**EGERTON UNIVERSITY**

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**Software Requirement Specification**

**For**

**Hospital Referral Management**

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# 1 Introduction

## 1.1 Purpose

The purpose of this document is to present a detailed description of a Hospital Referral Management System Application. It explains the purpose and features of the application itself, the web interface through which users can access their accounts and manage the referrals, the server that hosts the user accounts, and the constraints that must be satisfied for security purposes. This document is intended for both the customer and the project developer.

## 1.2 Document Convention

The entire document is in Calibri font. The headings are numbered 1,2,3... and so on and sub-headings are numbered x.1, x.2.... and so on. Both headings and sub-headings are in bold.

Main title: Font Calibri and size 14

Sub titles: Font Calibri and size 14

Content: Font Calibri and size 12

## 1.3 Intended Audience and Reading Suggestions

This document is intended for students, professors and developers for reading. It can serve as a good reference material. This system requirement specification contains the functional and non-functional requirements for the Hospital Referral Management System.

## 1.4 Project scope

This Hospital Referral Management System, is used to help patients get referred to facilities with better services. This application will be designed to provide a simple and reliable way to store and convey one’s medical history plus book appointments for specialists. Upon the event of an emergency, medical information would have to be acquired from the patient’s current doctor or family for any informed, safe procedure. HRM would alleviate the need to track down this medical history because it would be readily available. Doctors would be able to add information to the patient’s HRM account at anytime, including at an appointment, with the patient’s consent.

More specifically HRM will contain extensive documentation of the hospitals medical records, which can be authored by the hospital record management or the owner’s healthcare provider(s). This includes diagnoses, treatments, medications, allergies, and medical procedures. HRM would allow for uniform communication of information between the patient and their respective doctor(s). The software would label and organize information authored by health care providers separately from information authored by the patient to maintain authenticity.

# Overall description

## Product perspective

HRM is a new system meant to help the referral of patients from one hospital to another. It is comprised of the online appointment request, patient educational material, hospital registration and patient registration.

## 2.2 Product features

The HRM is aimed to perform the online appointment to hospitals the patients are referred to. Manage the patient medical history to ease the diagnosis. Track the treatment of the patient and also provide the patient educational materials explaining the procedures the patient will have to undergo. Also, it helps to calculate the costs incurred.

## 2.3 User problem statement

The user is expected to be familiar with either the smartphone, laptop, tablet or desktop computer as well as perform basic navigational, input and image uploading operations on the device.

The Web Users are expected to be Internet literate, understand how to navigate around a web page and perform conceptual tasks such as logging into a secure account, uploading pictures, and inputting data into specified fields. The technical expertise of the system is little as well the experience is none.

## 2.4 User Objectives

1. The system should be able to perform the following tasks by users.
2. Refer patients to other medical facilities.
3. View the patient medical history.
4. View the patient material providing the explanation of procedures the patient will undergo.
5. Upload and update the medical history.

## 2.5 Operating Environment

HRM should operate on both Linux, windows and MacOS. Accessed by users on web browsers when connected over the internet

## 2.6 Design and Implementation Constraints

HRM requires a connection for full functionality of the application. If a connection is lost during an active session the outcome may result in viewing only the data the application has currently downloaded on the physical device. Full functionality of the application will resume upon reconnection.

## 2.7 User documentation

Upon the completion the users will be provided with:

1. User manual
2. Online help on the system user interface
3. Tutorials on how to navigate the system
4. Search box for searching anything from the system.

## 2.8 Assumptions and Dependencies

HRM assumes that there will be a database of medical records of patients and hospital information plus the departments hosted by a server. The server assumes it will be installed with a high-speed Internet connection to communicate with HRM users. The software being developed assumes that the users have either laptop, desktop computer or a smartphone with access to the Internet from either a cellular or Wi-Fi connection to establish a connection between the application and the record repository. Full functionality of HRM will depend on the availability of an Internet connection. The web version HRM will run on the user’s computer. The use of this web-based application will completely depend on an Internet connection.

## 2.9 User Constraints

1. The users are assumed to have basic knowledge of the computers and Internet browsing.
2. The Organization’s information security system must be compatible with the Internet applications. This System is connected to the Organization’s computer and is running all 24 hours a day.
3. The administrators of the system to have more knowledge of the internals of the system and is able to rectify the small problems that may arise due to disk crashes, power failures and other catastrophes to maintain the system.
4. The proper user interface, user’s manual, online help and the guide to install and maintain the system must be sufficient to educate the users on how to use the system without any problems.
5. The users must have their correct usernames and passwords to enter into the System
6. The users of the system are Employees, Supervisors/managers and the administrators who maintain the system.
7. The information of all the users must be stored in a database that is accessible by this Online Staff Performance Appraisal and Review System.

# SYSTEM FEATURES

## 3.1. Registration of patient and hospital facilities

### 3.1.1. Description and Priority

This is a High priority feature that is used for registering patients and hospital facilities into the system

### 3.1.2. Stimulus/Response Sequences

1. The URL for the application is typed in the browser tab
2. A landing page appears and the hospital administrator has to choose the register patient or the register hospital.
3. Once the button is clicked, a form appears requiring the user to input the values.
4. A submit button is clicked to send the data to the database.

### 3.1.3. Functional Requirements

1. REQ-1: All the inputs should be filled. The system should not permit null values. A flash message is printed on the window.
2. REQ-2: A valid email address should be fed into the system: ([name@xxx.com](mailto:name@xxx.com)) is permitted.

### 3.1.4. Technical Issues

1. The connection between the system and the underlying database should be established first.
2. Stable internet is required for the registration to go through.

### 3.1.5. Dependencies with other requirements.

Depends on a well-established internet connection.

## 3.2. Patient record update

### 3.2.1. Description and Priority

The patient diagnosis report is added to the system. It includes the upload of x-ray scans and images of patients.

### 3.2.2. Stimulus/Response Sequences

1. The doctor clicks the update patient record.
2. A form appears requiring the personnel to fill in the diagnosis report.
3. Determines whether the patient has to be referred for further treatment or retained in the hospital.

### 3.2.3. Functional Requirements

REQ-1: the doctor should be registered and must be logged in to access the update feature.

### 3.2.4. Technical Issues.

The patient details should be in the database.

### 3.2.5. Dependencies with other requirements

Patient and hospital details should be registered first in the system.

## 3.3. Patient referral

### 3.3.1. Description and priority

This feature has the highest priority. It is the main feature for the system. Since the core purpose for the system is to facilitate the referral of patients. Once the patient requires further medical attention, the feature is used to locate the most suitable hospital with the facilities required.

### 3.3.2. Stimulus/Response Sequences

Once a referral button is clicked, a form appears requesting for the input of the patient condition.

The personnel in charge enters the desired input.

The hospitals are thus listed in the order depending on the distance from the lower level hospital, costs involved (low cost higher priority) and the hospital with the readily available space.

### 3.3.3. Functional Requirements

1. REQ-1 All hospital details including the services offered must be present in the database.
2. REQ-2 The patient condition to be addressed should be a service being offered in the hospital to be referred in.

### 3.3.4. Technical Issues

The hospital details should be up to date for proper decision to be made.

### 3.2.5. Dependencies with other requirements

This requirement depends on the availability of internet connection and presence of the information necessary for the process readily available in the system.

# 4. External Interface Requirements

## 4.1 User Interfaces

This section describes what the users will use to interact with the system. The user interface will be designed to be compatible to all the web browsers e.g. Mozilla, chrome, edge, safari etc. Icons, buttons, forms, checkboxes, tables and scroll bars will be used for event handling.

HTML is used to define how the screen with contents should look like. Java script will handle the responsiveness of the web pages. The font family used is product-sans.

The following are the screens for the HRM system.

|  |  |
| --- | --- |
| Screen name | Description |
| Sign in | Logging into the system |
| Register | Registration of the patient and the hospital |
| Patient | Updating the records and viewing of patient medical history |
| Referral | Referral process including the booking for appointment |
| Staff | Viewing the appointments. |

## 4.2. Hardware Interfaces

The system will not directly interact with the hardware components. It is located on the application layer.

## 4.3. Software Interface

This system is developed in Golang. Go compiler is required to compile the source code. Beego framework for facilitating the MVC application development.

The system has to sit on the server operating system for it to run. This is to help communication between the application and the hardware. A development database will be hosted locally (using MySQL); the production database is hosted centrally (using Oracle).

## 4.4. Communication Interfaces

HTTP protocol is used for sending requests from the browsers to and fro the server.

Web browsers are used for sending client requests and receiving server responses back to the user.

The system post is 8080.

Using the cellular service provider, the application accesses the internet to retrieve and post information. This application uses internet protocol to direct packets to a specific computer or server.

# 5. Other Nonfunctional Requirements

## 5.1. Performance Requirements

* There is no restriction on the number of the users to be added to the database.
* Queries shall return results within five seconds
* The log in information shall be verified within five seconds.
* The system shall consume very little of primary memory
* The number of the online user of the HRMS can be estimated as 50 at most.
* The load time for user interface screens shall take no longer than two seconds.

## 5.2. Safety Requirements

The patient reports are only accessed to the doctor in charge and the patient himself.

## 5.3. Security Requirements

To conduct the referral process you have to be logged into the system using a username and a password.

A patient is also provided with credentials for interacting with the system when viewing the medical history.

Passwords stored into the database are hashed.

## 5.4 Software Quality Attributes

### 5.4.1 Standards Compliance

There shall be consistency in variable names within the system. The graphical user interface shall have a consistent look and feel.

### 5.4.2 Adaptability

This is the ability of the software to be able to adapt to different, specified environment without providing any extra means other than those provided for this purpose. The application should not be affected by whichever application programming interface it is running on Linux, windows or MacOS operating system

### 5.4.3 Reliability

Specify the factors required to establish the required reliability of the software system at time of delivery.

### 5.4.4 Availability

The system shall be available throughout the time.

### 5.4.5 Testability

This system is easily tested. This means that there is a minimal error rate since validation and testing goes on in every step of development cycle. Also, error correction happens only when an error is detected. MVC (model view controller) method of development is used thus error correction is easier.

### 5.4.6 Maintainability

The Online Staff Appraisal System is being developed in Golang that is easy to maintain.

## 6. Preliminary Object-Oriented Domain Analysis

### 6.1 Inheritance relationships

Authentication

Department

Services

Hospital

Employee

Account

Patient

Referral

## 6.2 User Classes and Characteristics

### 6.2.1 Abstract or Concrete

The abstract classes for the system are the authentication and account.

The concrete class includes the hospital, service and employee.

### 6.2.2 List of Super classes

The following are the super classes for the HRM system.

1. Employee
2. Hospital
3. Referral
4. Patient

### 6.2.3 List of subclasses

The following are the sub classes for the HRM system.

1. Service
2. Department

### 6.2.4 Purpose

1. Authentication: Handles the log in and sign out of the system.
2. Patient: Contains the methods for the activities done by the patient, that is; viewing of medical history.
3. Hospital: For employee and department management.
4. Employee: For updating the medical reports for the patient and referral of patients.
5. Account: For the patient, hospital and employee registration details
6. Services: For holding the details of kind of services being offered by the hospital.
7. Department: For management of employees and services.
8. Referral: For handling the referrals.

### 6.2.5 Attributes

The attributes for the system include the details of the patient, employee and hospital.

They describe the characteristics of the classes described by the HRM.

### 6.2.7 Operations

The operations include:

1. Sign up
2. Sign out
3. Referral
4. Viewing of medical history
5. Updating the medical reports.

## 7. Preliminary Budget and Schedule

This chapter highlights the projected budget and the outlined schedule for the development of the HRM system.

### 7.1 Budget

Table 1 below shows the budget estimated for the software development of HRM system.

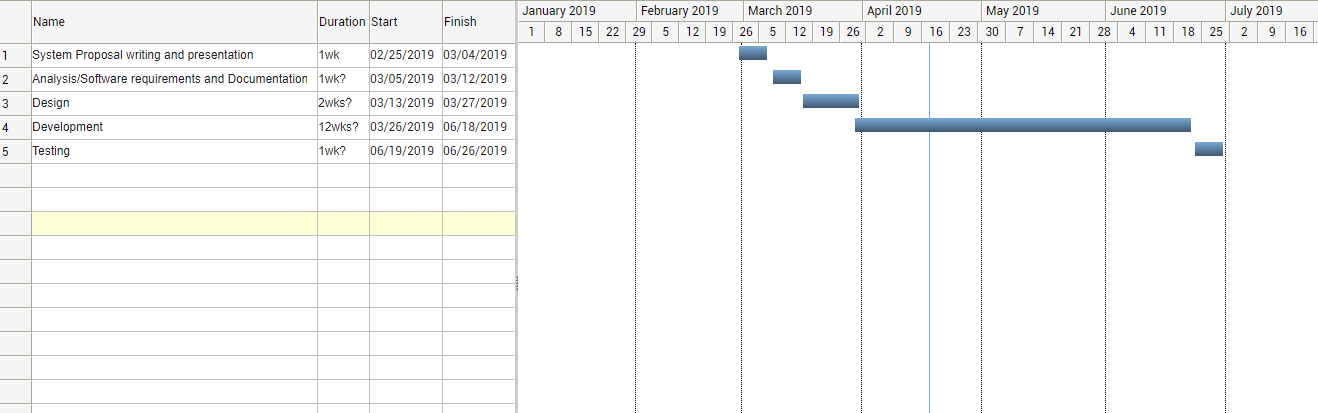
Table 1 Budget

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| List of Items | Quantity | | Cost | Total |
| Laptop | 1 | | 40000 | Ksh. 60,000 |
| Safaricom Modem | 1 | | 2000 | Ksh. 2000 |
| Safaricom bandwidth | 50GB | | 500 | Ksh. 25,000 |
| 64GB flash disk | 1 | | 4000 | Ksh. 4000 |
| Document Printing | 5 | | 500 | Ksh. 2500 |
| Total | Ksh. 93,500 |

### 7.2. Schedule

This topic deals with schedules and budgets needed to develop the project.

The figure below shows the system development with the approximate number of days and dates.



## 8. Other requirements

There are no other requirements for this system.

### 8.1. References

The following are the references used for this system.

1. Harrison, R., Flood, D. &Duce, D. J Interact Sci (2013) *Usability of web applications: literature review and rationale for a new usability model*- retrieved from

[https://doi.org/10.1186/2194-0827-1-1](https://doi.org/10.1186/2194-0827-1-1%20accessed%20on%2022/02/2018)

1. The Economic times (2018) *Portability testing* -retrieved from https://economictimes.indiatimes.com/definition/portability-testing accessed on 22/02/2018

### .2. Appendix A: Glossary of definitions, Acronyms and abbreviations

HRM – Hospital Referral Management

IDE – Integrated Development Environment