Software Requirements Specification

For

Electronic Health Record (EHR)

Version 1.0 (not approved yet)

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose of the document

The document is to build **EHR system** to store the diagnostic and therapeutic data of patients for easy tracking. The document determines functional and non-functional requirements and provides a general description of the system with UML models.

1.2 Document Conventions

This document uses the following conventions:

EHR	Electronic Health Record
UML	Unified Modeling Language
EMR	Electronic Medical Record
ICD	International Classification of Diseases

1.3 Intended Audience and Reading Suggestions

This project is a prototype for **EHR system**. This has been implemented under the guidance of college professors (Dr. Hossam Eladly and Dr. Hebatullah Rashed). This project is useful for the health facilities and as well as to the patients.

1.4 Project Scope

The purpose of **EHR system** is to create a convenient and easy-to-use application for health facilities and patients where **EHR** is repository of patient data in digital form, stored and exchanged securely, and accessible by multiple authorized users.

The system is based on a relational database. We will have a database server supporting thousands of health facilities around the country. Above all, we hope to provide a comfortable user experience along with support continuous, efficient, and quality integrated health.

1.5 Actors Including in The Application

Name	Description
Our Team	- Builds, maintains, updates, checking errors of software
System Managers	- An official assigned by the Egyptian Ministry of Health
Health Facilities Administrators	- Administrator assigned by the system manager - Responsible for registering health facilities
Health Facility Administrator	- Administrator assigned by the Health Facilities Administrators
Health Facility Manager	- The manager of the health facility in real-life
Physician	- The treating physician in hospitals, clinics, medical centers, radiology centers, and/or medical laboratories

Nurse	- A person trained to care for the sick or infirm.
Pharmacist	- A person who is professionally qualified to prepare and dispense medicinal drugs
Patient	- A person whose medical and treatment history will be recorded in the system
Insurance Organization Administrator	- A person who sees the treatment data of the employees of the organization

Table 1: Actors including in the application

1.6 References

- https://docs.google.com/presentation/d/19ENYXFftI9KZTaZeML2KGzieHRr7-t0u/edit?usp=sharing&ouid=118028005345112314012&rtpof=true&sd=true

2. Overall Description

2.1 Product Perspective

- EHR system is a **web-based system** implementing **client-server model**. It provides simple mechanism for users to share the patient data.

- EHR system is a new, self-contained product that organizations can use without having their own system, such as electronic medical record (EMR). It will also provide a set of APIs that can be combined with other systems if organizations have their own systems.

- The following are the main features that are included in EHR system:

  1. Registration of medical facilities and the medical staff of each facility.

  2. Recording the patient's basic data, vaccinations, allergies, medical history (before registering the patient on the system), medications, chronic diseases, and medical history of his family.

  3. Recording of the patient's surgeries, including progress notes, radiographs, laboratories, medications, etc.

  4. Recording of the patient's visits, including radiographs, laboratories, medications, etc.

  5. Enabling health facilities to upload test results and bills.
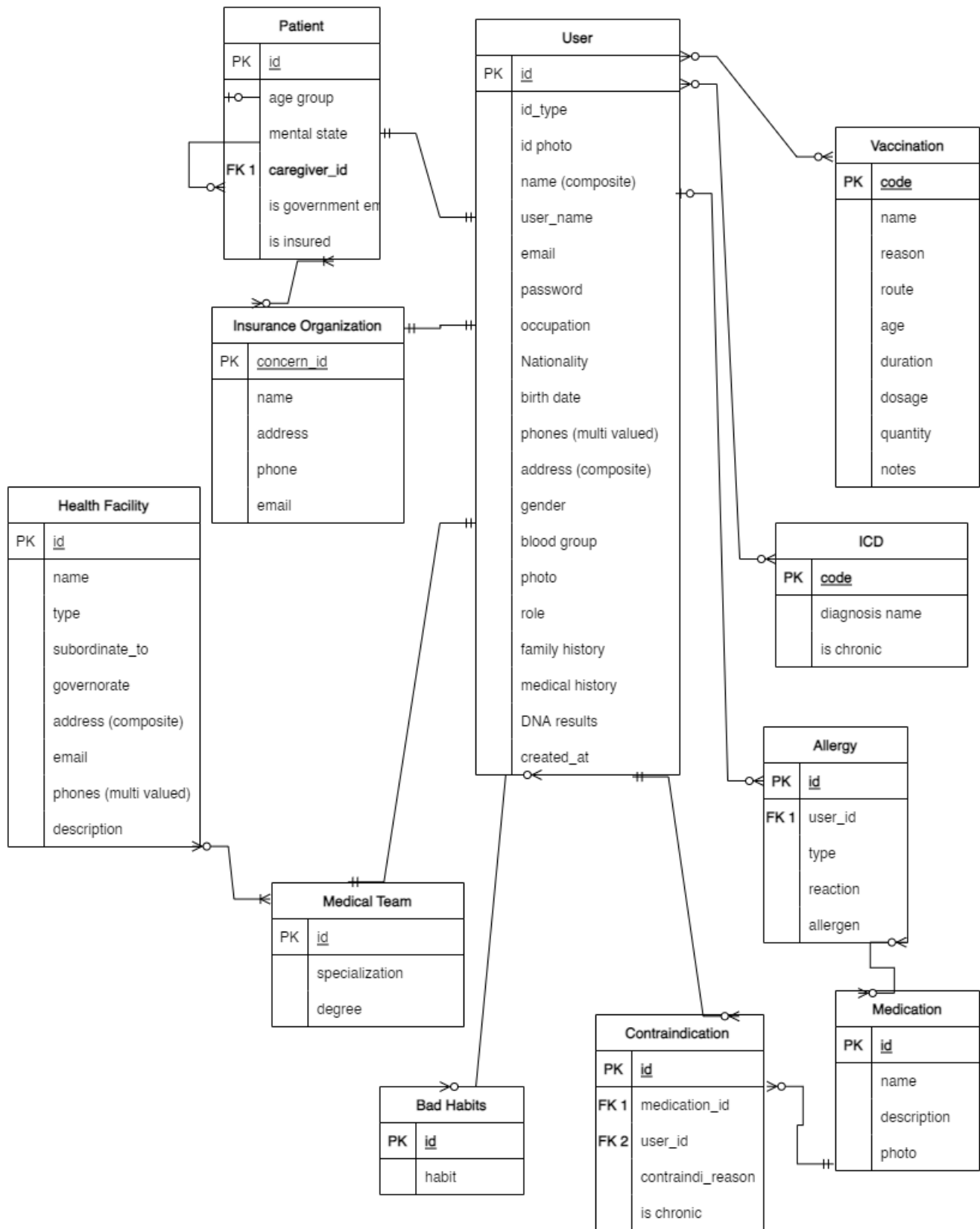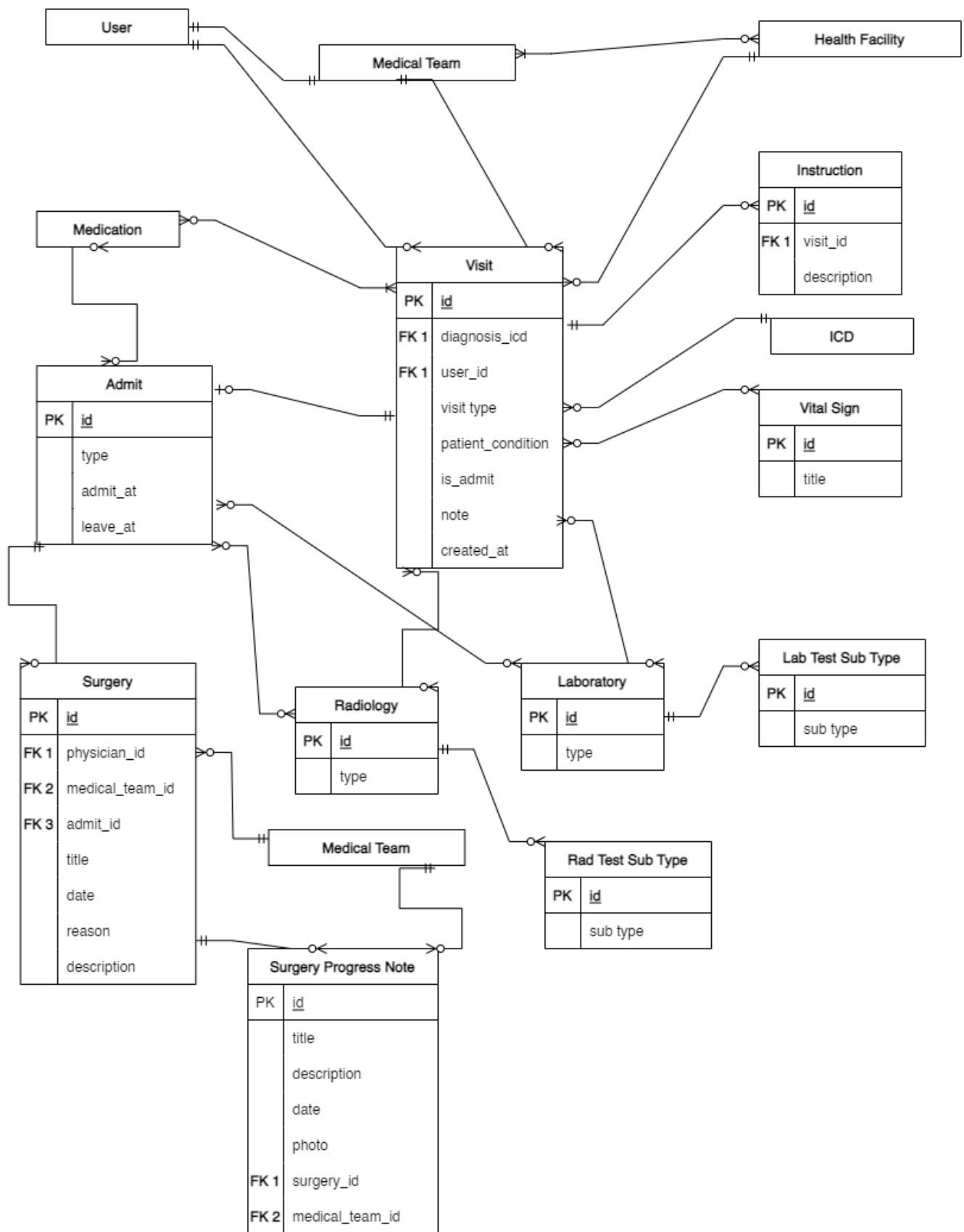
2.2 Product Features

Fig 1: ERD Part 1

Fig 2: ERD Part 2

2.3 User Classes and Characteristics

The system will support nine types of users **System Managers**, **Health Facilities Administrators**, **Health Facility Administrator**, **Health Facility Manager**, **Physician**, **Nurse**, **Pharmacist**, **Patient**, and **Insurance Organization Administrator**.

The System Managers should be able to do the following functions:
1. Registering the **Health Facilities Administrators**.
2. Search for any data in the system.

The Health Facilities Administrators should be able to do the following functions:
1. Registering and modifying the data of health facilities.
2. Registering the **Health Facility Administrator** for each health facility.
3. Searching the data of medical facilities and the medical staff working in them.

The Health Facility Administrator should be able to do the following functions:
1. Registering the health staff of the health facility.
2. Search for any data related to the health facility he is responsible for.

The Health Facility Manager should be able to do the following functions:
1. Registering any data related to patients.
2. Search for any data related to the health facility.
3. Search for any data related to the patients.

The Physician should be able to do the following functions:
1. Registering data related to patients, according to his specialty.
2. Search for any data related to the patients.

The Nurse should be able to do the following functions:
1. Registering basic data, chronic diseases, allergies, and bad habits of patients.
2. Upload results documents and bills.
3. Search for any data related to the patients' laboratory and radiology.

The Pharmacist should be able to do the following functions:
1. Upload bills of patients' medicines.

The Patient should be able to do the following functions:
1. Registering basic data, chronic diseases, allergies, and bad habits.
2. Search for basic data related to the health facilities and its medical teams.

The Insurance Organization Administrator should be able to do the following functions:
1. Registering basic data of organization.
2. Search for the treatment data of the employees of the organization.

2.4 Design and Implementation Constraints

- **Client/Server System**
- **Internet Connection**
- **Operating system:** Windows, Linux, or MAC.
- **Database:** SQL Server *[During Development]*
- **Frameworks:** asp.net core and React.js
- **Programming Languages:** C# and JavaScript

3. SYSTEM FEATURES

3.1 Description and Priority

The **EHR system** maintains information on diagnostic and therapeutic data of patients for easy tracking, patients' data, health facilities data, health teams' data, medications, allergies, vaccination, and surgeries.

Of course, this project has a high priority because it is no secret to anyone that the problem that exists today in our country, which is the difficulty of tracking the patients' medical and therapeutic history because of the scattering of diagnostic and therapeutic data for patients.

3.2 Functional Requirements

Manage Users Personal Data [MUPD]

Requirement ID	Description
1. MUPD	The system must allow the <u>System Managers</u> to register or update the Health Facilities Administrator.
2. MUPD	The system must allow the <u>Health Facilities Administrators</u> to register or update the Health Facility Administrator
3. MUPD	The system must allow the <u>Health Facility Administrator</u> to register or update the health staff of the health facility
4. MUPD	The system must allow the <u>Health Facility Manager</u> to register or update the personal data of patients
5. MUPD	The system must allow the <u>Physician</u> to register or update the personal data of patients
6. MUPD	The system must allow the <u>Nurse</u> to register or update the personal data of patients
7. MUPD	The system must allow the <u>Patient</u> to register or update his personal data
8. MUPD	The system must allow the <u>Insurance Organization Administrator</u> to register or update his personal data

Table 2 Functional Requirement of Manage Users Personal Data

Manage Users Vaccinations [MUV]

Requirement ID	Description
1. MUV	The system must allow the <u>Physician</u> to register the Vaccinations of users

Table 3 Functional Requirement of Manage Users Vaccinations

Manage Users Chronic Disease [MUCD]

Requirement ID	Description
1. MUCD	The system must allow the <u>User</u> to register his chronic diseases and medications assigned for it.
2. MUCD	The system must allow the <u>Physician</u> to register the user chronic diseases and medications assigned for it
3. MUCD	The system must allow the <u>Nurse</u> to register the user chronic diseases and medications assigned for it

Table 4 Functional Requirement of Manage Users Chronic Disease

Manage Users Allergies [MUA]

Requirement ID	Description
1. MUA	The system must allow the <u>User</u> to register his allergies and medications assigned for it.
2. MUA	The system must allow the <u>Physician</u> to register the user allergies and medications assigned for it
3. MUA	The system must allow the <u>Nurse</u> to register the user allergies and medications assigned for it

Table 5 Functional Requirement of Manage Users Allergies

Manage Users Bad Habits [MUBA]

Requirement ID	Description
1. MUBA	The system must allow the <u>User</u> to register his bad habits.
2. MUBA	The system must allow the <u>Physician</u> to register the bad habits of user
3. MUBA	The system must allow the <u>Nurse</u> to register the bad habits of user

Table 6 Functional Requirement of Manage Users Bad Habits

Manage ICD Data [MID]

Requirement ID	Description
1. MID	The system must allow the <u>Physician</u> to register ICD data.

Table 7 Functional Requirement of Manage ICD Data

Manage Contraindication Data [MCD]

Requirement ID	Description
1. MCD	The system must allow the <u>Physician</u> to register Contraindication data.

Table 8 Functional Requirement of Manage Contraindication Data

Manage Health Facility [MHF]

Requirement ID	Description
1. MHF	The system must allow the <u>Health Facilities Administrators</u> to register health facility data.
2. MHF	The system must allow the <u>Health Facilities Administrators</u> to modify health facility data.
3. MUBA	The system must allow the <u>Nurse</u> to register the bad habits of user

Table 9 Functional Requirement of Manage Users Bad Habits

Manage Health Facility [MHF]

Requirement ID	Description
1. MHF	The system must allow the <u>Health Facilities Administrators</u> to register health facility data.
2. MHF	The system must allow the <u>Health Facilities Administrators</u> to modify health facility data.

Table 10 Functional Requirement of Manage Health Facility

Manage User Visit [MUV]

Requirement ID	Description
1. MUV	The system must allow the <u>Physician</u> to register patients' visits and associated instructions, vital signs, laboratories, and radiology.
2. MUV	The system must allow the <u>Physician</u> to determine if the patient needs to be placed under observation

Table 11 Functional Requirement of Manage Users Visit

Manage User Admit [MUA]

Requirement ID	Description
1. MUA	The system must allow the <u>Physician</u> to register the patients' surgeries that based on patients' visits and associated progresses notes.

Table 12 Functional Requirement of Manage Users Admit

Manage User Laboratory Results [MULR]

Requirement ID	Description
1. MULR	The system must allow the <u>Physician</u> to upload the patients' laboratory results and bills if he works in a facility specializes in medical laboratory.
2. MULR	The system must allow the <u>Nurse</u> to upload the patients' laboratory results and bills if he works in a facility specializes in medical laboratory.

Table 13 Functional Requirement of Manage Users Laboratory Results

Manage User Radiology Results [MURR]

Requirement ID	Description
1. MURR	The system must allow the <u>Physician</u> to upload the patients' Radiology results and bills if he works in a facility specializes in medical radiology.
2. MURR	The system must allow the <u>Nurse</u> to upload the patients' Radiology results and bills if he works in a facility specializes in medical radiology.

Table 14 Functional Requirement of Manage Users Radiology Results

Manage User Medication Purchases [MUMP]

Requirement ID	Description
1. MUMP	The system must allow the <u>Pharmacist</u> to the upload patients' medication purchases.

Table 15 Functional Requirement of Manage Users Medication Purchases