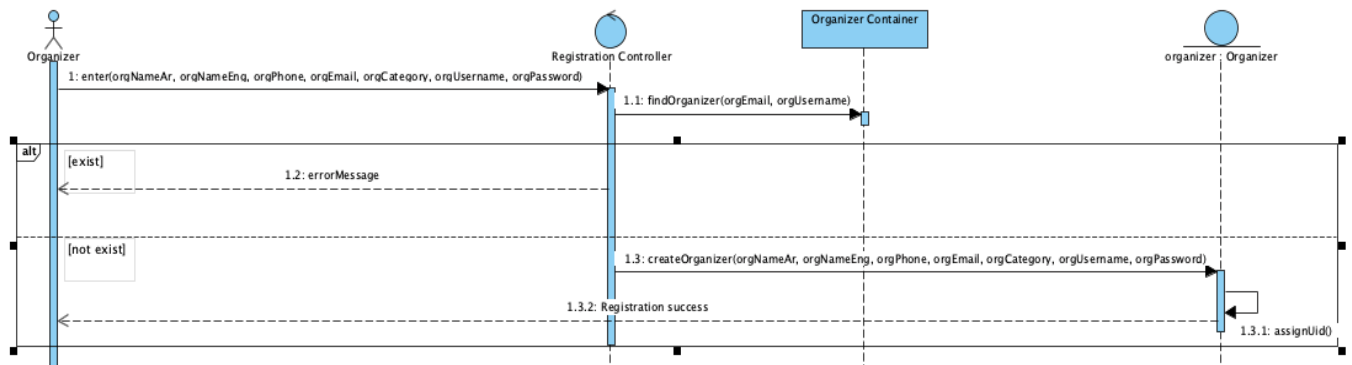
Figure 28: Organizer register
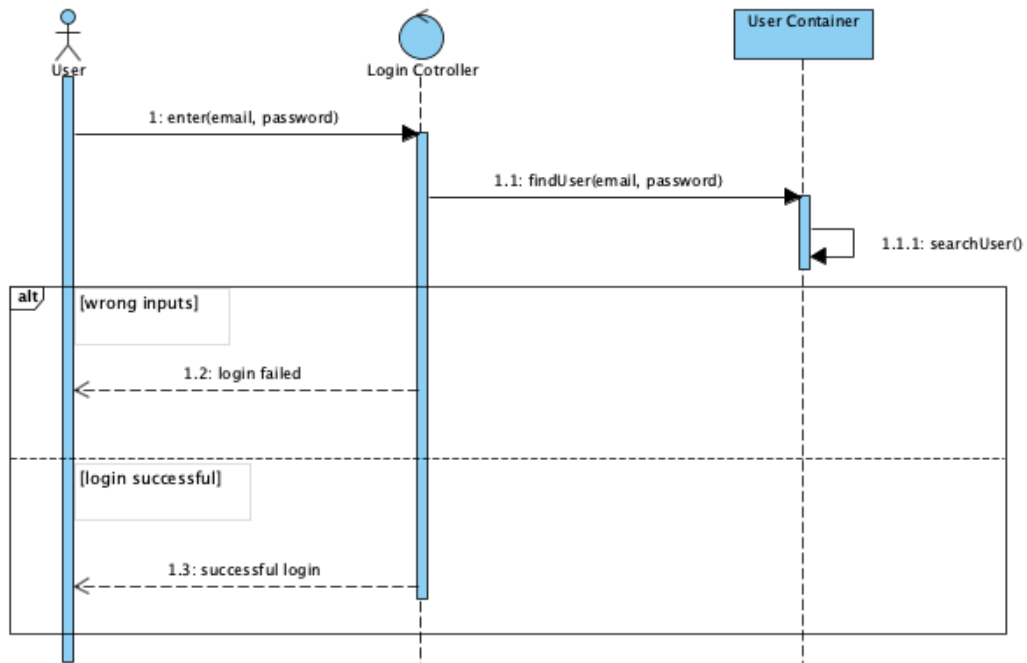
Figure 29: User login
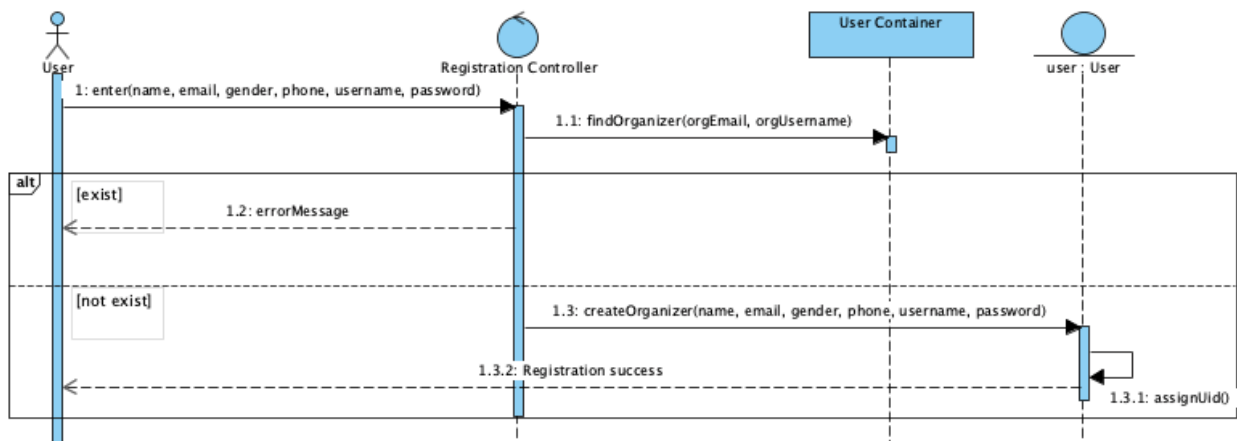
Figure 30: User register
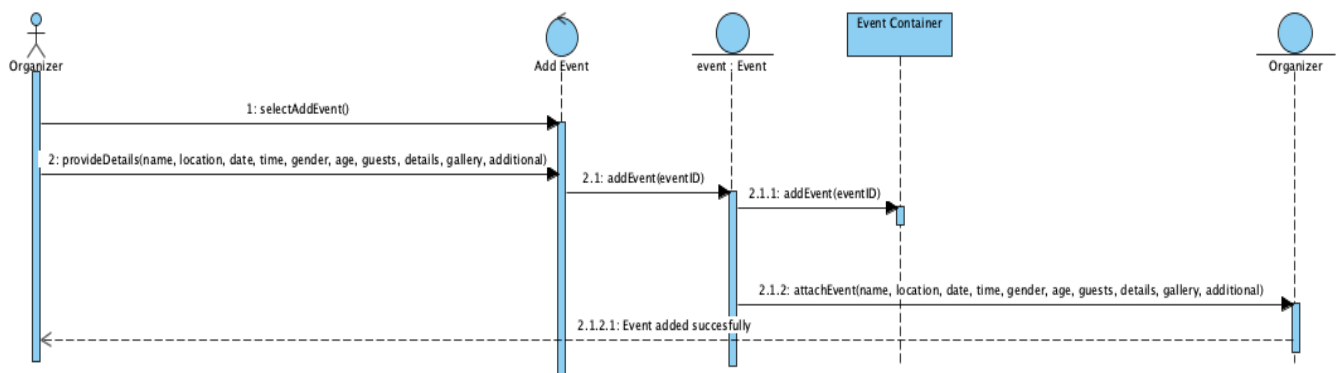
Figure 31: Add event

4.5. Database design

Object	Relationship Type	Attributes
Users	*Event organizer is-a-user*	username Name email password organizationName phoneNum uid orgCategory
	Users is a-user	uid name phone email userName password gender role
Event	Event organizers has added-	eventName location locationName category description age gender isFreeEvent ticketPrice eventGallery guests addInfo eventDate organizer
Promotion	Event Organizers *inherited-from*	eventName timePeriod Description
Advertisement	Event Organizers *handles*	advId date

4.6. User interface design
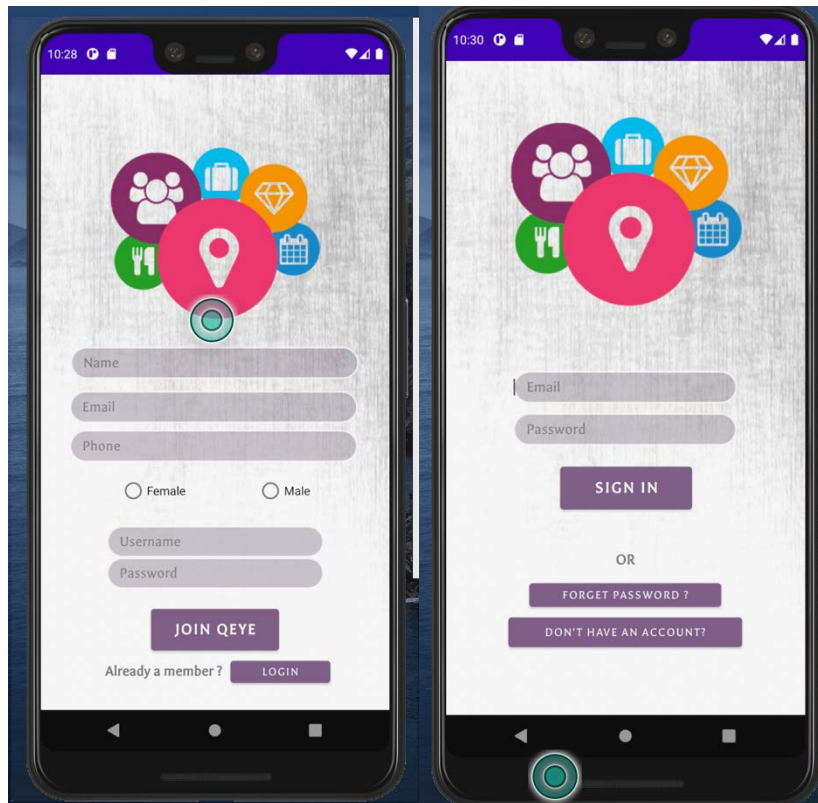
Figure 32: User sign up and login

Figure 33: Navigation between User Login and Sign up
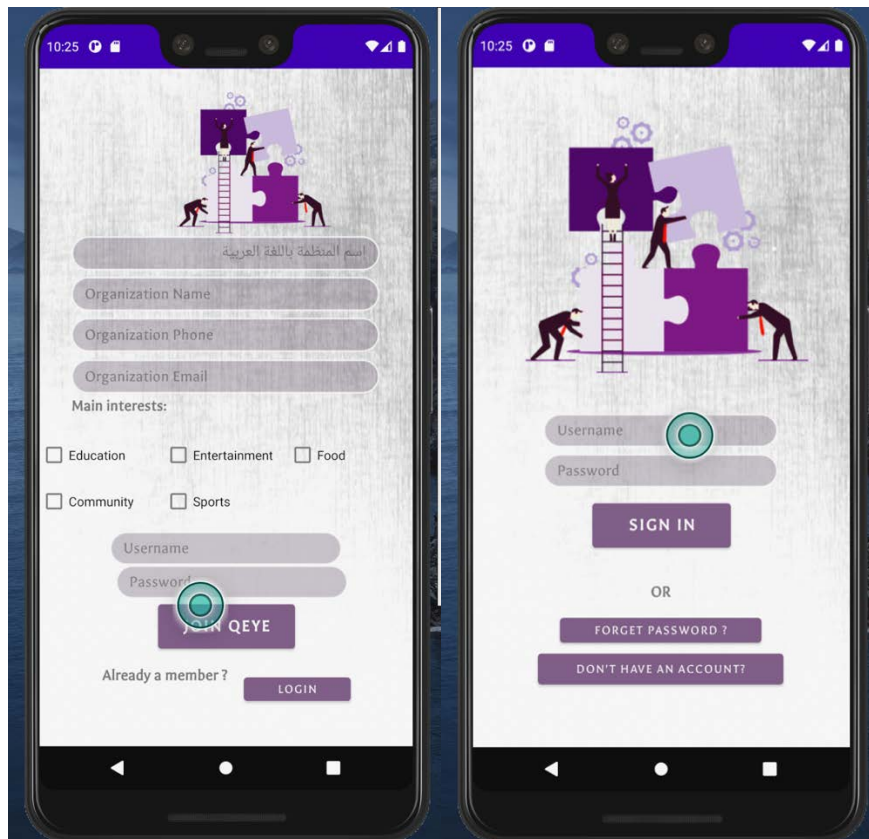
Figure 34: Event Organizer sign up and login
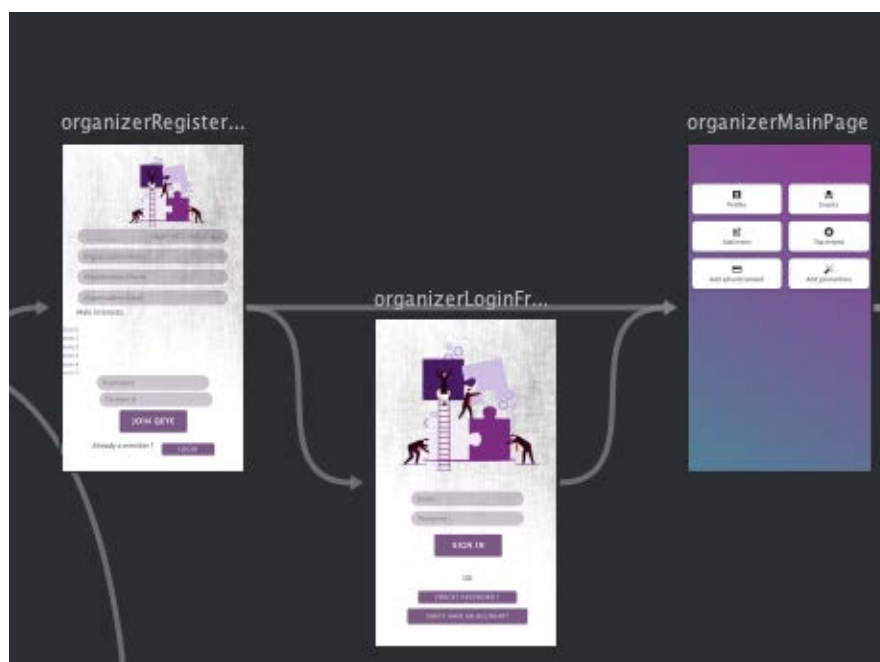
Figure 35: Navigation between Event Organizer Login and Sign up

4.7. Design patterns

We designed our system using the model view controller pattern (MVC) as the following:
1- **Model:** This part includes the essential components of the system that reflects the real-world things and controls the application logic and rules. Model is responsible for gathering and processing the data set thus it would be the brain of the system. For our system, we created many models like user, category, event organizer and event. The model contains all the data that would be connected with the database in the firebase. This will take care of the operations of login, register and adding events.
2- **View:** This component includes any depiction of data like diagrams. It is the representation of the information inside the user interface area. The view consists of the components that are combined with the XML files.
3- **Controller:** Controls the feedback and send it to the Model or View. The controller has been provided in our system to evaluate the user inputs and send the orders to the other components.
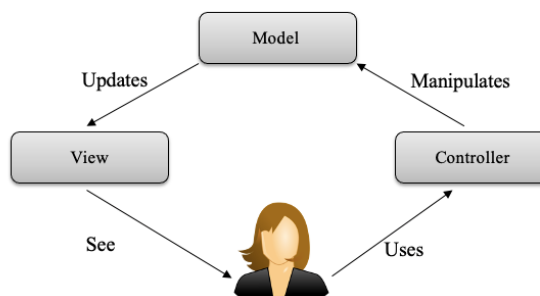
Figure 36: MVC pattern

MVC patterns support the parallel development since if it used to develop the application then two people can work at the same time as one works with the view and the other with the controller. This would keep the developing process completed faster than the usual. Moreover, the user interface can be modifying more frequently since the modification does not affect the entire model.
As a result, we used this pattern for designing the application get the best results.
Factory pattern was also used to solve the question of constructing artifacts without the need of defining the types of the entities to be produces. We done this by initializing objects to call the factory method rather than calling the constructors. The main goal for using the factory parent in our system was to provide an approach to the code for the interface rather than the implementation.
In our system, we used the factory pattern in the navigation bars for the user and the organizer, since addition navigations will be added to the same bar of the user with little changes.
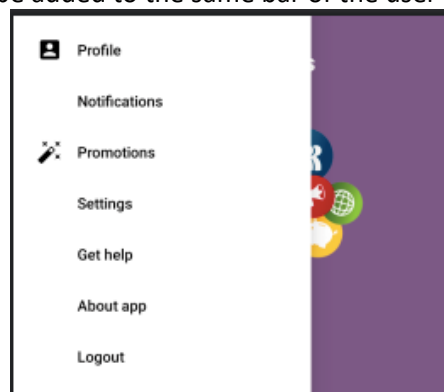
Figure 37: User navigation bar

The main benefits of the factory pattern concluded in it is provides abstraction between implementation and user classes through inheritance. It also removes the instantiation of the actual implementation classes from the user code.

The last pattern we used was the proxy pattern that helps to include an interface for some objects by constructing a proxy class. The proxy class will provide additional features to the object without modifying the real code of the component.
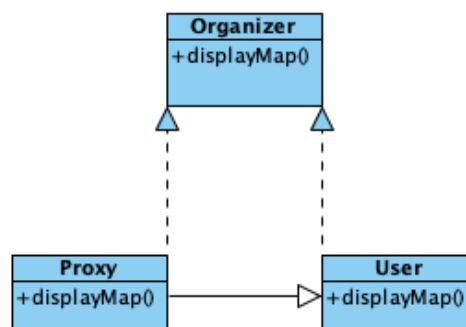
Figure 38: User proxy

Proxy patterns benefits are that it is the most secure pattern and it avoids duplication of objects which might take a huge size from the memory.

4.8. Hardware/software used

Hardware:

Device	Operating System	Justification
MacBook Air	macOS Catalina	Used in building the application.
MacBook Pro	macOS Catalina	Used in building the application.
HP	Windows 10	Used in building the application.
Samsung Galaxy S10	UI 3.0 beta	Used for testing the application.

Table 11: Hardware used

Software:

Category	Tools	Justification
Graphics	Adobe Xd	To design the prototype for the application.
Development of source code	Android Studio	For implementing the source code.
Database Development	Firebase	For storing and managing data (create, delete, execute and preform).
Programming Language	Kotlin, XML	For implementing the application structure and design.

Modeling	Visual Paradigm for Unified Modeling Language (UML) diagrams, Microsoft Project	To model the project diagrams such as use-cases diagrams and to develop the project plan.
Documentation	Microsoft Office (Microsoft Word and Microsoft PowerPoint)	Documentations, diagrams and representation of the project.

Table 12: Software used

5. Implementation

To implement this mobile application, we used Android Studio for the following features:

1- Intelligence coding editor: It is an intelligent and quick code editor since it guides the user with the accurate code and helps to complete the code and analyze it before building the application. It also has the property of translating Java to Kotlin code which helps us lot since we studied it with both languages.
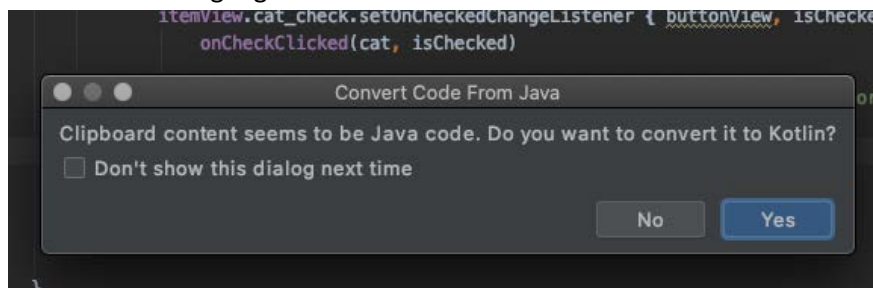
Figure 39: Java to Kotlin code

2- Helps to build app for all devices: It is very suitable for every screen size and for many types of devices such as tablets, phones and TVs. It also can simulate hardware features like GPS location tracker.
3- Easy to connect with Firebase: It is the best system in giving the real-time experience thus we can connect it with the Firebase to provide a direct database connectivity.
4- Color's preview: The separated XML files gives the user the creativity opportunity that can gives results that perfectly matches his ideas. It contains drag and drop features that would be easy to choose the design.

During working with Android studio, we faced some challenges that slowed down the work such as one of our team members didn't work with Android studio before, so we have some shortage. Also, one of the members studied it with Java coding and we faced some problems in translating the code into Kotlin. However, we passed over all challenges and accomplished our job.

6. Testing & Evaluation

Testing is a major aspect for our application since it proves the satisfactions of the solution, we have done either for the functional or the non-functional requirements. We checked our project functionalities with the suitable tools and techniques to make sure that our software can be successfully operated in any environment.

First, we conducted the functional requirements using the unit testing by applying the flowchart concepts. This example represents the user registration process as if the user registered, he will just login and he will have the access for the main page, however, if the user is not registered, he will input his details easily to be registered and continue with the same process.
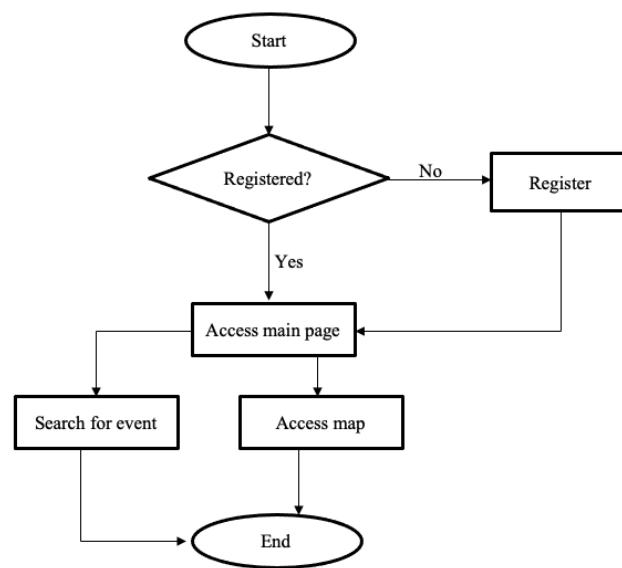
Figure 40: Flowchart for user registration

Then we continue to apply the integration test to the navigated components to check that they are successfully connected. This test done between the registration and the login pages. Thus, the registration page will be the first page appears to the user but if he is already registered a button will navigate the user to the login page to continue the authentication process. Moreover, black box testing used to evaluate the integrated system and to ensure that it meets the requirements. Our system passed this test by the successful interaction between the inputs and the system. This is proved by the successful user logging process when he inputs a present username and a correct matching password. The last phase of the functional testing is the acceptance test that we used to assess whether the final version of our system is ready to be published or not. This test has been done by giving 3 person's the opportunity to experiment it and give their feedback.

The second part we tested was the non-functional processes using the non-functional testing methods that focused on the operational aspects of our system. The first test we used was the performance test to determine how will the application behave under many conditions. For this test we applied the to run the application in multiple emulators and multiple laptops with different storages and RAM storages. We found that the response time differs in each emulator and getting to be perfect with the latest API versions. Also, an action took 3.00 seconds with the laptop that had a

freer storage and 6.00 seconds with the laptop with the less free storage. Overall, the performance test success depends on the used device. The second test used was the security test, and this was successfully detected by adding the authentication login page with a secret credentials.

To summarize, most of the tests was successfully applied on our system. However, the performance test should be improved to not cause any weaknesses in the system.

7. Impact of your project solution

Our project aims to display all events of various kinds that are held in Qatar in an organized manner to facilitate finding them, and thus our project has an effective impact on individuals, organizations and society in Qatar.

Impact on the individual locally and internationally:

It provides individuals with ease of knowledge and speed of booking all events that take place in Qatar, especially as it provides the user with the option to view events according to his interests (sports, scientific, entertainment ... etc.) and update them continuously.

It also provides the individual and his family with an easy-to-use source of entertainment instead of relying solely on searching websites or seeing advertisements for events by chance, whether those events are for adults or children.

Our application is considered a source of learning, through which educational events that take place in the country from time to time are displayed, especially those in which free attendance is available, which facilitates the individual the opportunity to learn by simply booking for the event.

Impact on the organization locally and internationally:

QEye has a supportive effect on tourism to revitalize it in Qatar, as it allows tourists to access tourist places by displaying events held in them such as Katara, the Islamic Museum and others, especially the presence of some events that know the State of Qatar and its great history, in this way, it provides a greater opportunity to get to know the country's tourist attractions and increase entertainment opportunities for tourists to increase their desire to return again, and certainly there will be a positive impact on Qatar's economy, as tourism is an important economic resource for any country.

Our application also supports event owners in providing publicity for them and ease of spreading and holding the event in an organized and complete manner, especially considering the current conditions of Corona and the laws of external gathering to preserve health and safety.

Our application contributes to creating a safe educational and entertainment atmosphere for the community and volunteer opportunities for all its members, adults, and children, with various interests, and certainly this greatly affects the education and awareness of society and creates a spirit of harmony and peace between them, which reflects a civilized image of the Qatari society in front of the world.

8. Conclusion

All in all, this project aims to build an application that hold events around Qatar. This application is going to support the tourism and the economy in Qatar since it will spread awareness of events among the class of people that our country targeting. Events advertising process should be highlighted to get more care. As the main goal of our system is to ease the connection between the event and the user who needs this event. Events searching process is going to be much comfortable and easy by the implementations and the additions that we added in our QEye application. As well as advertising events is going to be an easy reachable and manageable process to the events' organizers.

One of the top features in our application is that it highlights the events that suits the locals with all genders, ages and interests. Also, the application will have the property to search anywhere on the map and find the suitable events. The user can easily find out his target event by making a search on the application making a reference to the organization name. In order to developments and improvements, we are allocating collection of works around this topic to be conducted in future.

9. Future work

For sure this project is an in-progress and we have ambitions to come up with new ideas in the way of developing the current idea. Here are some ideas that would be implemented soon.

1- First, we will start working on developing the same application on iOS devices to extend the system to be suitable for all types of people.

2- Adding the property of reservation for the users to keep the connection easy between the user and the events.

3- Adding the chatting feature and arranging it between user-event organizer, user-customer service, admin-event organizer and user-user so users can reach each other easily.

4- Cooperate with sponsorships in the way of exchanging benefits as advertising the application and make it known.

5- Update the categories that has been added to the events, so the organizer will have a free space to put more information about the event.

6- Adding additional tabs to the user and to the organizer to get the easiest shortcuts and this will help in reaching the different areas of the application with one tap.

7- Providing additional languages other than English and Arabic such as French.

10.   Student reflections

Yomna:

This project was a big tressure for me. In my four years of studying, I was always wondering about the moment that I will implement all the concepts that I learned in a tangible project before getting a job, and this project was the answer to my question. I practiced as much as I worked but I learned much more. In general, I can say that I am now an expert in time management, and I got the techniques of finishing tasks within the time frame. I also learned how to work under the pressure, either the pressure of other tasks or problems inside the team members since I faced all these problem in one year. This work gives me the chance to think more to apply the concept of think out of the box. All I want to say is I enjoyed working in this project because it gives me the chance to get a practical experiment before the real one.

Maryam:

Working on this project was one of the most difficult and beautiful situations that I went through in my university life. With all the difficulties and challenges that we faced and passed through. This project is a life work, we included everything we have learned and worked on in the last past years, also we have put all our effort to make this project as we imagined it at the beginning of senior 1. I have learned to be able to manage time, working under pressure, being able to fix problems, solving issues from practicing and searching for answers and solutions through internet. Moreover, I have learned to be creative and think differently because coding is all about being b creative, I enjoyed working on this project, it gave me a different Idea of being a computer science student.

Hanin:

In fact, this project was one of the most difficult stages for me at the university and it was a very difficult challenge to complete because of the problems I faced, whether in the first or current semester, and I am very grateful to the doctor and my colleagues for their continuous help and support for me, I learned in it for the first time in a tangible way the meaning of teamwork and support, I learned how to try and continue to achieve the goal, and I hope that it will be a success for all of us.

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Appendix A – Project Plan

A.1. Project milestones

Milestone	Tasks
Milestone – 1 **Revise application**	• Revise the progress of the application.
Milestone – 2 **Build User Interface**	• Design UI interface in Single Page Application (SPA) using Json and flutter. • Build system functions (API) using Json • Build asynchronous JavaScript
Milestone – 3 **Modification and development**	• Improve and edit the previous work while we developed our usage of dart language.
Milestone – 4 **Implement Features**	• Organizer, user register • Login • Add event • Identify map location • Edit event details (update/ delete) • Add advertisement • Get event feedback • Search event • Reserve event • Edit reservation (update/ cancel) • Provide feedback • Logout
Milestone – 5 **Design Database**	• Create a database in Cloud Firestore. • Encrypt Firestore data.
Milestone – 6 **Implement Security**	• Create secure login using authentication. • Create secure login page using authorization. • Establish confidentiality.

A.2. Project timeline

Milestone	Task No.	Tasks	Member	Number of days
Milestone – 1 Revise application	T1	Revise the progress of the application	All	5
Milestone – 2 Build User Interface	T2	Design UI interface in Single Page Application (SPA) using Json and flutter.	Yomna Hanin	21
Milestone – 3 Modification and development	T3	Improve and edit the previous work while we developed our usage of dart language	All	9
Milestone – 4 Implement Features	T4	Feature 1: Register Organizer.	Yomna	7
	T5	Feature 2: Register user	Yomna	4
	T6	Feature 3: login	Yomna	3
	T7	Feature 4: Add event	Maryam Yomna	3
	T8	Feature 5: Edit event	Maryam	7
	T9	Feature 6: Update event	Maryam	4
	T10	Feature 7: Delete event	Maryam	3
	T11	Feature 8: Identifying map location	Yomna	3
	T12	Feature 9: Edit map location	Yomna	4
	T13	Feature 10: Add advertisement	Yomna	6
	T14	Feature 11: Add promotion	Yomna	4
	T15	Feature 12: Search event	Maryam	3
	T16	Feature 13: Get event feedback	Maryam	3
	T17	Feature 14: Provide feedback	Yomna	7
	T18	Feature 15: logout	Yomna	6
Milestone – 5 Design Database	T19	Create a database in Cloud Firestore.	Maryam	5
	T20	Encrypt Firestore data.	Youmna	5
Milestone – 6 Implement Security	T21	Create secure login using authentication.	Maryam	5

	T22	Create secure login page using authorization.	Maryam Hanin	1
46	T23	Establish confidentiality.	Hanin	2

	Task No	Task Name	Start	Finish	Duration	Resource Names
1	T1	Revise the progress of the application	27/01/21	02/02/21	5 days	all
2	T2	Design UI interface in Single Page Application (SPA) using Json and flutter.	01/02/21	25/02/21	21 days	Yomna, Hanin
3	T3	Improve and edit the previous work while we developed our usage of dart language	04/02/21	12/02/21	9 days	all
4	T4	Feature 1: Register Organizer.	06/02/21	12/02/21	7 days	Yomna
5	T4	Feature 2: Register user	07/02/21	10/02/21	4 days	Yomna
6	T5	Feature 3: login	09/02/21	11/02/21	3 days	Yomna
7	T7	Feature 4: Add event	11/02/21	15/02/21	3 days	Maryam, Yomna
8	T8	Feature 5: Edit event	15/02/21	23/02/21	7 days	Maryam, Hanin
9	T9	Feature 6: Update event	17/02/21	22/02/21	4 days	Maryam
10	T10	Feature 7: Delete event	19/02/21	23/02/21	3 days	Maryam
11	T11	Feature 8: Identifying map location	22/02/21	24/02/21	3 days	Yomna
12	T12	Feature 9: Edit map location	25/02/21	01/03/21	4 days	Yomna
13	T13	Feature 10: Add advertisement	27/02/21	05/03/21	6 days	Yomna
14	T14	Feature 11: Add promotion	02/03/21	05/03/21	4 days	Yomna
15	T15	Feature 12: Search event	05/03/21	08/03/21	3 days	Maryam
16	T16	Feature 13: Get event feedback	07/03/21	09/03/21	3 days	Maryam
17	T17	Feature 14: Provide feedback	10/03/21	18/03/21	7 days	Yomna
18	T18	Feature 15: logout	15/03/21	22/03/21	6 days	Yomna
19	T19	Create a database in Cloud Firestore.	24/02/21	01/03/21	5 days	Maryam
20	T20	Encrypt Firestore data.	25/02/21	02/03/21	5 days	Yomna
21	T21	Create secure login using authentication.	02/03/21	07/03/21	5 days	Maryam
22	T22	Create secure login page using authorization.	07/03/21	07/03/21	1 day	Maryam, Hanin
23	T23	Establish confidentiality.	10/03/21	11/03/21	2 days	Hanin

Gantt chart showing project timeline from 21 Feb '21 to 21 Mar '21:

- Yomna
- Yomna
- Yomna
- Maryam
- Maryam
- Yomna
- Yomna
- Maryam
- Yomna
- Maryam
- Maryam, Hanin
- Hanin
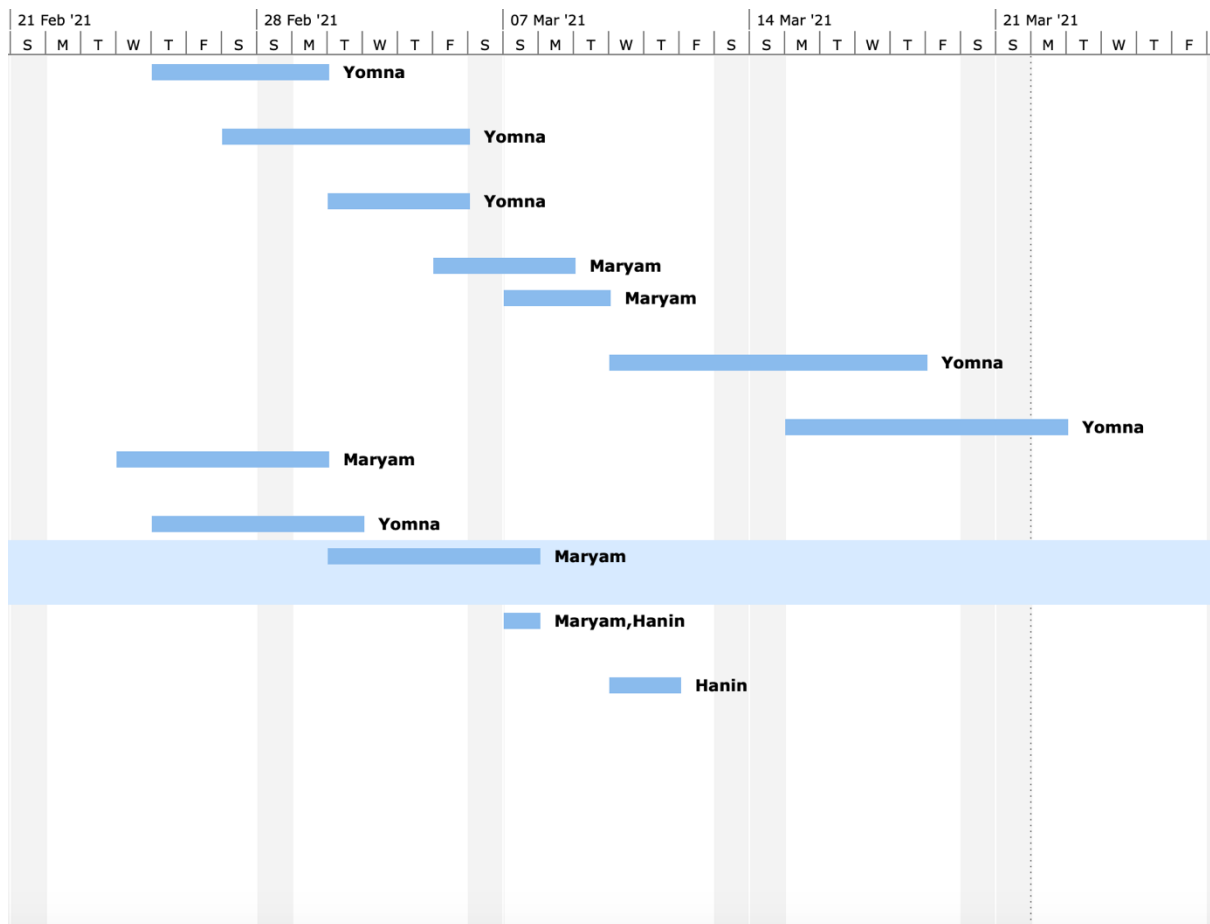
***Note: Hanin's contribution is low since she was sick and couldn't work as much as we can.*

A.3. Anticipated risks

Risk	Risk status	Proposed solution
Time	Facing a delay because of not being able to schedule a fixed time to work as a group, as well as having other course requirements to do.	Fixed meeting was arranged with the supervisor weekly, tasks distributed equally between team members.
Presenting the founder of the application idea	Lack of information presented by the owner and not being able to manage time for meetings.	Proposing some ideas to the owner which helped us to know what should exists in the application.
Challenge	One of the group members had a medical issue which led her to not completing her tasks causing pressure on the rest of the team members. In addition to not taking the necessary courses so she couldn't do the work as predicted.	Allocating more time in the schedule to complete what's missing in the project by other team members, dividing the work between the other two members (the report and the project) and increasing the pressure to complete the report at time.
Corona Virus Situation	Taking precautions due to corona virus affected our time management and it has been a major factor in reducing teamwork.	Scheduled online meeting within team members and lately started to do the work face to face which was much better than online meetings to reach the wanted target.
System Overload	The application receives huge number of users which led to affect the database storage and reach its limit.	Upgrading the Firebase gave us more space to store more data.
Dart programming Language	Completely new concept for us and took a long time to understand how to work with it which affected our time management.	Watching plenty of tutorials about how to setup flutter and implement Dart SDK in our project.
External Obstacles	laptops stopped working due to the heavy application that we are working on, which led to delay in completing the work even more.	Saving the project in different laptops and having another copies of the work.

Other Appendices

Use case Id: UC01	Register Organizer
Brief Description	Event organizer choose to register as organizer in the system.
Primary actors	Organizer

Preconditions:
- Organizer must not exist. - Organizer should have licenses to be able to register as event organizer.
Post-conditions:
- A new Organizer is created in the database.
Main Success Scenario: Organizer registration has been created.

Actor Action	System Response
1. Organizer provide the required details.	2. Check is the organizer doesn't exist in the system.
	3. Create a new registration for the organizer.
	4. Assign a unique number to the registration.
	5. Inform the organizer about the registration success.

Alternative flows:
2.a. If the organizer is already existing, inform the client that a new registration cannot be created.

Use case Id: UC02	Register User
Brief Description	User choose to register as normal user in the system.
Primary actors	User

Preconditions:
User must not exist.
Post-conditions:
A new user is created in the database.
Main Success Scenario: User registration has been created.

Actor Action	System Response
1. User provide the required details.	2. Check if the user exists in the system.
	3. Create a new registration for the user.
	4. Assign a unique number to the registration.
	5. Inform the user about the registration number.

Alternative flows:

2.a. If the user is already existing, inform the client that a new registration cannot be made.

Use case Id: UC**03**	Login
Brief Description	Organizer, user login to "QEye".
Primary actors	User / organizer.

Preconditions:
- The user/organizer has a valid account.

Post-conditions:
- the user/ organizer is logged into the system. If not, the system state is unchanged.

Main Success Scenario: The user/ organizer logging in has been successful.

Actor Action	System Response
1. Enters username and password	2. Validates the entered username and password and logs the user into the system.
	3. Log organizer/user into the system.

Alternative flows:

2.a. If the user and organizer enter invalid username and/or password, the system displays an error message. The user can choose to either return to the beginning of the basic flow or cancel the login, at which point the use case ends.

Use case Id: UC**04**	Add Event
Brief Description	Organizer add the event in the system.
Primary actors	Organizer

Preconditions:
- Organizer must be registered in the system.

Post-conditions:
- Organizer provide reliable details.

Main Success Scenario: Event has been added successfully to the system.

Actor Action	System Response
1. Organizer sign into the system.	
2. Organizer open add event page.	
3. Organizer provide event details.	4. fill in the details
4. Organizer add the event.	5. Add the new event to the events page.
	6. Display all events

Alternative flows:

5.a. if the details are not completed, display "details are not completed".

Use case Id: UC05	Edit Event Details	
Brief Description	Organizer Edit the event details	
Primary actors	Organizer	
Preconditions: - Organizer should be logged in. - Event should be existing.		
Post-conditions: - Event details was edited.		
Main Success Scenario: Event has been edited successfully.		
Actor Action	**System Response**	
1. Organizer choose to edit event details.	2. Display a new window to choose to update event details or delete the event.	
	3. Organize the events and make all needed changes.	
Alternative flows:		

Use case Id: UC06	Update Event	
Brief Description	Organizer update evets details.	
Primary actors	Organizer	
Preconditions: - Event should be existing.		
Post-conditions: - Event details was updated		
Main Success Scenario: Event updated successfully.		
Actor Action	**System Response**	
1. Organizer choose to update the event.		
2. Organizer update the details and submit it to the system.	3. Retrieve the old details of the event.	
	4. Display the updated event such as date, location, price if existed.	
Alternative flows:		

Use case Id: UC**07**	Delete Event
Brief Description	Organizer delete the event added before.
Primary actors	Organizer.

Preconditions:
-    Event should exist.

Post-conditions:
-    Event is deleted.

Main Success Scenario: Event is deleted from the app.

Actor Action	System Response
1. Organizer choose to delete an event.	2. Retrieve the event from events page.
	3. Delete event information.
	4. Send confirmation that event was deleted successfully.
	5. Display the page with the remaining events in the application.
Alternative flows:	

Use case Id: UC**08**	Identify Map Location
Brief Description	Organizer provide event details; system generate live events map.
Primary actors	Organizer.

Preconditions:
-    Organizer must be registered.
-    Event should exists.

Post-conditions:
-    An event location was added to the system.

Main Success Scenario: map location is added.

Actor Action	System Response
1. Organizer login.	
2. Organizer select an event.	
3. Organizer select location button.	4. Display Map.
5. Organizer provide event information.	
6. Organizer select geo point	7. Display the event location and the utilities around.
Alternative flows:	

     7.a. if there is no event in selected location, display "no events in the selected location".

Use case Id: UC09	Edit Map Location	
Brief Description	Organizer	
Primary actors	Organizer.	

Preconditions: Location must be identified
- Location must be assigned to the event

Post-conditions:
- Event location was edited

Main Success Scenario:

Actor Action	System Response
1. Organizer choose to edit a location.	2. Retrieve old location.
	3. add the new location
	4. Send confirmation that location was edited successfully.

Alternative flows:

Use case Id: UC010	Add Advertisement	
Brief Description	Organizer choose to add advertisement for his event.	
Primary actors	Organizer.	

Preconditions:
- Organizer must be registered in the system.

Post-conditions:
- Organizer provide the details about the content of the Advertisement he wants to add.
- Advertisement added

Main Success Scenario: Advertisement is successfully added to the system.

Actor Action	System Response
1. Organizer login to the system.	
2. Organizer select add advertisement.	3. choose the date and the due date of the advertisement
4. Organizer provide details of the advertisement.	5. fill in the details for the advertisement
6. Organizer submit the request of adding an advertisement.	5. Display the added advertisement in the application.
Alternative flows:	

Use case Id: UC**011**	Add promotion
Brief Description	Organizer choose to add promotion for his event.
Primary actors	Organizer.

Preconditions:
-    Organizer must be registered in the system.

Post-conditions:
-    Organizer provide the details about the content of the promotion he wants to add.
-    Promotion added

Main Success Scenario: Advertisement is successfully added to the system.

Actor Action	System Response
1. Organizer login to the system.	
2. Organizer select add promotion.	
3. choose the date and the due date of the promotion	
4. Organizer provide details of the promotion.	
5. fill in the details for the promotion	
6. Organizer submit the request of adding a promotion	5. Display the added promotion in the application.

Alternative flows:

Use case Id: UC**12**	Search Event
Brief Description	User select to search for an event.
Primary actors	User

Preconditions:
-    User must be registered in the system.

Post-conditions:
-    Event exists to be able to search.

Main Success Scenario:

Actor Action	System Response
1. User login to the system.	
2. User search for an event by date or by name.	3. Generate the search and display the events founded.

Alternative flows:

   3.a. if there are no events founded by the given details for the search, display "No event
   found".

Use case Id: UC**15**	Logout	
Brief Description	User and organizer logout from the system.	
Primary actors	User/ organizer	
Preconditions: 1. The user / organizer must be logged in.		
Post-conditions: 1. If the use case was successful, the user/ organizer is logged out from the system.		
Main Success Scenario: The user/ organizer logging out has been successful.		
Actor Action	**System Response**	
1. User/ organizer must select logout button.	2. exit from the system.	
Alternative flows:		

Appendix B – Survey Statistics

الفئة العمرية / Age

More Details

🔵	less than 18	13
🟠	18-25	95
🟢	26-30	11
🔴	above 30	46

الجنس /Gender

الجنسية ? / Nationality

More Details

🔵	قطري / Qatari	105
🟠	دول مجلس التعاون / from GCC	40
🟢	اخرى / Others	21

Current status / الحالة الحالية

More Details

🔵	Student / طالب	105
🟠	Employee / موظف	52
🟢	Retired / متقاعد	4
🔴	Others / اخرى	5
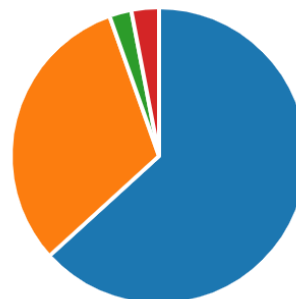
Educational level / المستوى التعليمي

More Details

🔵	High School / المرحلة الثانوية	48
🟠	Bachelor Degree / بكالريوس	107
🟢	Master / ماجستير	7
🔴	PHD / دراسات عليا	2
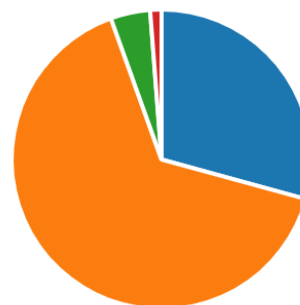
Do you visit the festivals, exhibitions, and entertainment events that the country holds annually? / هل تقوم بزيارة المهرجانات والمعارض الاماكن الترفيهية التي تقوم بها الدولة سنوياً ؟

More Details

🔵	Yes / نعم	48
🟠	Sometimes / احياناً	108
🟢	No / لا	10
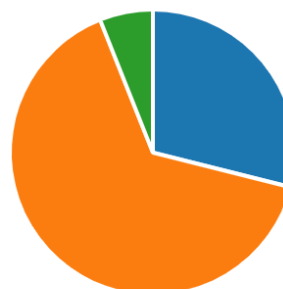
Do you think there are applications and websites that perform their work in announcing such events in the country? / برأيك هل توجد تطبيقات ومواقع تؤدي عملها في الاعلان عن مثل هذه الاحداث في الدولة؟

More Details

- 🔵 Yes / نعم   77
- 🟠 Maybe / ربما   65
- 🟢 No / لا   24

If the answer is yes, do these applications and websites advertise these entertainment festivals and constantly specify places and dates? / اذا كان الجواب نعم، هل تقوم هذه التطبيقات والمواقع في الاعلان عن هذه المهرجانات الترفيهية وتحديد الاماكن والتواريخ باستمرار ؟

More Details

- 🔵 بشكل متواصل / Constantly   59
- 🟠 Maybe / ربما   68
- 🟢 No / لا   17
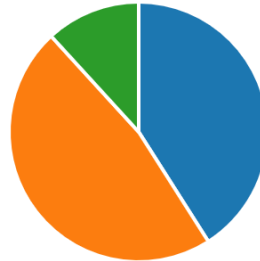
In your opinion, will the development of such an application support the entertainment aspect in Qatar? / برأيك هل سيدعم تطوير مثل هذا التطبيق الجانب الترفيهي في قطر ؟

More Details

- 🔵 Yes / نعم   139
- 🟠 Maybe / ربما   24
- 🟢 No / لا   2
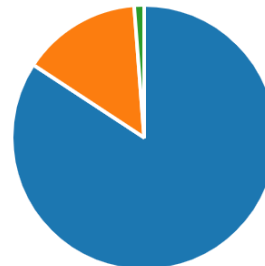
Will such an application help support the tourism trend and tourists in Qatar, especially with the hosting of the 2022 World Cup? / هل سيساعد مثل هذا التطبيق في دعم التوجه السياحي والسياح في قطر خصوصاً مع استضافة كأس العالم لعام ٢٠٢٢ ؟
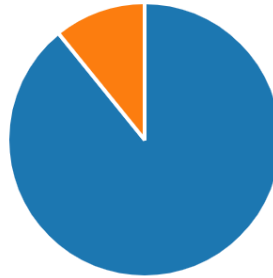
🔵	Yes / نعم	140
🟠	Maybe / ربما	24
🟢	No / لا	2

To what extent may this application benefit the citizen, resident, and tourist?/ الى اي مدى قد يفيد هذا التطبيق المواطن والمقيم والسائح ؟
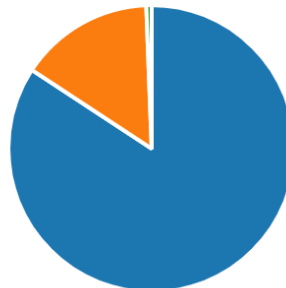
🔵	It will be very helpful / مفيداً جداً..	148
🟠	It wouldn't be of much use / ..رة	18
🟢	It will not be useful / لن يكون مفيداً	0

Do you expect success for this application now and in the future? / هل تتوقع النجاح لهذا التطبيق في الحاضر والمستقبل ؟

🔵	Yes / نعم	139
🟠	Maybe / ربما	25
🟢	No / لا	1

Appendix C – Related Social Media Account