Innopolis University
HOSPITAL MANAGEMENT SYSTEM
PHASE II: DOMAIN DESCRIPTION

Data Modelling and Database I, Fall 2019

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SYSTEM OVERVIEW:

The project Hospital Management system includes registration of patients, storing their details into the system, and also computerized billing in the pharmacy, and labs. The software has the facility to give a unique id for every patient and stores the details of every patient and the staff automatically. It includes a search facility to know the current status of each room. Users can search the availability of a doctor and the details of a patient using the id.

The Hospital Management System can be entered using a username and password. It is accessible either by an administrator or receptionist. Only they can add data to the database. The data can be retrieved easily. The interface is very user-friendly. The data are well protected for personal use and makes the data processing very fast.

The purpose of the project entitled as “HOSPITAL MANAGEMENT SYSTEM” is to computerize the Front Office Management of Hospital to develop software which is user-friendly, simple, and fast. It deals with the collection of patient’s information, diagnosis details, etc.

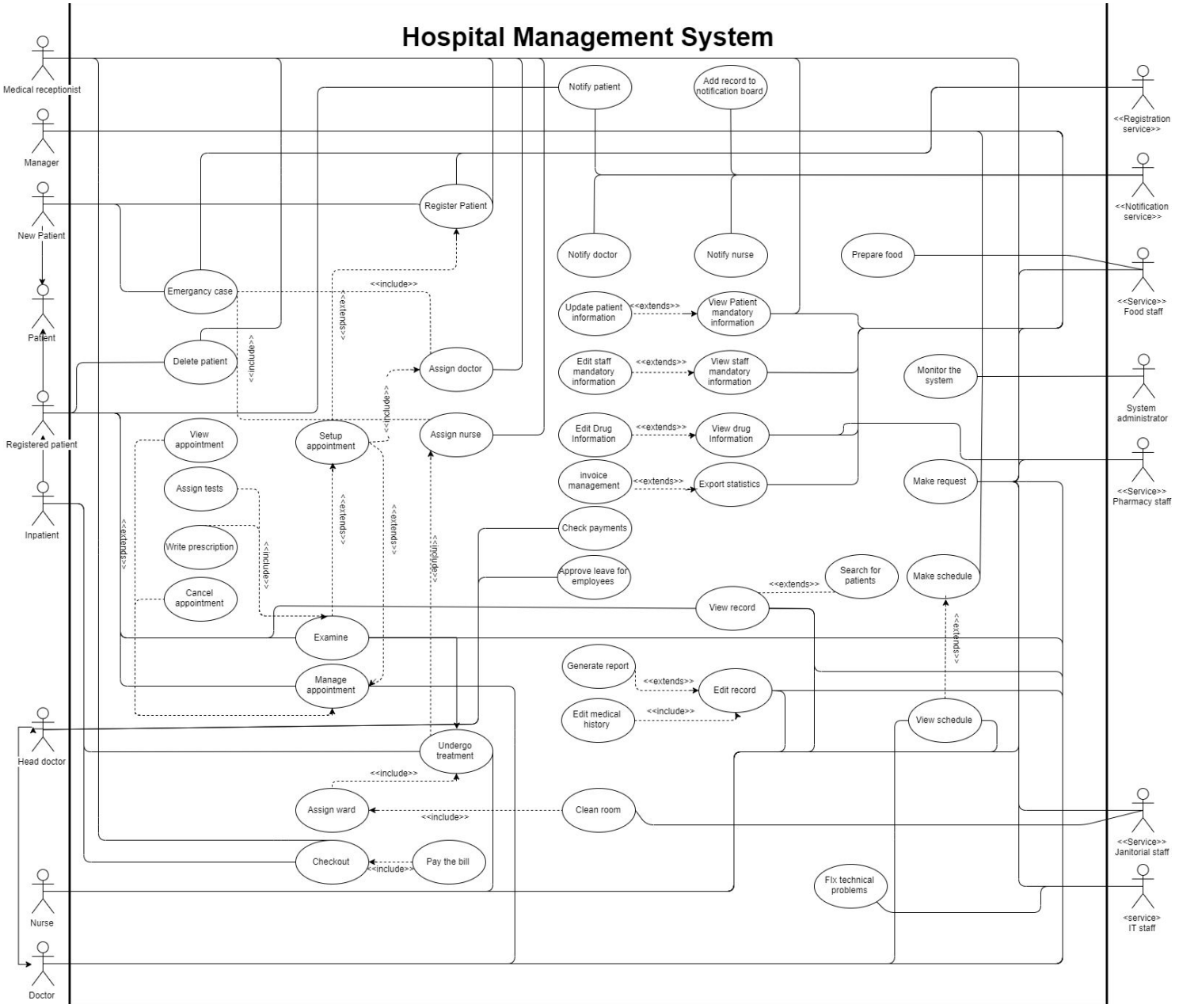
The main function of the system is to register and store patient details and doctor details and retrieve these details as and when required, and also to manipulate these details meaningfully System input contains patient details, diagnosis details

ADVANTAGES:

- It is fast, efficient and reliable
- Avoids data redundancy and inconsistency
- Very user-friendly
- Easy accessibility of data
- Number of personnel required is considerably less
- Provides more security and integrity to data

I. Use-case diagram:

[Link to Draw.io]



II. Functional Requirements:

Requirement ID	F-REQ01
Title	**System should allow receptionist to register a patient**
Type	Functional
Description	System, in particular, registration service allows receptionist to add patients to the system in case of record loss or hospital change
Priority	1
Risk	C

Requirement ID	F-REQ02
Title	**System should oblige users to obey input restriction**
Type	Functional
Description	System must prevent user from supplying malicious input when login and editing to protect the system from attacks (such as SQL injection).
Priority	1
Risk	C

Requirement ID	F-REQ04
Title	**System should allow doctors and patients to set up, edit or/and cancel an appointment**
Type	F-REQ05
Description	System allows doctors and patients to select date and time and set up an appointment and edit or cancel it in the future
Priority	1
Risk	C

Requirement ID	F-REQ06
Title	**System should generate patient's reports**
Type	Functional
Description	System shall generate patient's situation report when requested by manager or medical staff.
Priority	1
Risk	C

Requirement ID	F-REQ07
Title	**System should allow the manager and patient to view and edit patient mandatory information**
Type	Functional
Description	View and edit mandatory information for each patient: patient id, first name, last name, phone number, address, personal health number.
Priority	1
Risk	C

Requirement ID	F-REQ08
Title	**System should allow the manager to view and edit staff mandatory information**
Type	Functional
Description	View and edit mandatory information for each staff: identification number, first name, last name, phone number, address, position, schedule.
Priority	1
Risk	C

Requirement ID	F-REQ09
Title	**System should allow manager and pharmacy staff to view drug information**
Type	Functional
Description	View mandatory information for each drug: identification number, manufacturer, name, import date, expiration date, quantity.
Priority	1
Risk	C

Requirement ID	F-REQ11
Title	**System should allow pharmacy staff and manager to edit drug information**
Type	Functional
Description	Pharmacy staff and manager could edit drug's identification number, manufacturer, name, import date, expiration date, quantity.
Priority	1
Risk	C

Requirement ID	NF-REQ01
Title	**System shouldn't be unavailable for more the 6 hours**
Type	Non-Functional
Description	Any technical issue with the system should be solved maximum in 6 hours
Priority	1
Risk	C

Requirement ID	F-REQ14
Title	**System should ask user for confirmation for dangerous action**
Type	Functional
Description	System should ask user for verifying danger action such as deleting or editing information to avoid human errors.
Priority	1
Risk	H

Requirement ID	F-REQ16
Title	**System should allow user to log in**
Type	Functional
Description	User using the system must have a login Id and password.
Priority	1
Risk	H

Requirement ID	F-REQ17
Title	**System should allow medical receptionist to assign a doctor to the patient**
Type	Functional
Description	System allows a receptionist to assign a doctor to a given patient. Also, the system can assign an available suitable doctor to a patient automatically.
Priority	1
Risk	H

Requirement ID	F-REQ18
Title	**System should allow medical receptionist and the assigned doctor to assign a nurse to the patient**
Type	Functional
Description	System allows receptionist and the assigned doctor to assign a nurse to a given patient. Also, the system can assign an available suitable nurse to a patient automatically.
Priority	1
Risk	H

Requirement ID	F-REQ19
Title	**System should allow doctor and nurse to edit medical history of the patient**
Type	Functional
Description	Doctor and nurse can edit medical history of the patient
Priority	1
Risk	H

Requirement ID	F-REQ20
Title	**System should allow doctor to assign tests to patients**
Type	Functional
Description	Doctors may assign tests for registered patients or inpatients on the appointment in order to make a diagnosis.
Priority	1
Risk	H

Requirement ID	NF-REQ02
Title	**System should back-up every 24 hours**
Type	Non-Functional
Description	System is able to back-up the data every 24 hours so that it can recover in case of disaster situation.
Priority	1
Risk	H

Requirement ID	F-REQ24
Title	**System should allow medical staff to see their schedule**
Type	Functional
Description	Doctors and nurses should be able to see their schedule of the work via the system on the notification board
Priority	2
Risk	H

Requirement ID	F-REQ25
Title	**System should allow employees to make requests**
Type	Functional
Description	Employees can make any type of request, technical problems or ordering food.
Priority	2
Risk	H

Requirement ID	F-REQ26
Title	**System should be able to assign wards to patients**
Type	Functional
Description	Patients who need treatment in a hospital should be assigned to wards.
Priority	2
Risk	H

Requirement ID	NF-REQ03
Title	**System should have a response time less than 1 second**
Type	Non-Functional
Description	System shall give responses in 1s after checking patient’s information.
Priority	2
Risk	H

Requirement ID	F-REQ27
Title	**System should export financial statistics**
Type	Functional
Description	The system will calculate the outlays in the hospital.
Priority	1
Risk	M

Requirement ID	F-REQ28
Title	**System should allow users to view their appointment's information.**
Type	Functional
Description	Doctors and patients can view their appointments, and know where and when they should be.
Priority	2
Risk	M

Requirement ID	F-REQ29
Title	**System should keep track of patient's checkout**
Type	Functional
Description	After getting treatment patients check out from the hospital.
Priority	2
Risk	M

Requirement ID	F-REQ30
Title	**System should allow medical staff and patients to search for patient's information**
Type	Functional
Description	Medical staff, a manager and the patient can search for patient's information.
Priority	2
Risk	M

Requirement ID	F-REQ31
Title	**System should inform doctor about new patients and consultations**
Type	Functional
Description	Notification service shall inform doctors of new patients and consultations using notifications.
Priority	2
Risk	M

Requirement ID	F-REQ32
Title	**System should inform nurse about new patients**
Type	Functional
Description	Notification service shall inform nurses of new patients using notifications.
Priority	2
Risk	M

Requirement ID	F-REQ33
Title	**System should inform patient**
Type	Functional
Description	Notification service shall inform patients of new consultations and test results status using notifications.
Priority	2
Risk	M

Requirement ID	F-REQ34
Title	**System should deal with emergency cases**
Type	Functional
Description	A receptionist uses the registration service to assign an emergency room, doctor and nurse to patients in critical state immediately.
Priority	2
Risk	M

Requirement ID	F-REQ35
Title	**System should allow doctors to view and edit patient record**
Type	Functional
Description	Doctor can check and edit the records of the patient
Priority	2
Risk	M

Requirement ID	F-REQ36
Title	**System should record all errors and bug reports**
Type	Functional
Description	All errors and bug reports must be recorded.
Priority	2
Risk	M

Requirement ID	F-REQ37
Title	**System should be reusable**
Type	Functional
Description	Implement simple, independent code modules that are reusable.
Priority	2
Risk	M

Requirement ID	F-REQ38
Title	**System should allow doctor to write prescription**
Type	Functional
Description	Doctors use the system to write a prescription for the patient and save it in history
Priority	2
Risk	M

Requirement ID	F-REQ39
Title	**System should manage invoices**
Type	Functional
Description	Expenses are managed automatically by the system and economical documents are generated
Priority	2
Risk	M

Requirement ID	F-REQ40
Title	**System should manage notification board**
Type	Functional
Description	Notification service adds new record to the notification board every time a new appointment is set up, schedule is changed, emergency case occurs
Priority	2
Risk	M

Requirement ID	NF-REQ04
Title	**System should support multi-users upto 1000**
Type	Non-Functional
Description	System must support upto 1000 people at a time since the average number of full-time staff (200-299 bed hospital) is around 1000.
Priority	2
Risk	M

Requirement ID	F-REQ41
Title	**System should allow head doctor to approve leave for employees**
Type	Functional
Description	Head doctor can dismiss employees
Priority	3
Risk	L

Requirement ID	F-REQ42
Title	**System should keep track of fixing technical problems**
Type	Functional
Description	IT staff should be notified about problems related to the technical part and they should fix them timely
Priority	3
Risk	L

Requirement ID	F-REQ43
Title	**System should allow receptionist to delete patient**
Type	Functional
Description	Receptionist uses the system to delete patient from the database when he/she is not going to take treatment from the hospital anymore
Priority	3
Risk	L

III. Entity-Relationship Model

1. Description:

Manager, Doctor, Nurse, Receptionist, and Janitor are a strong entities because they are humans and their existence doesn't depend on any other entity. They have attributes: (ID, Salary, and Personal Information), also Patient, ward and Medicine because their existence is not conditional.

Patients' entities are created when they sign up their information in the hospital system by the receptionist. A patient can book an appointment with a doctor, creating an appointment object. The patient selects a date, time, and the doctor. The appointment is a weak entity.

After the patient visits the doctor in the appointed time, the doctor "EXAMINE" the Patient and "MAKE" a Report describing their diagnosis and optionally the prescription and "ASSIGN_TESTS". The report cannot be written without a doctor or a patient for whom it is written, so it is a weak entity depending on those two other entities. A Record needs to have exactly one patient, but a patient may have many doctor that may add to the reports. The report will include an invoice with the amount the patient has to pay, taking into account the price for the doctor, the medicine given by the hospital, this is why Record, Appointment, and Treatment are weak entities because they all depend on the Patient.

Doctors, Nurses, and Receptionist, and Janitor can view their Schedule that can be changed by the Manager. Therefore, Schedule is also a weak entity.

Wards has a Nurse "RESPONSIBLE_FOR" it, and a Janitor who "CLEAN" it.

Authentication, notifications, and private messaging are implemented in separate systems, and are therefore not in this database.

2. Diagram:

   Link: https://drive.google.com/file/d/17Bj_Z_LgwdhynIBjyW6EKeLwVLjNbeds/view?usp=sharing