SOFTWARE ENGINNERING PRACTICAL FILE.

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INDEX

EXPERIMENT 1

AIM - Study of UML tools.

UML Tools

Since UML is a Unified Modeling Language, it is used to create meaningful, object-oriented models for a software application. It clearly represents the working of any hardware/ software system. There are numerous tools, both commercial and open-source, which are available for designing UML diagrams, are enlisted below:

1. StarUML

StarUML is an open-source software modeling tool, which is provided by MKLab. It has come up with eleven different types of modeling diagrams. It also supports UML2.0 specified diagrams.

Features:

- It let you create Object, Use case, Deployment, Sequence, Collaboration, Activity, and Profile diagrams.
- It is a UML 2.x standard compliant.
- It offers multiplatform support (MacOS, Windows, and Linux).

2. Umbrello

Umbrello is a Unified Modeling language tool, which is based on KDE technology. It supports both reverse engineering and code generation for C++ and Java.

Features:

- It implements both structural and behavioral diagrams.
- It imports C++ and can export up to a wider range of languages.

3. UML designer tool

The UML designer tool helps in modifying and envisioning UML2.5 models. It allows you to create all of the UML diagrams.

Features:

- It provides transparency to work on DSL as well as UML models.
- With the UML designer tool, the user can reuse the provided presentations.

- It implements Component, Class, and Composite structure diagrams.
- To start working with DSL, you can use UML legacy models.

4. Altova

Altova has provided UModel, which is another UML software modeling tool. It supports all types of 14 UML2 diagrams as well as SysML for the embedded systems. It also holds up for business process modeling for enterprise analysts. It generates visually designed software models by incorporating Java, C++, and C #or Visual Basic .NET.

Features:

- It provides a dedicated toolbar for an individual diagram.
- It offers unlimited undo/redo, which inspires to discover new ideas.
- In UML diagrams, you can easily add a hyperlink to any element.
- It also provides an intuitive color-coding, icons, customized alignment grid, and cascading styles for colors, fonts line size.

5. Umple

Umple is an object-oriented and modeling language that textually supports state diagrams and class diagrams. It adapts JAVA, C++, and PHP, which results in more readable and short lines of code.

Features:

- It includes Singleton pattern, keys, immutability, mixins, and aspect-oriented code injection, which makes UML more understandable to the users.
- It enforces referential integrity by supporting UML multiplicity.

6. Visual Paradigm

A visual Paradigm is a tool that supports SysML, UML2, and Business Process Modeling Notation from Object Management Group. It involves report generation as well as code generation.

Features:

- It supports all of the 14 UML2 diagrams.
- It supports BPMN 2.0, ERD, ORMD, SysML

7. WhitestarUML

Whitestar UML is a division of StarUML 5.0 that offers bug fixes and has improved its compatibility with the latest operating systems, i.e., support of Unicode strings or simply being developed and tested on Windows 7 and 8.

Features:

- It offers a refreshed user interface.
- It completely handles the functioning of Unicode strings.
- It provides support on Windows 7, 8, and 10.
- On-demand upload and download of units.
- It directly integrates the ERD profile and extends to generate and parse the SQL tables.

8. Draw.IO

Draw.io is an open-source modeling tool to create flowcharts, process diagrams, UML, ER, and network diagrams.

Features:

- Since it is very easy to use, it provides an intuitive interface, drag& drop functionality, a huge amount of templates, and also, it does not need to install.
- It offers security and reliability.
- It can be used anywhere, both online and offline.
- It is compatible with every browser.

9. GenMyModel

GenMyModel is an online modeling platform that offers Business (Archimate, BPMN, flowcharts support) as well as IT modeling (RDS, UML2.5 class diagrams).

Features:

- It provides an online platform.
- It generates online code.
- It provides a centralized repository for easy and simultaneous model collaboration.
- You can import or export as a PDF.

10. Latino

It is an online platform that offers UML tools for faster development of UML diagrams.

Features:

- It allows you to export the diagram as XML or any other image file such as Gif, JPEG, or SVG format

EXPERIMENT 2

AIM: Types of UML diagram.

1. **Use Case Diagram**

As the most known diagram type of the behavioral UML types, Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions interact.

It's a great starting point for any project discussion because you can easily identify the main actors involved and the main processes of the system. You can create use case diagrams using our tool and/or get started instantly using our use case templates.

2. **Activity Diagram**

Activity diagrams represent workflows in a graphical way. They can be used to describe the business workflow or the operational workflow of any component in a system. Sometimes activity diagrams are used as an alternative to State machine diagrams. Check out this wiki article to learn about symbols and usage of activity diagrams. You can also refer this easy guide to activity diagrams.

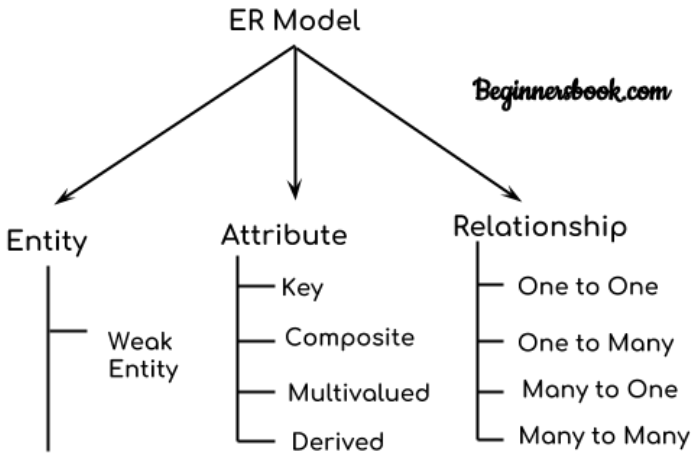
3. **ER – DIAGRAM**

An **Entity–relationship model (ER model)** describes the structure of a database with the help of a diagram, which is known as **Entity Relationship Diagram (ER Diagram)**. An ER model is a design or blueprint of a database that can later be implemented as a database. The main components of E-R model are: entity set and relationship set.

An ER diagram shows the relationship among entity sets. An entity set is a group of similar entities and these entities can have attributes. In terms of DBMS, an entity is a table or attribute of a table in database, so by showing relationship among tables and their attributes, ER diagram

shows the complete logical structure of a database. Lets have a look at a simple ER diagram to understand this concept.

Components of a ER Diagram



4. Sequence Diagram

Sequence diagrams in UML show how objects interact with each other and the order those interactions occur. It's important to note that they show the interactions for a particular scenario. The processes are represented vertically and interactions are shown as arrows. This article explains the purpose and the basics of Sequence diagrams. Also, check out this complete Sequence Diagram Tutorial to learn more about sequence diagrams.

You can also instantly start drawing using our sequence diagram templates.

5. Object Diagram

Object Diagrams, sometimes referred to as Instance diagrams are very similar to class diagrams. Like class diagrams, they also show the relationship between objects but they use real-world examples.

They show how a system will look like at a given time. Because there is data available in the objects, they are used to explain complex relationships between objects.

6. Class Diagram

Class diagrams are the main building block of any object-oriented solution. It shows the classes in a system, attributes, and operations of each class and the relationship between each class.

In most modeling tools, a class has three parts. Name at the top, attributes in the middle and operations or methods at the bottom. In a large system with many related classes, classes are grouped together to create class diagrams. Different relationships between classes are shown by different types of arrows.

Below is an image of a class diagram. Follow the link below for more class diagram examples or get started instantly with our class diagram templates.

7. State Machine Diagram

State machine diagrams are similar to activity diagrams, although notations and usage change a bit. They are sometimes known as state diagrams or state chart diagrams as well. These are very useful to describe the behavior of objects that act differently according to the state they are in at the moment. The State machine diagram below shows the basic states and actions.

CASE STUDY

→ *HOSPITAL MANAGEMENT SYSTEM*

XYZ hospital is a multi speciality hospital that includes a number of departments, rooms, doctors, nurses, compounders, and other staff working in the hospital along with Receptionist. Patients having different kinds of ailments come to the hospital and get checkup done from the concerned doctors. If required they are admitted in the hospital and discharged after treatment.

The aim of this case study is to design and develop a database for the hospital to maintain the records of various departments, rooms, and doctors in the hospital. It also maintains records of the regular patients, patients admitted in the hospital, the check up of patients done by the doctors, the patients that have been operated, and patients discharged ...

PROBLEM STATEMENT

- A system to manage the activities in a hospital:
- Patients request for appointment for any doctor. The details of the existing patients are retrieved by the system. New patients update their details in the system before they request for appointment with the help of assistant. The assistant confirms the appointment based on the availability of free slots for the respective doctors and the patient is informed. Assistant may cancel the appointment at any time.

Construct Actors, Use cases, analysis design, CRC cards, Sequence Diagram, detail design (related to at least two classes) and any suggestions regarding maintenance.

OBJECTIVES

Main objectives of a Hospital Management System are:

→Design a system for better patient care.

→Reduce hospital operating costs.

→Provide MIS (Management Information System) report on demand to management for better decision making.

→Better co-ordination among the different departments.

→Provide top management a single point of control.

→Hospital management System handles activities of major departments in a hospital like:

1.Front Office/OPD Management

2. Patient management (scheduling, registration and long-term care)

3. Patient care management and departmental modules (radiology, pharmacy and pathology labs)

4. Investigative Labs

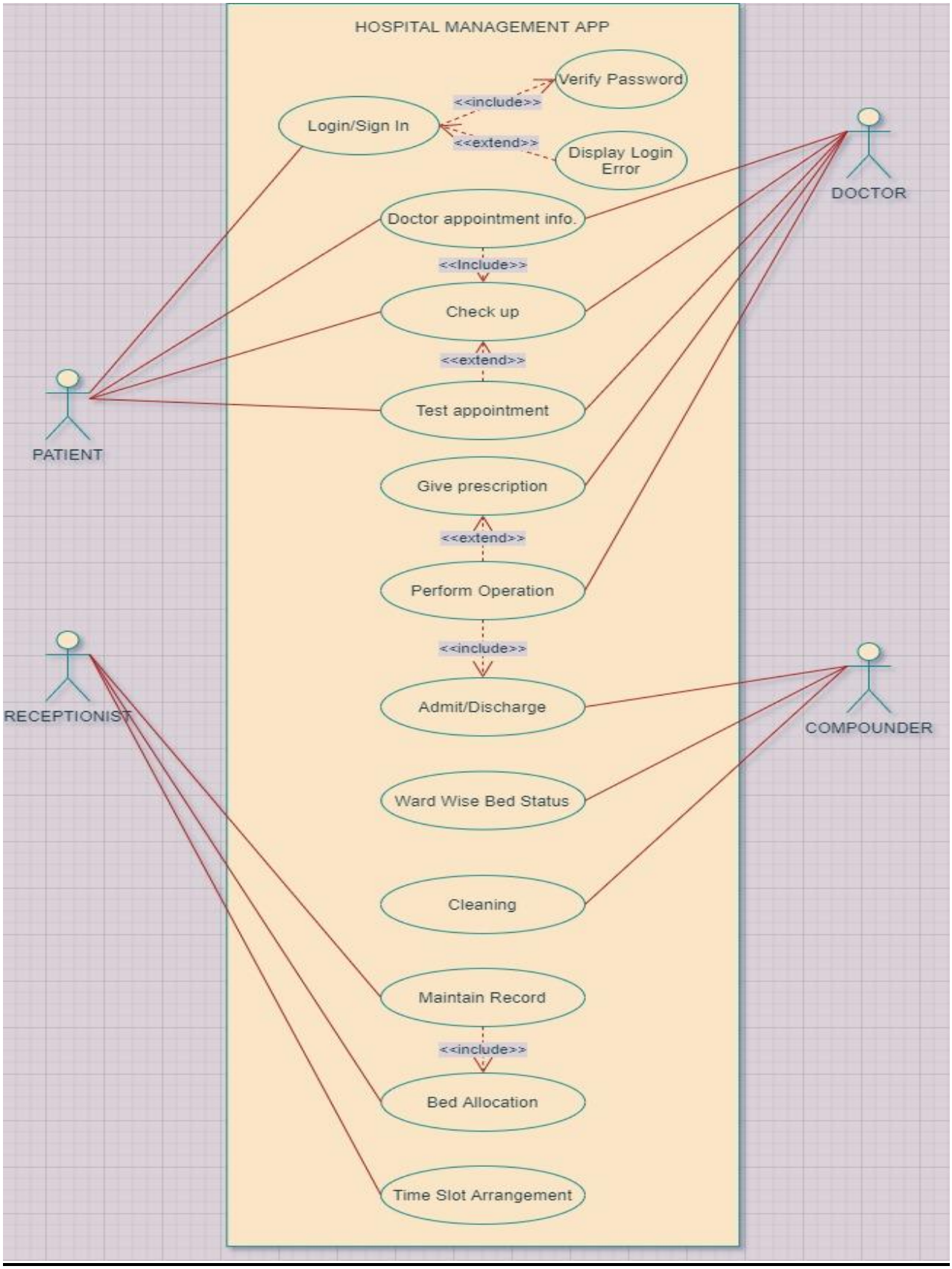
5. Billing

6. Medical Stores

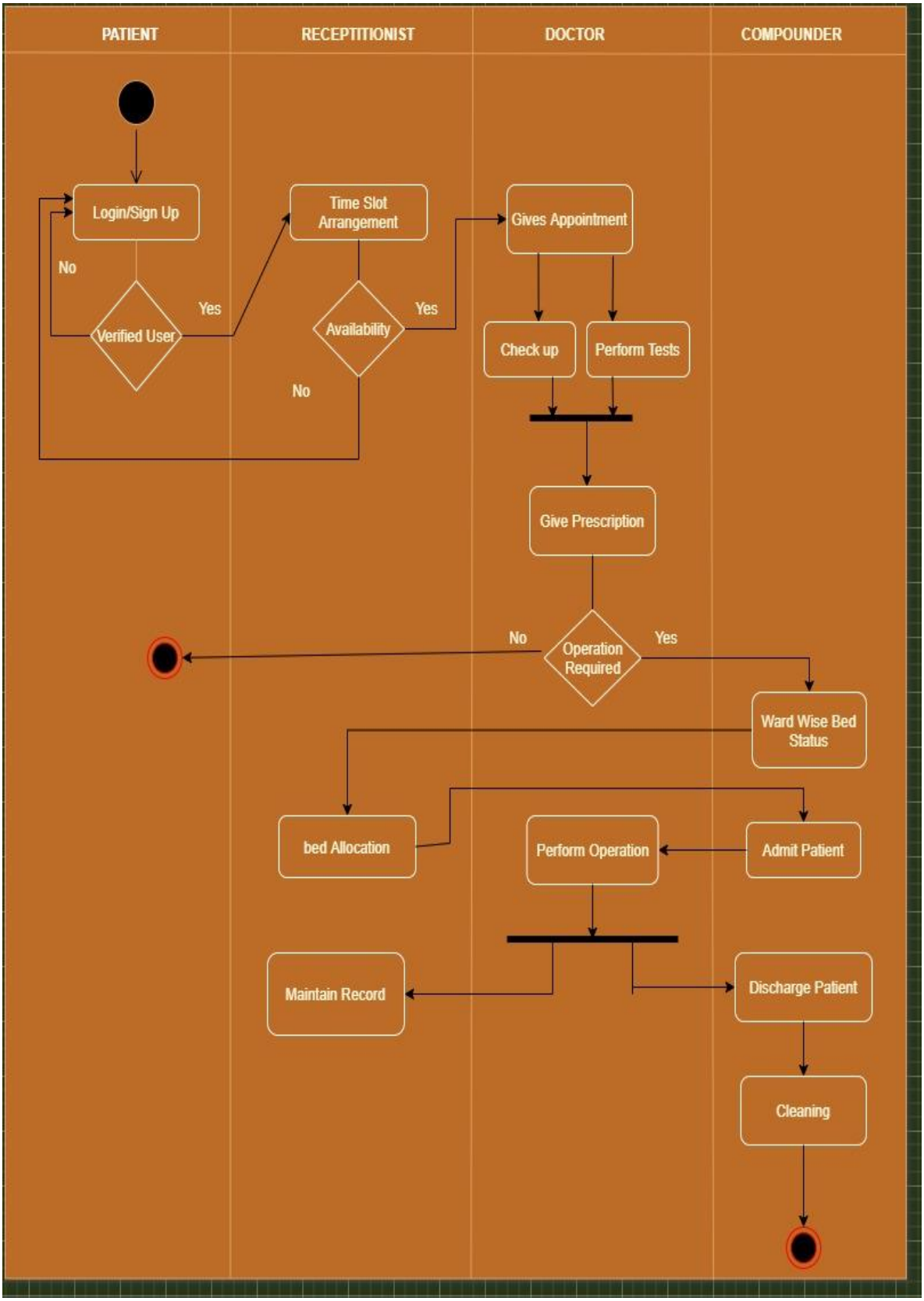
7. Financial Accounting (billing, insurance processing, materials management, accounts payable/receivable, payroll and general ledger)

8. Payroll

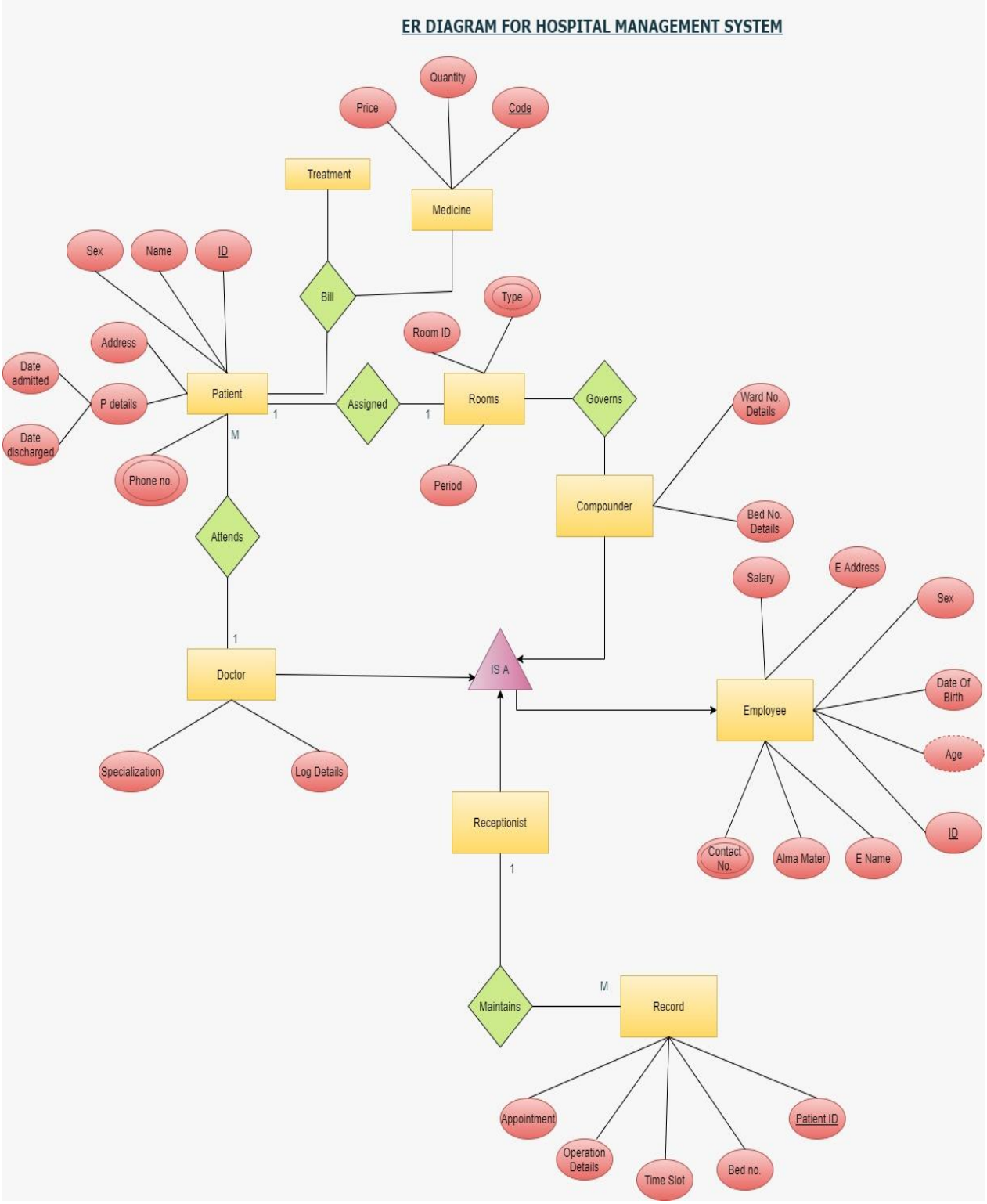
1. USECASE DIAGRAM:



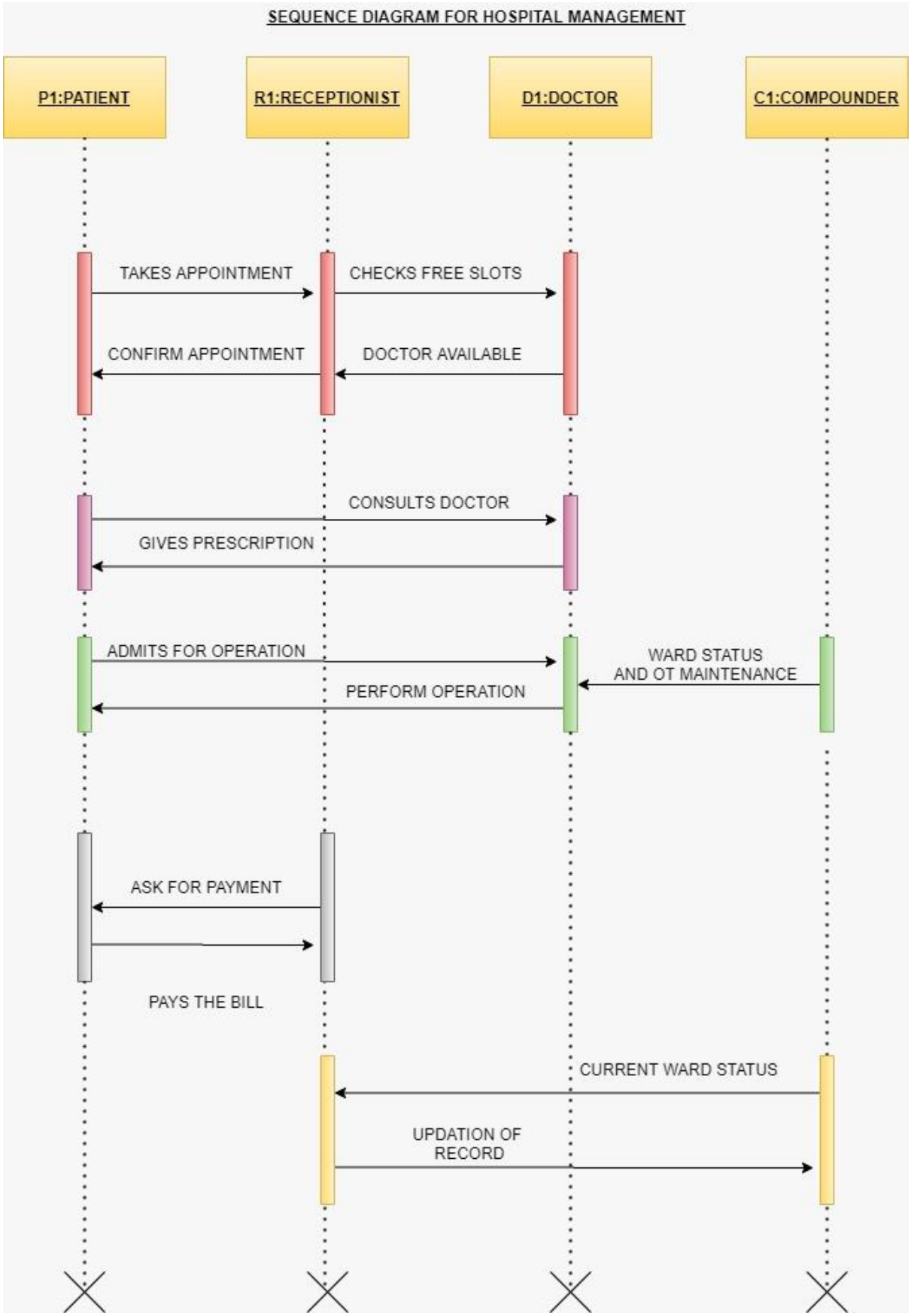
2. ACTIVITY DIAGRAM:



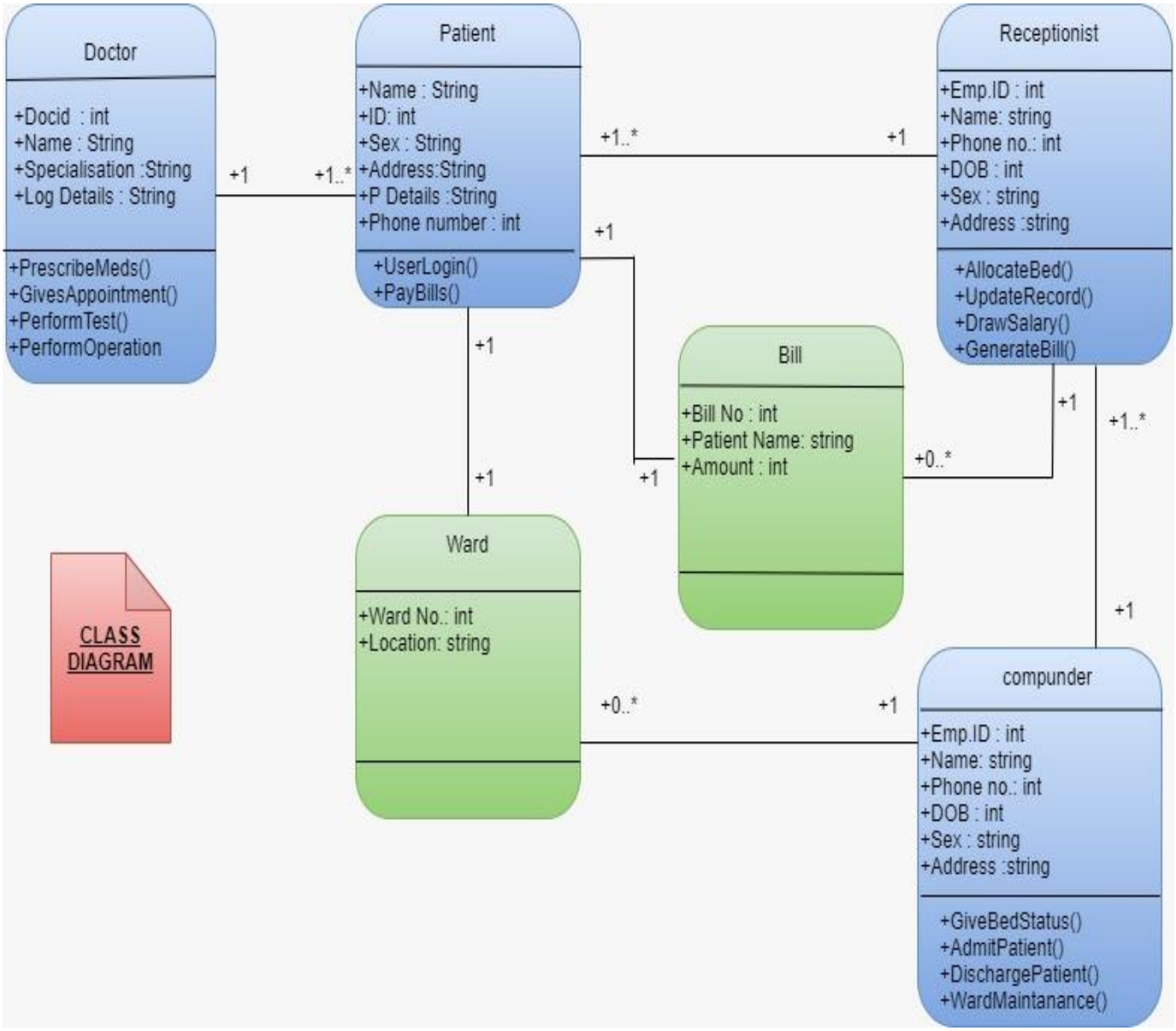
3. ER-DIAGRAM:


ER DIAGRAM FOR HOSPITAL MANAGEMENT SYSTEM
Quantity
Price
Code
Treatment
Medicine
Sex
Name
ID
Bill
Type
Room ID
Address
Date admitted
P details
Patient
Assigned
Rooms
Governs
Ward No. Details
Date discharged
Phone no.
Period
Compounder
Bed No. Details
Attends
Salary
E Address
Sex
Doctor
IS A
Date Of Birth
Employee
Age
Specialization
Log Details
Receptionist
ID
Contact No.
Alma Mater
E Name
Maintains
Record
Appointment
Operation Details
Time Slot
Bed no.
Patient ID

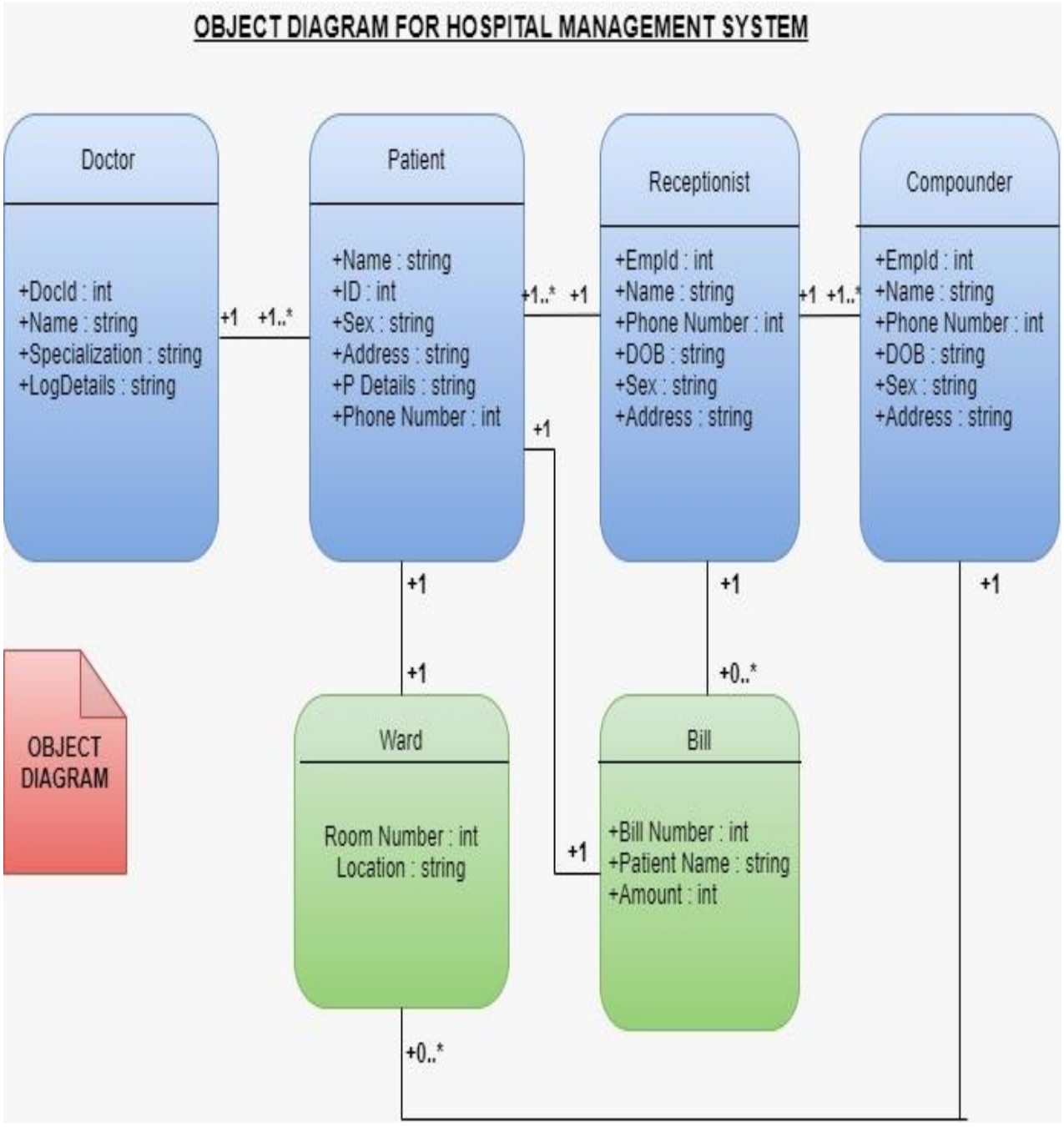
4. SEQUENCE DIAGRAM:



5. (A) CLASS DIAGRAM:

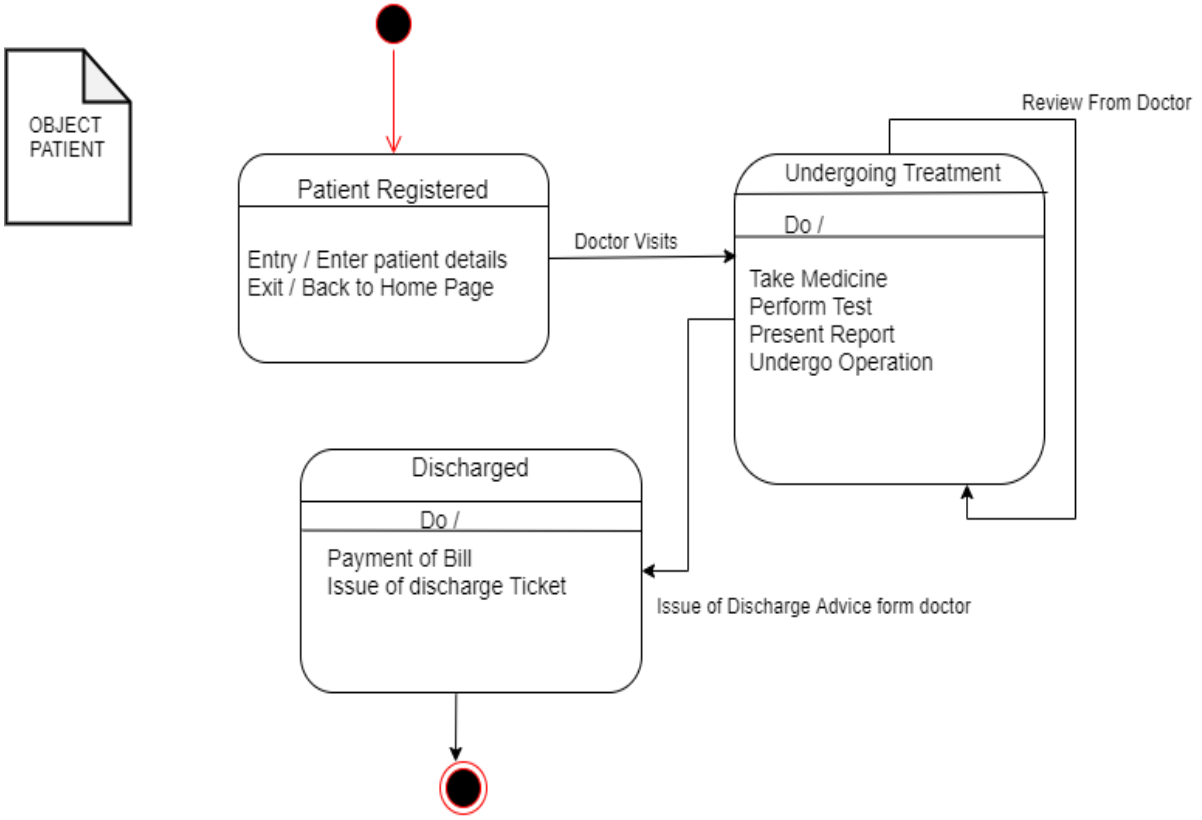


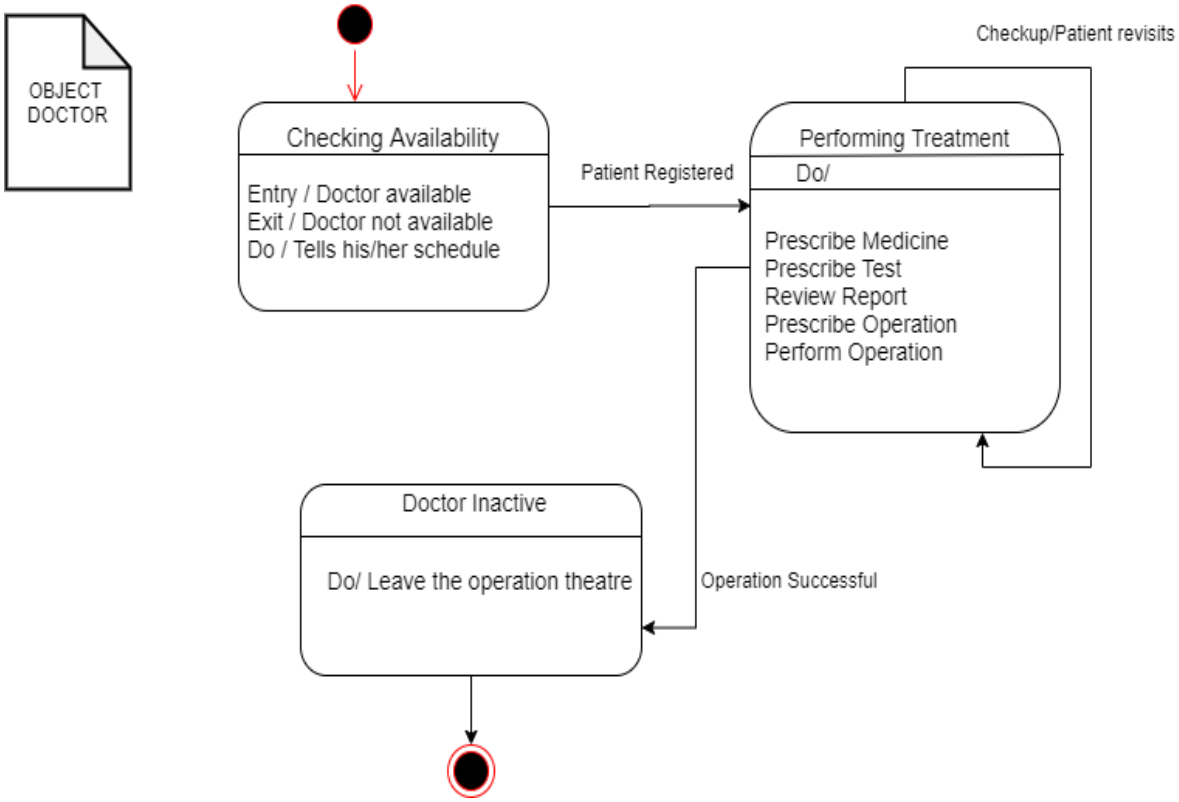
(B) OBJECT DIAGRAM:



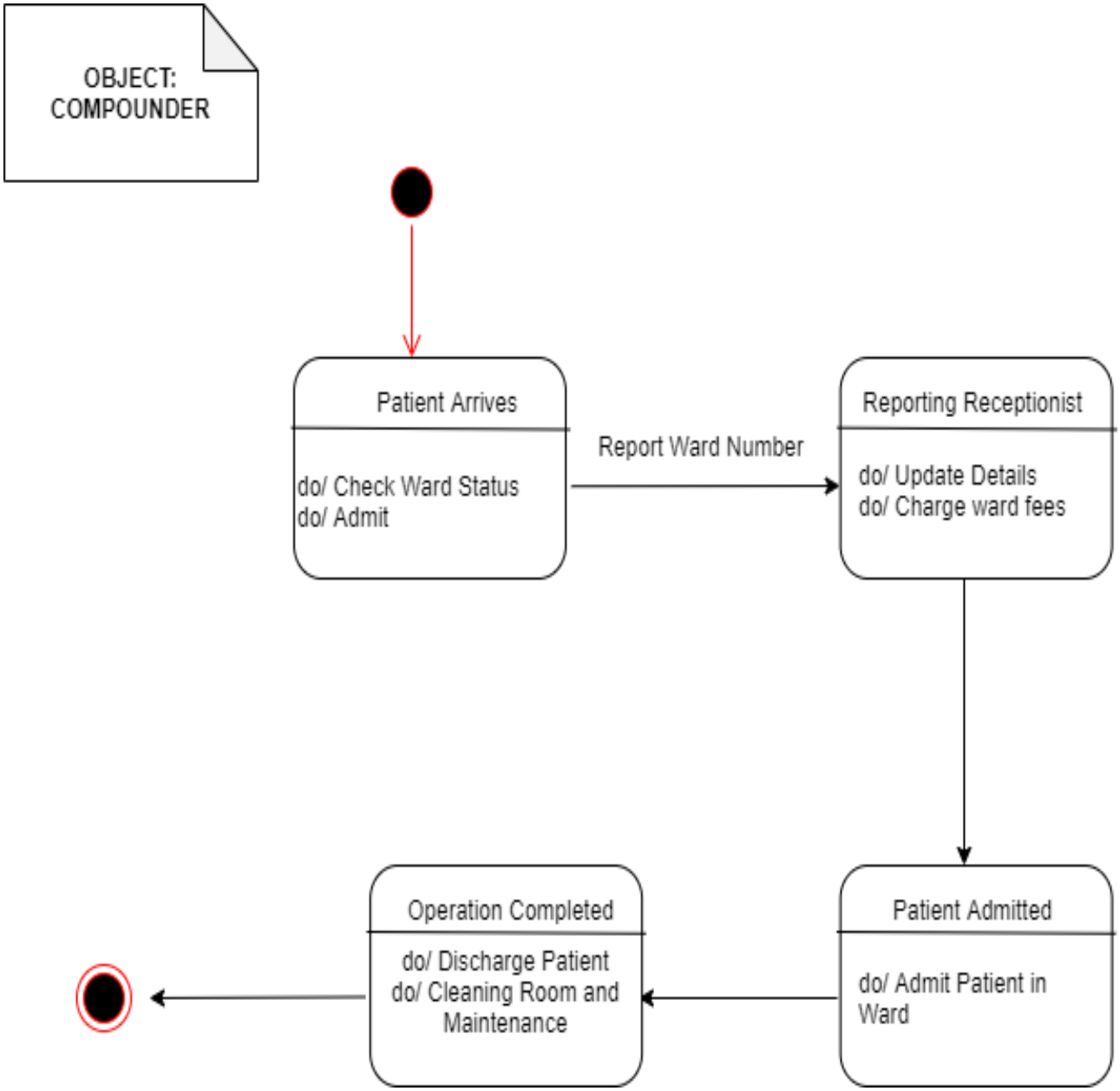
6.STATE DIAGRAM:

(A) OBJECT PATIENT AND OBJECT DOCTOR.





(B) OBJECT COMPOUNDER :



(*C) OBJECT RECEPTIONIST:*