# SEN3003

## SOFTWARE PROJECT MANAGEMENT

## GROUP NAME: purple team

## PROJECT TITLE: Mobile Health Care Management System

| Student ID | Student Full Name | Responsibilities |
|---|---|---|
| 1900812 | Umniyah Sameer Haitham Abbood | 0,1.1,1.2,1.3,1.4,1.5,2.1 |
| 1800827 | Hanin Noman Alsharif | 2.2,2.3,3.1,3.2,3.3,3.4 |
| 1806216 | Sara Emran Abedalaziz Abu-Owaimir | 3.5,3.6,5.2,6.1,6.2. |
| 1905394 | Emre Vurgun | 4.1,4.2,4.3,4.4,4.5,5.1 |
| 1807441 | Caner Umur Can | 7.1,7.2,8.1,8.2, |

## Contents

# 1. Identify project scope and objectives

## 1.1. Identify objectives and measures of effectiveness in meeting them.

**Objective / Vision**

The 20th century has seen considerable advances in many technical fields and artificial intelligence, which have contributed to a rise in all fields. Our project is related to the health field. It will advance the life standard for patients, pharmacists, and doctors. Our project is a mobile healthcare management system that sends notifications to remind patients to take their medicine. Keep a record of the number of pills left and notify the patient, especially chronic people, to repurchase their medication and suggest the pharmacy that contains their medication. Maintain a complete record of the patient medications used, and a list of medications that may cause allergic reactions. Moreover, it will help the patient to book an appointment with any doctor. Finally, all prescriptions will be sent to the application, which will reduce paper prescriptions.

**Project Scope**

The users of this application are doctors, patients, pharmacists. The users will provide a detailed list of medicines they had used/ have been using and all the other details such as how many times they should take the medicine and this information should be stored accordingly in the database. Moreover, the payment details will also be entered.

After processing, the data that the users have offered should make automated cases and scheduling appointments that will match the patient and the available doctor or the available pharmacy that met their needs. The app will also be producing reported about the patient information and bills.

Besides, our application may communicate with other hospital branches and medical clinic's systems, thus the history of the patient should be

reachable to all doctors to review the history of the patient and give the best diagnosis.

Our goal from this application is to facilitate the work of doctors, organizing patient files in an environmentally friendly way. Also, reducing incorrect or incomplete information. Serving more patients, reduce the waiting time for patients, and keep a history for patients and make the user's lives easier.

**Functional Requirements**

1. The patient shall be able to create/edit/cancel an appointment using the application.
2. The patient shall display the list of doctors' names and their available time; therefore, the patient will be able to choose the time that fits his/her from the list when they use the application.
3. The patient shall display the payment options such as paying using MasterCard or paying cash when he/she goes to the hospital.
4. The Email management system shall send an email to the patient to confirm their online payment that has been received.
5. The Email management system shall send an email to the patient to confirm their appointment and to remind them of the appointment one day before the appointment.
6. The patient shall be able to take his medications by showing the electronic prescriptions to the pharmacists.
7. The patient shall be able to display her medicine list and share it with anyone.
8. The patient shall be able to display her medicine list that causes allergic reactions and share it with anyone.
9. The patient shall be able to display how many bills have been left in specific medicine.

**Non-Functional Requirements**
1. Performance:-
   ➢ Reaction Time: The framework of the management system gives affirmation in only three seconds once the patient's data is checked

2. Maintainability:-
   - ➢ The app offers a backup for the data that is being stored

3. Usability:-
   - ➢ Users should be able to use the App easily without any hassles

4. Security:-
   - ➢ The app should require users to enter their passwords every 30 days.
   - ➢ Users should create a strong password that includes numbers, capital, and small letters; otherwise, the password will not be accepted.
5. Availability:-
   - ➢ The app should be available in Play and in Apple's App Store.

**Measures of effectiveness**

- ➢ If the application launched within a budget and assigned period
- ➢ If the number of downloads would be 3 million users over two years after launch.
- ➢ If  The Retention Rate would be between 40%-60%
- ➢ If the Stakeholder were satisfced

## 1.2. Establish a project authority

Assist. Prof. Yücel Batu Salman- E-mail: batu.salman  eng.bau.edu.tr

## 1.3. Identify stakeholders

- ➢ Project manager: An experienced professional who is responsible for planning, monitoring, and controlling the project. He is also responsible for delivering the product within the budget and agreed time.

- ➢ Project sponsor: A person/group/ organization that own the project and provide the resources support for the project, or portfolio to achieve success.

➢ Analysts: Experts who deal with organizational issues, opportunities, instructions, and needs. And make sure they are met.
➢ Designers: Technical experts who translate the enterprise system user requirements and limitations into technical solutions.
➢ Builders: Technical experts who build information systems and their features based on the functional and non-functional requirements, which are being defined by designers.
➢ Users/ end-user/consumer: Any person affected by it will be used regularly to capture, verify, enter, store and exchange data and information.

## 1.4. Modify objectives in the light of stakeholder analysis

After a discussion, we have these features to offers in our app:-

1. Create appointments, the stakeholders think that it is a good feature and not very costly because we will transfer our clients to other hospital's servers to create their appointment.
2. E-payment, almost all hospital servers will give the client that choice, therefore some of the stakeholders think, it is not a top priority, on the other hand, some stakeholders think that we are in 2021 and e-payment is an essential feature that will help the client to keep track of his/her budget. We agreed to keep this feature but not as a top priority.

3. E-prescriptions, all stakeholders agreed to keep it as it is very beneficial for our environment and will create a full history for the patient and that our main aim from our product, which reduces the incomplete/wrong information, however, we need to keep in mind the cost of training the doctors and pharmacists.
4. Receive a notification; all the stockholders agreed that it is a basic feature.

5. Stockholder said that we need to keep in mind that we will design 3-user interfaces, one for the doctors, one for the pharmacist, and one for the patient, and put the proper features in each one.

## 1.5. Establish methods of communication with parties

- ➢ Using WhatsApp for daily communication.
- ➢ Using email to send important reports and updates to all stakeholders.
- ➢ Using zoom for meetings/ meet in the office.

## 2. Identify project infrastructure

## 2.1. Establish relationship between project and strategic plan

| Strength | Weaknesses |
|---|---|
| 1. Speed access to medical data<br>2. Eco-friendly system<br>3. Personalized service<br>4. Atomization of data collection | 1. Need to manage rapid growth.<br>2. Security issues<br>3. Lack of medical information |
| Opportunities | threats |
| 1. Marketing to other doctors who are not using the facility to generate more referrals<br>2. Improve patients' awareness of service products.<br>3. Reduce work-load<br>4. Development of the health care industry | 1. New government regulations.<br>2. Strong competitions<br>3. Hesitant social adoption of this technology<br>4. Imperfect standards and legal issues |

## 2.2. Identify installation standards and procedures

1. Meet the requirement: application procedures should meet written features
2. Flexibility of use: the application should be used as it is planned to work
3. Quality management: assurance whether the application will compensate the needs which are built for.
4. Processes include:-

   ➢ Quality planning: determining how to satisfy the standers, which are relevant to the application.
   ➢ Quality assurance: periodically evaluating overall application performance to make sure the appliance will satisfy the relevant quality standers
   ➢ Quality control: observing special application outcomes to assure they react with the related quality measures.

## 2.3. Identify project team organization

   A project team is a formed group of people who cooperating to perform their common and separate duties of the project and fulfilling their objectives to finish their project. We have the project sponsors as a leader of the group's formation, and right underneath them, the project manager who is accountable for the sub-managers, in other words, will be accountable for their team members. Moreover, some of the employees will be software developers because of their proficiency and understanding of the project.

## 3. Analyse project characteristics
## 3.1. Distinguish the project as either objective or product driven

➢ Mobile Health Care Management System is an objective based project.

## 3.2. Analyse other project characteristics

1. Simplicity: many people have short attention spans this issue was the reason why we made our application smooth to navigate, so they will not lose interest. We made sure that our customer could access their information quickly and easily.
2. Speed: Speed: A quick loading screen is necessary. No one likes waiting, especially when they require immediate access to information. The ability to display an appropriate assortment of images without having to retrieve large tables or databases is referred to as speed. Our application is simple to use and effective.
3. Flexibility: Our application is easy to upload to phones, it is available on the main mobile operating systems such as iOS and Android.

## 3.3. Identify high-level project risks.

| Risk ID | Risk Description | Likelihood | Impact | Risk Exposure |
|---|---|---|---|---|
| R1 | Tight Schedules, project managers may face the pressure of getting to deliver the application before anticipated | 8 | 10 | 80 |
| R2 | Budget changes, engineers may fail to understand the precise requirements of the health application and add extra functionalities | 6 | 8 | 48 |
| R3 | Poor management may affect the ability to reach data | 4 | 7 | 28 |
| R4 | Incorrect budget estimation, funds have not been reserved, or unplanned project expansion | 8 | 10 | 80 |
| R5 | Poor code quality may cause complex multipart project | 3 | 4 | 12 |

## 3.4. Take into account user requirements concerning implementation

1. As a patient: I want to see all functionality on the main page, such as, checking my information, creating an appointment, checking my list of medicine, following my payment processes.
2. As a user: when I check the list of the medicine, I want to see a detailed list of information such as the name of the patient, the name of the doctor who written that medicine, the name of the pharmacist who gave the medicine, and when that medicine has been taken and when the patient stopped taking it.
3. As a user: I want to change the color of the interface depending on my preference, such as Blue which is widely used in clinics, Green which is the color of nature and health and pink which is normally associated with small children and women

4. As a user: I want the application to provide me a monthly report, including medicine that has been taken or stopped, an appointment I have been created or canceled, doctors I have been visited and payments I have been paid.

## 3.5. Select general life-cycle approach

The advancement procedure to be utilized for our Mobile Health Care Management System project is Scrum, which is a kind of Agile framework for Software Development intended to assist with overseeing projects and further develop usefulness. Dealing with a Health Care System project with this approach gives us progressing deceivability and correspondence so we can take care of issues early and regularly. Scrum works with more association in course creation for our undertaking's structure, prompting quicker results and a further developed likelihood of maintenance of data. The Scrum model is established in the presence of groups cooperating through all undertaking stages, contingent upon the degree of the general task, we ordinarily work in runs. We are running after a Sprint goal, planning, refining, developing, delivering, evaluating, etc. A rundown of the principal steps in the Scrum lifecycle is given below:

1. A product backlog (a list of priority product requirements for the healthcare management system) must be established.
2. The Scrum Team generates workload projections and plans based on the product backlog list in the Product Backlog Refining Meeting.
3. We need to organize a Sprint Planning Meeting with the Product Backlog list to determine the sprint objective for this iteration (a sprint is normally 1 to 4 weeks long), and then choose a set of user stories to form the Sprint Backlog for the next sprint that will help us achieve the sprint goal.

4. The Sprint Backlog is finished by the Scrum Team, and each component is broken down into smaller tasks based on the Sprint Backlog.
5. During each sprint, the team working on the Health Care management system has a daily Scrum meeting that lasts about 15 minutes. Members of the team must cooperate and coordinate their work with the project manager to help the team reach the project objectives and commit to the tasks they must do.
6. At this point, the Sprint Backlog has been completed, indicating that a Sprint has been completed. A Sprint Summary Meeting is now required. The development team conducts a Sprint review to display and get feedback from the client.
7. Finally, following the sprint review, the Sprint Retrospective is held at the end of each sprint. During the retrospective, the team self-identifies components of the process that worked or did not work during the sprint, as well as feasible alternatives.

### 3.5. Review overall resource estimates

Any project has a plan to follow all of the activities that are scheduled to be completed, which necessitates the use of assets such as people, equipment, facilities, budget, or whatever else is required to execute the project.

In our Health Care Management System, there are significant kinds of resources to take into consideration.

- *(Staff)*:

One of the most important operating expenses is labor costs, which is the total cost of staff hired to complete the project.  Staff is divided into two groups:

➢ The major group: who are analysts, designers, developers, and testers that result in production units. The labor cost would be calculated by

dividing the salary into the number of days or hours it took them to complete a task in the project. Any employee ought to have his/her insurance covered, retirement offerings, premium benefits, and any other type of expenses that would correlate with a staff member.

➢ The minor group: who are project manager, quality controller, and production supervisor that produces deliverables but does not render directly into production also, in other words, they reinforce the direct labor to increase efficiency. In this category, estimations are carried out to provide precise project expenditure, thus these estimations are divided and approximately assigned to each activity.

*- Health Care Management tools:*

➢ Electronic health record (medical database), where it collects information about the patients.
➢ Personal Health Record Software, where the user can use it to maintain a healthy lifestyle.
➢ Appointment scheduling software, where it helps hospitals, and other medical practices manage their appointment online.
➢ Recovery software, where it is not directly associated with patient care, recovery software can ensure that you do not lose all your important data.

*- Material & supplies:*

We need equipment to make the product to deliver an outcome of the project.

These objects are frequently palpable and are measured in units. We have to estimate the capacity by considering two factors:

➢ The exact material measurement will not be generated as planned. Any endeavor must be prepared for some waste to be generated.
➢ To avoid any erroneous estimation, emergency changes can be used.

*- Fixed Cost:*

> This point is crucial since it is linked to the three previous points. Which calculates all resource expenses in order to determine the budget. Many initiatives fail because they do not realize they need to fix the costs until it is too late. As a result, determining the scope of work and the pricing for each resource might help you avoid wasting money.

## 4. Identify project products and activities

## 4.1. Identify and describe project products (including quality criteria)
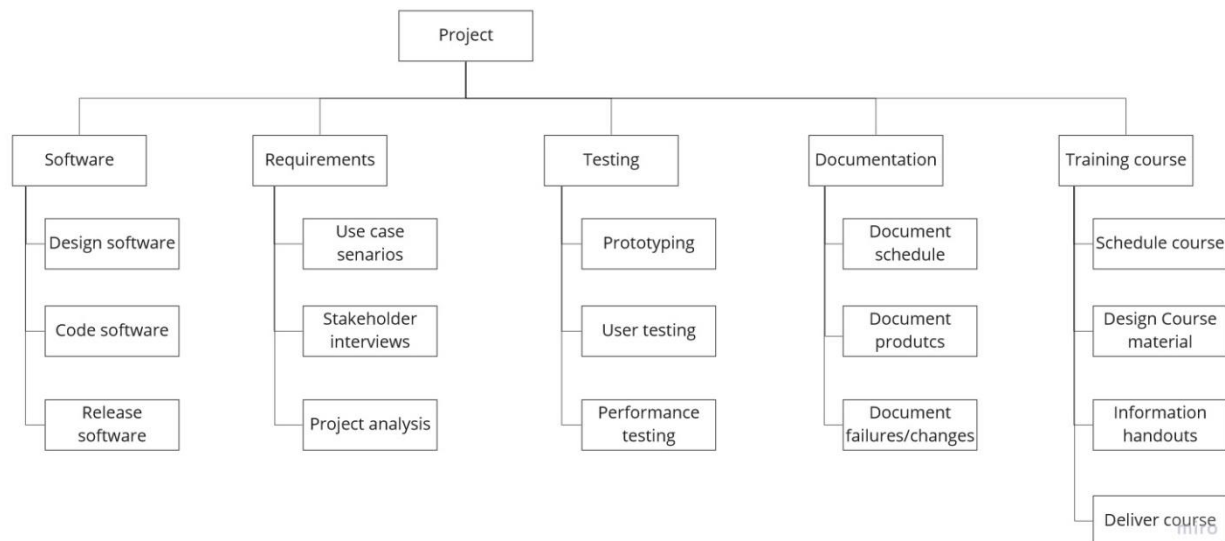


- **Software:** is the set of functions that the project is going to accomplish according to information from the requirements gathering phase. Its quality criteria are the satisfaction of the stakeholders.
- **Requirements:** are the result of the analysis conducted to determine the overall structure and purpose of the project. Its quality criteria are how well the developers know what they will develop.

- **Testing:** is the set of activities that are done to ensure the full functionality of the features of the app and that all necessary features are present. Its quality criteria are the absence of failures and bugs and the implementation of all the required functions and the satisfaction of the users.
- **Documentation:** is what is done to keep a record of all the events of the project to ensure smooth workflow and to assess the details of the project and keep a record of the project for use in later projects. Its quality criteria are the complete documentation of the entire project.
- **Training course** is a course designed to teach new users of the app how to use the features they would use for their needs. Its quality criteria are the ease and the completeness of retention of the instructions given in the course to the users.

## 4.2.    Document generic product flows

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│ Project schedule│
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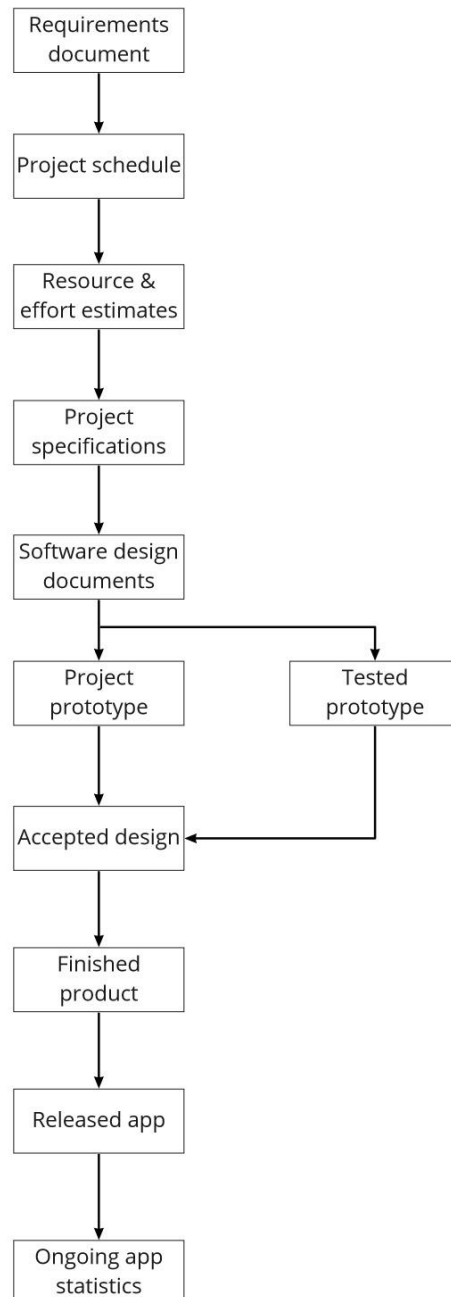
## 4.3. Recognize product instances

When developing the software there is currently known 4 main instances of the app and they are:

- The appointment scheduling system. **(Instance 1)**
- The pill regulation system. **(Instance 2)**
- The prescription handling system. **(Instance 3)**
- The mobile and web-based counterparts of the systems. **(Instance 4)**

## 4.4. Produce ideal activity network
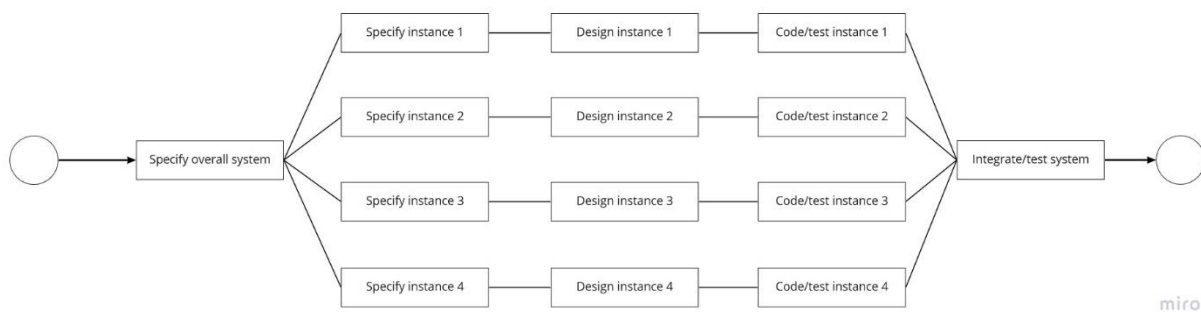


*\* Ideal activity network diagram of the project.*

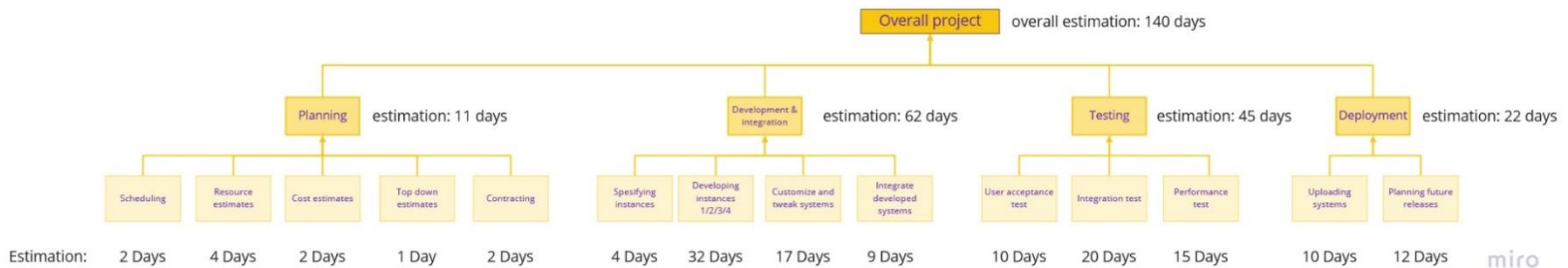## 4.5. Modify ideal to take into account need for stages and checkpoints
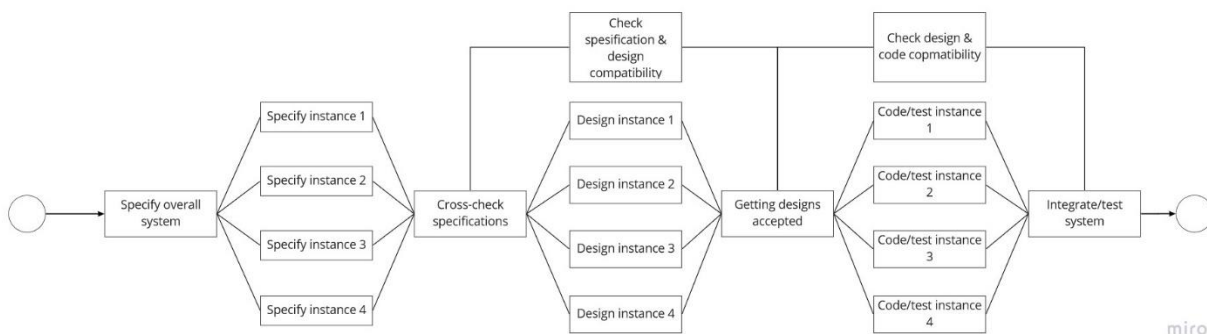


*\*Modified activity network diagram of the project*

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## 5. Estimate effort for each activity

### 5.1. Carry out bottom-up estimates



*The bottom-up effort estimation of the project.*

When estimating the effort, the effort for all activities and tasks has been added in a bottom-up way. This resulted in 11 days estimated for planning, 62 days for development and integration, 45 days for testing, 22 days for deployment, and 140 days for the overall project.

Note that this is most likely not the actual duration of the project because some activities and tasks could be performed concurrently and will be done so if the management requires it.

### 5.2. Revise plan to create controllable activities
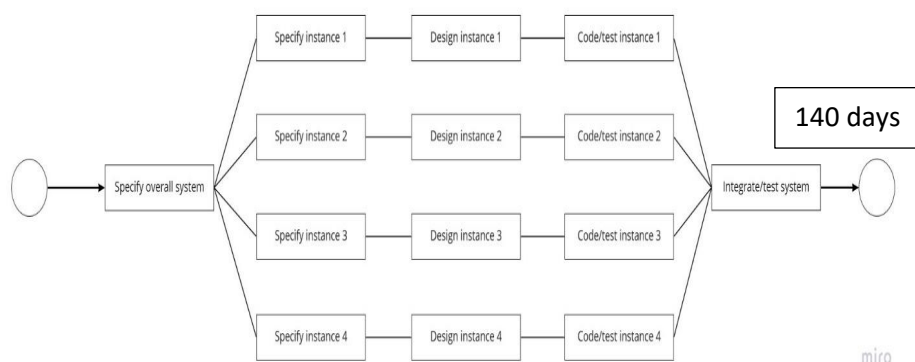


*A revise plane of the project.*

# 6. Identify activity risks

## 6.1. Identify and quantify activity-based risks

| Risk ID | Risk Description | Likelihood | Impact | Risk Exposure |
|---------|-----------------|-----------|--------|---------------|
| R1 | The user interface is not easy to use | 4(Moderate) | 9(High) | 36 |
| R2 | The system loses the stored data | 4(Moderate) | 7 (Significant) | 28 |
| R3 | Cloud server is too expensive/Not efficient | 4(Moderate) | 9(High) | 36 |
| R4 | Unnecessary features are added | 7 (Significant) | 6 (Significant) | 42 |
| R5 | Cyber Attacks | 2(Low) | 10(High) | 20 |

## 6.2. Plan risk reduction and contingency measures where appropriate
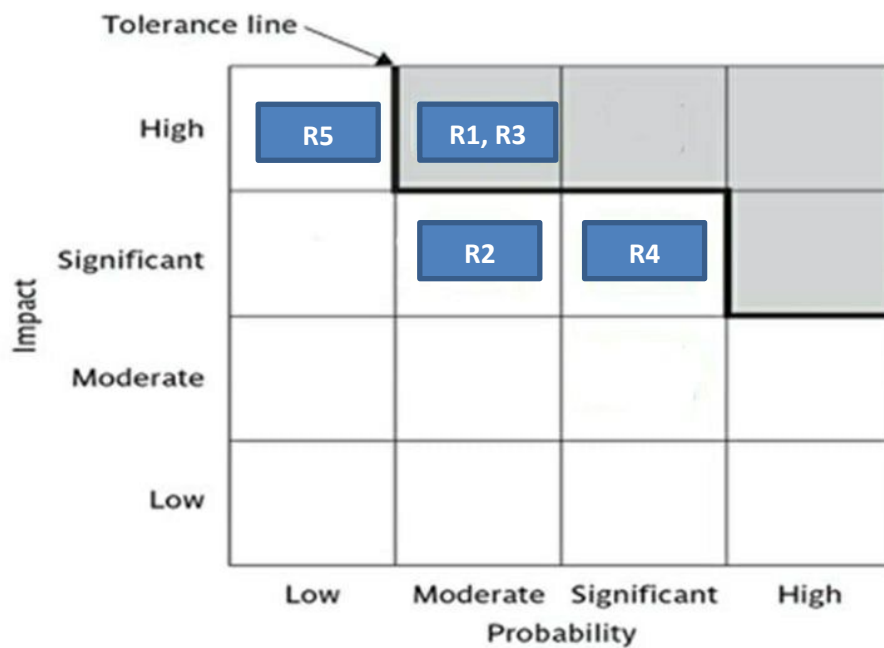
## 6.3. Adjust plans and estimates to take account of risks

| Risk ID | Risk title | Risk Description | Impact Description | Recommended Risk Mitigation | Contingency Measures | Likelihood |
|---|---|---|---|---|---|---|
| R1 | User Interface | The user interface is not easy to use | The user will not be satisfied because his need had not been met and that will lead to failure the app | The GUI should gather all user functionality on the main page. | User interface will be updated when needed to keep it easy to use | 4(Moderate) |
| R2 | Data lose | The system loses the stored data | The system does not provide a basis pack up process | The system should be supplied with a daily pack up process | All data will be stored in a pack up database to ensure not losing data | 4(Moderate) |
| R3 | Cloud server | Cloud server is too expensive/Not efficient | The System will not be reachable by all users – the efficiency will not satisfy the users | An affordable system with a high level of efficiency | System efficiency should be tested and well done | 4(Moderate) |
| R4 | Unnecessary features | Unnecessary features are developed | Development will be out of scope and unplanned time will be spent on non-beneficial tasks | Development will be checked regularly for unnecessary features | There should be enough time in the project to correct the risk if it occurs | 7 (Significant) |
| R5 | Cyber Attacks | User and project data are being stolen or corrupted by cyber-attacks. | Project will be stopped, stakeholders will be vulnerable to lawsuits | Developers should use required technologies when building the architecture. | Full vulnerability test by outside contractors. | 2 (Low) |

# 7. Allocate resources

## 7.1. Identify and allocate resources

| Stage | Activity | Resource | Days | Quantity | Notes |
|---|---|---|---|---|---|
| ALL | ALL | Project Manager | **140** | | |
| 1-Planning | ALL | -Workstation | - | **38** | **Back-end programmers should be notified!** |
| | Meeting with experts in the field | -Senior Analysts -Experts | **5** | | |
| | Creating the project timeline and deciding on the technologies | - Senior Analysts -Whiteboard | **6** | | |
| 2- Develop-ment and integration | ALL | -Workstations Utilities -Software and Technologies | - | **35** | |
| | Building the project architecture and API | -Analysts - Back-end Programmers | **20** | | |
| | Designing the project template | -Designers - Front-end Programmers - | **15** | | |
| | IOS API integration and app development | -Analysts -Designers - IOS Programmers | **42** | | **App store deployment process should be started here!** |

| | | | | | |
|---|---|---|---|---|---|
| | Android API integration and app development | -Analysts<br>-Designers<br>- Android Programmers | **25** | | **IOS and Android programmers** |
| | Web API integration and website development | -Analysts<br>- Designers<br>-Back-end programmers<br>-Front-end programmers | **20** | | |
| 3 - Testing | All | - Workstations<br>-Utilities<br>-Software and Technologies | **-** | **35** | **User guide should be created at this phase.** |
| | Alpha Testing | -Analysts<br>- Programmers<br>- Testers, | **25** | | |
| | Vulnerability Testing | -Outside Contractors (White hat hackers) - Back-end Programmers | **5** | | **NDA's should be signed for IP.** |
| | System Testing | -Database Programmers<br>-Server Managers, | **10** | | |
| | Beta Testing | Full Development team, focus group | **20** | | **Focus group should be created by a third party.** |
| 4-Deployment | All | -Workstations, Utilities,<br>-software and Technologies | | **18** | |
| | Deploying to app store | -Analysts, Designers,<br>-IOS Programmers | **22** | | |
| | Deploying to play store | -Analysts, Designers, - Android Programmers | **3** | | |
| | Deploying the website | -Analysts, Designers, - Back-end programmers, - Front-end programmers | **10** | | |

## 7.2. Revise plans and estimates to take into account of resource constraints
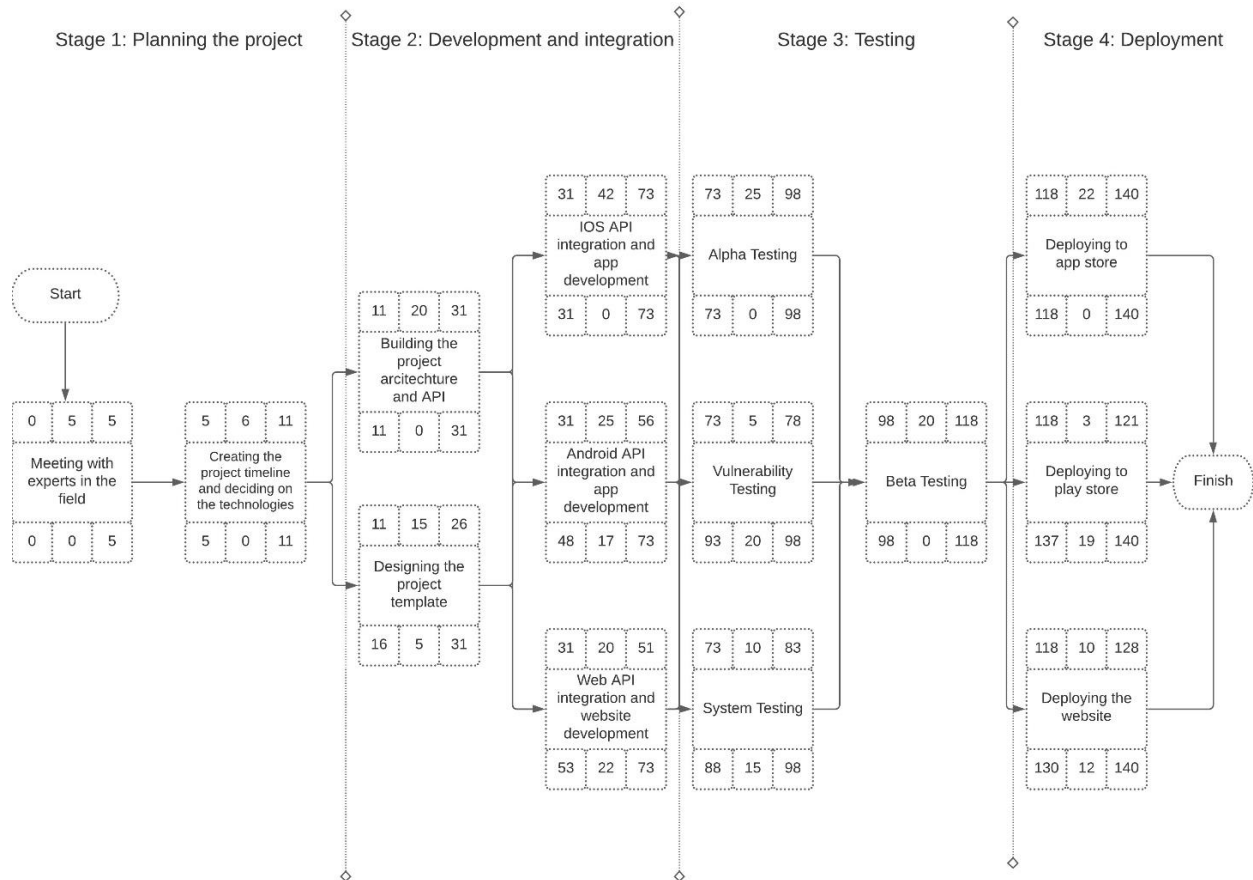


Ideally, there should be a senior designer/analyst and three designers/analysts for each IOS, Android and Website branch of the project. However, due to the challenges App store and the lack of IOS resources compared to web and android development, web and android can share resources without many setbacks.

## 8. Review/publicize plan

### 8.1. Review quality aspects of project plan

**INTERNAL QUALITIES**

- **Effectiveness:** All HTTP requests will be handled through a single API, which will require user tokens that will be created every time they log in. All API methods have been tested for a variety of situations and all calculated bugs have been fixed. Still, there are vast result codes in case of a failure, which the development team can easily identify and solve with haste.

- **Productivity:** All login-related information is stored in Mongo DB to not overstuff the database, which holds the crucial information. API repository and microservice methods are created specifically for each functionality so the database can handle more requests and servers are capable of dealing with more actions so the resources are currently being used to maximum capacity

- **Safety:** Users' information about their ID is not stored in our database, we only check to see if their given information exists in the government's database through an API provided by them. User password is stored as SHA-512 hash, which is one of the most complex hashing methods there is. Only the CTO, Senior Analyst, and Senior Back-end developer will have access to the database once the project is deployed. All HTTP requests will be handled through tokens and all the information transferred through will be encrypted with a private key and whenever a new device will be introduced by a user we will require an SMS code to recognize the device.

**EXTERNAL QUALITIES**

- **Functionality**: Project has multiple functionalities such as scheduling appointments for patients, online prescription for drugs, checking for prescription details, access to patients' medical history, indirect communication with doctors(FAQ page and doctors' notes for patients).

- **Reliability:** The project should not have any trouble in handling traffic in the first few thousand users however since we have the aspiration of countrywide scaling millions of users will be expected, and further functionalities can be added in the future as well. At this stage, more servers should be made readily available and architecture needs to be created in such a way to be made swift changes to the requests.

- **Usability:** Project will have a very simple template, which will lead the users through every functionality through the guide created by the development team.

- **Efficiency:**  Project can be considered extremely efficient because all user has to do is verify their id as a citizenو which everyone is capable of doing it and all the functionalities will be available to them through the application since the alternative to our functionalities involves going to the hospital every time.

- **Maintainability:** All users' relevant information will be linked to their accounts so the system will start to recognize them and every process will get easier with each use.

- **Portability:** Since we have established users information will be linked to their accounts when they switch platforms they will not have any issues with their account information and they will be able to use the functionalities with the same ease.

## 8.2. Document plans and obtain agreement

Short daily Scrum meetings with team members will take hold. This will help everyone stay on the same page. Furthermore, Diagrams for functionalities will be drawn in the testing phase by designers. Tasks will be assigned by senior personnel via emails. All progress and changes during the development and integration phase will be discussed during the daily scrum meetings and will be reported to their seniors via emails. All agreements will be signed by the project manager.