

Apollo

Patient Billing System Software Requirements Specification

Version 1.0

Team Members

Ipsit Patra
Ghanshyam Bhatt
Parashar Pandya

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Revision History

Date	Version	Description	Author
14/sep/08	1.0	First Version of Apollo PBS	Ipsit Patra

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Software Requirements Specification

1. Introduction

The medical information of a patient is one of the most sensitive types of information. Medical information is collected from the moment a person is born until her death. Medical information typically includes aspects of a person's physical health such as treatments, medicines and diagnoses. In addition to this health information, a medical record may also include information about substance abuse, sexual behavior, family relationships, and private thoughts expressed through psychotherapy. The Patient Treatment pattern focuses on the private and sensitive nature of this information and the need for maintaining accurate and organized records. This pattern describes only some of the aspects of patient treatment, which include the creation and maintenance of the patient record and the assignment of the assets for use by the patient. This pattern describes a general non-emergency treatment situation and does not consider the details of patient diagnosis and treatment.

Patient billing system mainly deals with automating the various activities that are taking place within a hospital. This project is aimed at developing a patient billing software system that is of importance to a hospital.. This system can be used to maintain the location (bed no.) of each patient either in the ward or the ICU. Information about the patient and the charges to be paid is also stored.

Existing patient information is already stored in the database. Any new patient information can be stored in the database via a patient information input screen. The screen will take as input all the details of the patient along with his health condition, the disease he is suffering from, the amount to be paid, the registration number, case number, etc.

The hospital data entry operator should be able to: Login to the system through the first page of the application, Change the password after logging into the system, Enter / edit the organization code and address. Enter the ward number for the patient either in the general ward or the ICU, Settle all bills pending to be paid by a patient before the patient's discharge.

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1.1 Purpose

Patient Billing System is for establishing and sustaining the business relationships by maintaining valuable Patient information. It also integrates the Support Desk, which gives an overall view of all the Patient relationships. The central repository enables to track account- level data, service level agreements, patient information and patient billing details.

1.2 Scope

- Create different system users
- Manage all the new patient details such as Patient name, Doctors, Patient Identification numbers, address, email addresses of all the patient from one central location.
- Track all the Patient and Room number details(General Ward or the ICU Ward).
- Track all the payment details of the patient detail.

1.3 Definitions, Acronyms and Abbreviations

- **HTML:** Hypertext Markup Language is a markup language used to design static web pages.
- **EJB:** Enterprise Java Beans.
- **J2EE:** Java 2 Enterprise Edition is a programming platform— part of the Java Platform—for developing and running distributed multitier architecture Java applications, based largely on modular software components running on an application server.
- **DB2:** DB2 Database is the database management system that delivers a flexible and cost effective database platform to build robust on demand business applications.
- **HTTP:** Hypertext Transfer Protocol is a transaction oriented client/server protocol between web browser & a Web Server.
- **HTTPS:** Secure Hypertext Transfer Protocol is a HTTP over SSL (secure socket layer).

1.4 References

- IEEE SRS Format
- Problem Definition (Provided by IBM)
- CT Arrington. Enterprise Java with UML. OMG Press

1.5 Technologies to be used

- J2EE: Application Architecture
- DB2: Database
- WAS: Web Server
- WSAD: Development Tool

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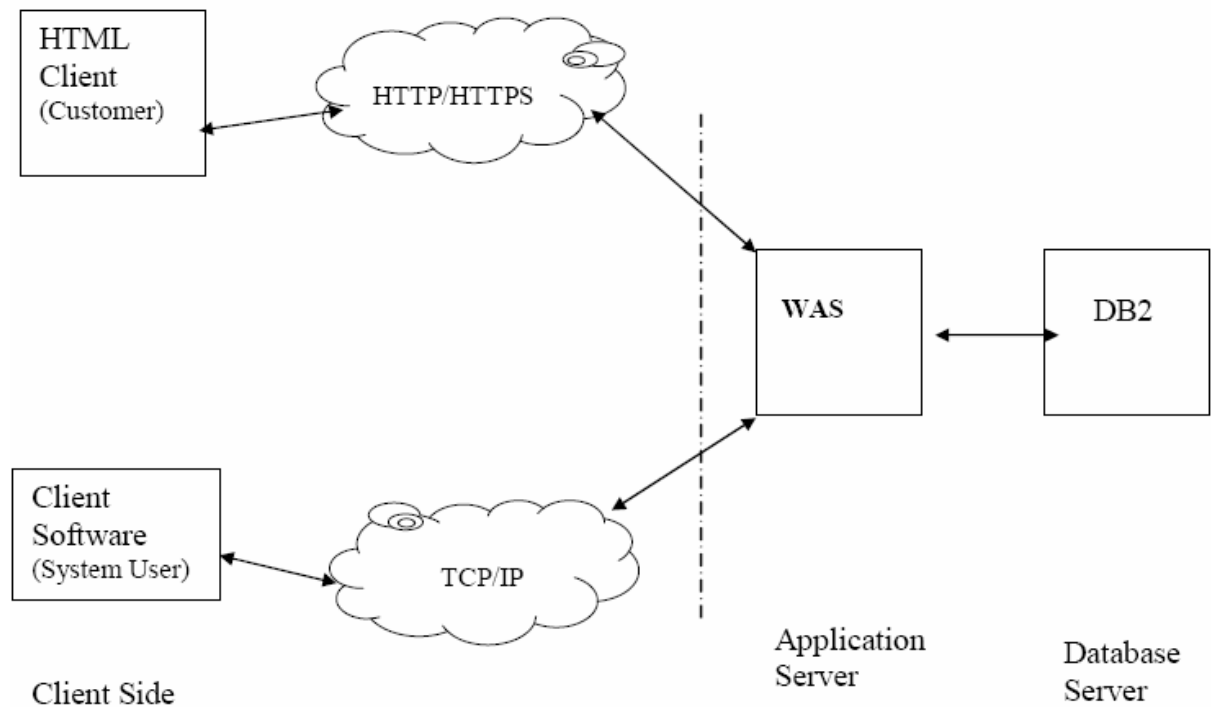
1.6 Overview

- **Overall Description** will describe major components of the system, interconnection and external interfaces.
- **Specific Requirements** will describe the functions of actors, their role in the system and constraints

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2. Overall Description

Product Perspective:



The web pages (XHTML/JSP) are present to provide the user interface on customer client-side. Communication between customer and server is provided through HTTP/HTTPS protocols.

The Client Software is to provide the user interface on system user client side and for this TCP/IP protocols are used.

On the server side web server is for EJB and database server is for storing the information

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2.1 Software Interface:

- **Client on Internet:** Web Browser, Operating System (any)
- **Client on Intranet:** Client Software, Web Browser, Operating System (any)
- **Web Server:** WAS, Operating System (any)
- **Data Base Server:** DB2, Operating System (any)
- **Development End:** WSAD (J2EE, Java, Java Bean, Servlets, HTML), DB2, OS (Windows), Web Server.

2.2 Hardware Interface:

Client Side			
	Processor	RAM	Disk Space
Internet Explorer 6.0	Pentium II at 500 MHz	64 MB	1 GB
Server Side			
Web sphere application server V5.0	Pentium III at 1 GHz	512 MB	2 GB
DB2 V8.1	Pentium III at 1 GHz	512 MB	1GB (Excluding data size)

2.3 Communication Interface:

- Client on Internet will be using HTTP/HTTPS protocol.
- Client on Intranet will be using TCP/IP protocol.

2.4 User Characteristics:

Every user should be comfortable of working with computer and net browsing. He must have basic knowledge of English too.

2.5 Constraints:

- GUI is only in English.
- Login and password is used for identification of User and there is no facility for guest.
- This system is working for single server.
- There is no maintainability of back up so availability will get affected.
- Limited to HTTP/HTTPS

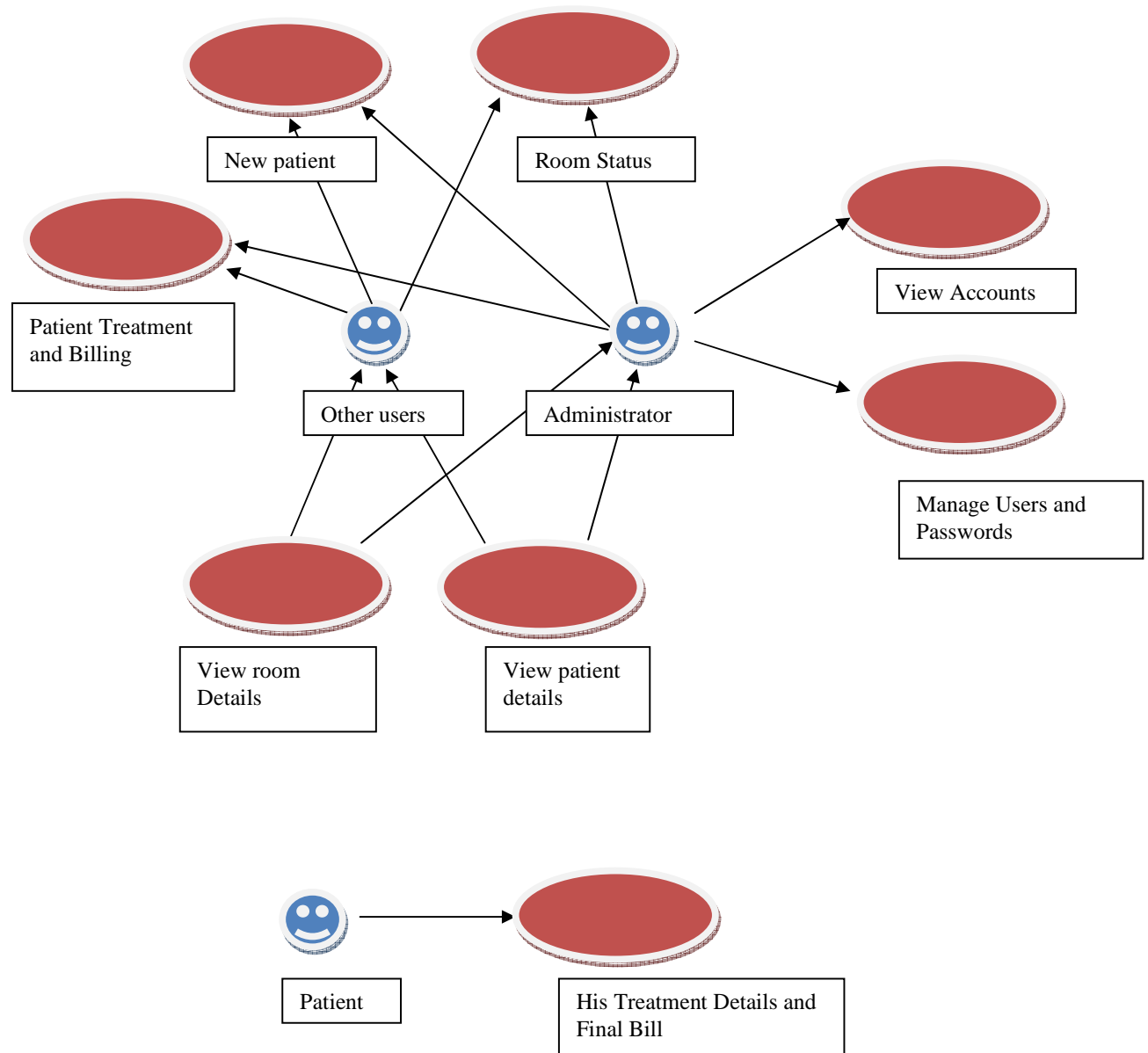
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2.6 Product Function:

1. **Track Account Level Data:** In this module, receivables from customer are maintained.
2. **Service Level Agreements:** It contains the agreements of providing the services related to product and customer.
3. **User Contact Information:** It maintains all the details (Personal, Official, Contact, and Company) of the customer.
4. **Product Ownership Details:** It maintains the information that does which customer own which product.
5. **Track Support Transactions:** Maintenance of transactions related to the services provided to the customer in the form of support.
6. **Maintaining Logs:** Activities of the System Users can be tracked through the logs, which are maintained by the system.

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2.7 Use-Case Model Survey



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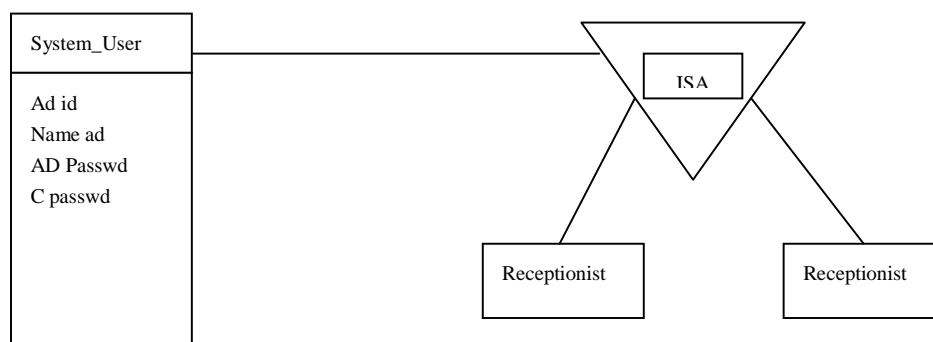
1. **Administrator:** Responsible for application users, viewing accounts and managing users and their password of the system.

- **View Accounts:** Responsible for checking code and address of Entering / edit the organization code and address
- **Manage Uses and Password:** updating by the administrator, which will be visible to all the system users.
- **View patient details:** View the patient details, payment details, doctor assigned, daily service transaction details, and treatment details.
- **View room details:** View the room (General ward and ICU) Status, patient in room details, and daily service transaction details
- **Patient Treatment and Billing:** View the patient details, payment details, treatment details, and daily service transaction details
- **Room Status:** Keeps Track of Free bed in ICU and General ward and status of the occupied beds.
- **New Patient:** New Patient is admitted into the hospital and general details are filled and room status is updated

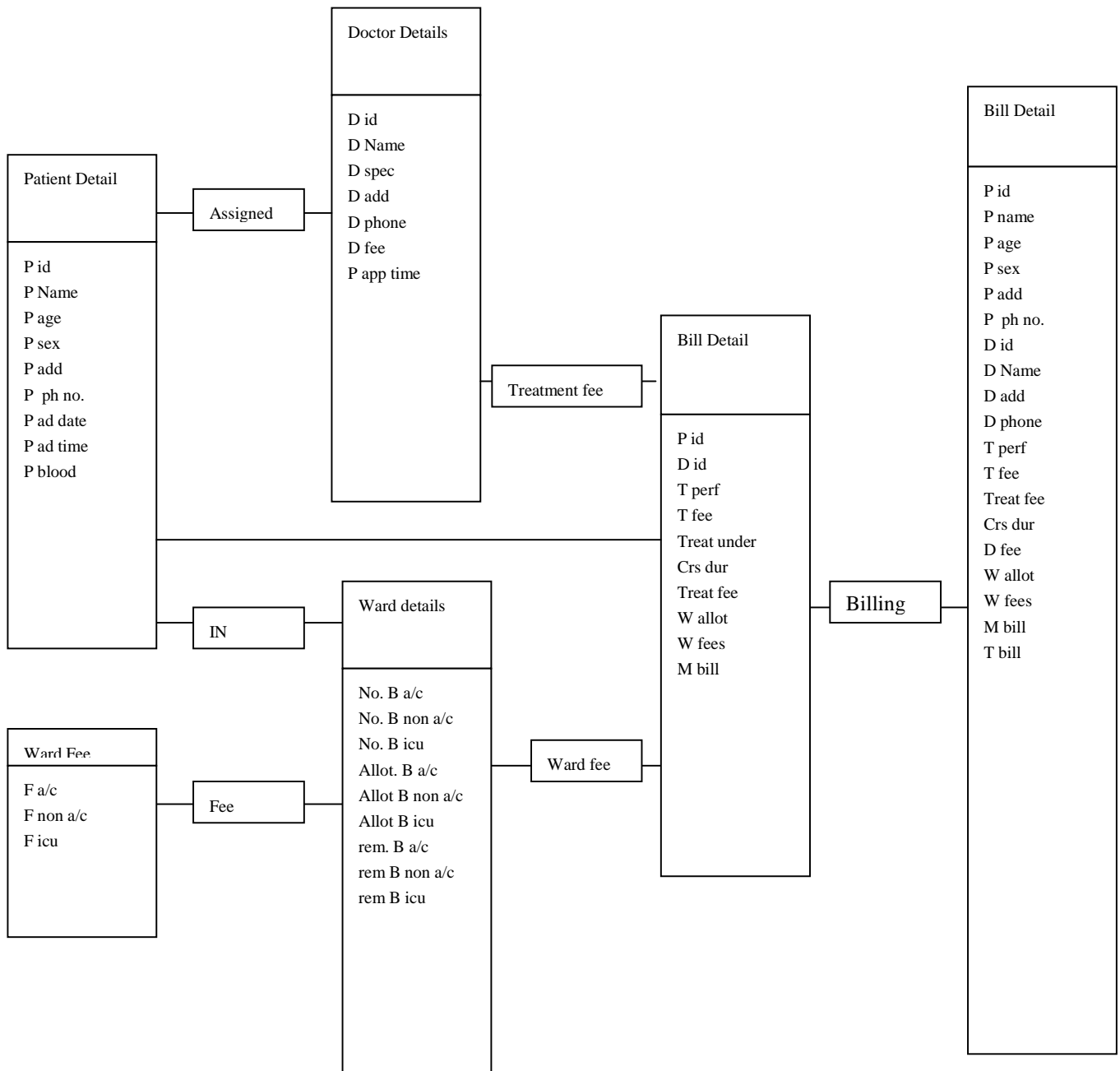
2. **Other Users:** Responsible for managing Patient and Room Status along with billing

- **View patient details:** View the patient details, payment details, doctor assigned, daily service transaction details, and treatment details.
- **View room details:** View the room (General ward and ICU) Status, patient in room details, and daily service transaction details
- **Patient Treatment and Billing:** View the patient details, payment details, treatment details, and daily service transaction details
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2.8 Database design



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2.9 Table Descriptions

Table No.:	1					
Table Name:	administrator login details					
Table Description:	Maintains all the login details of the administrator in patient billing system .					
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/Not Null	Remarks
1	Name ad	Name of the administrator	Varchar			
2	Ad id	administrator id	Varchar	pk		
3	Ad passwd	Administrator password	Varchar			
4	C passwd	Change password after login	Varchar			

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Table No.:	2					
Table Name:	Patient details					
Table Description:	Maintains all the details of the patients in patient billing system .					
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/ Not Null	Remarks
1	P id	Patient id	varchar	pk		
2	P name	Patient name	Varchar			
3	P age	Patient age	Integer			
4	P sex	Sex of patient	Varchar			
5	P add	Address of the patient	varchar			
6	P ph no.	Patient phone no.	Integer			
7	P ad date	Patient admit date	varchar			
8	P ad time	Patient admit time	varchar			
9	P blood	Patient Blood group	varchar			

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No.:		3				
Table Name:		Doctor details				
Table Description:		Maintains all details of the consultant doctor in patient billing system .				
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/ Not Null	Remarks
1	D id	Doctor id	varchar	pk		
2	D name	Doctor name	varchar			
3	D spec	Specialization of doctor	varchar			
4	D add	Doctor address	varchar			
5	D phone	Phone no. of doctor	integer			
6	D fee	Doctor fees	integer			
7	D app time	doctor appointment timings	varchar			

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Table No.:	4					
Table Name:	Ward details					
Table Description:	Maintains the details of all the wards.					
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/ Not Null	Remarks
1	No.B a/c	No. of beds in a/c ward	integer	Pk		
2	No.B non a/c	No. of beds in Non a/c ward	integer	Pk		
3	No.B icu	No. of beds in ICU ward	integer	Pk		
4	Allot B a/c	No. of beds allotted in a/c	integer	Pk		
5	Allot B non a/c	No. of beds allotted in non a/c	integer	Pk		
6	Allot B icu	No. of beds allotted in ICU	integer	Pk		
7	rem B a/c	No. of beds remained in a/c	integer	Pk		
8	rem B non a/c	No. of beds remained in non a/c	integer	Pk		
9	rem B icu	No. of beds remained in ICU	integer	Pk		

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Table No.:	5					
Table Name:	Ward fee details					
Table Description:	Maintains all details of the ward fee in patient billing system .					
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/	Remarks
1	F a/c	a/c ward fee	integer	Pk		
2	F non a/c	Non a/c ward fee	integer	Pk		
3	F icu	Icu ward fee	integer	Pk		

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Table No.:	6					
Table Name:	Billing details					
Table Description:	Maintains all the billing of the patient in patient billing system.					
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/ Not Null	Remarks
1	P id	Patient id	varchar	Pk/fk		
2	D id	Doctor id.	Varchar	Pk/fk		
3	T perf	Tests performed.	Varchar			
4	T fee	Test fees	Integer			
5	Treat under	Treatment undergone	Varchar			
6	Crs dur	Course duration	Integer			
7	Treat fee	Treatment fees	Integer			
8	W allot	Ward allotted	Varchar	pk		
9	W fees	Ward fees	integer	Pk/fk		
10	M bill	Medicine bill	integer			

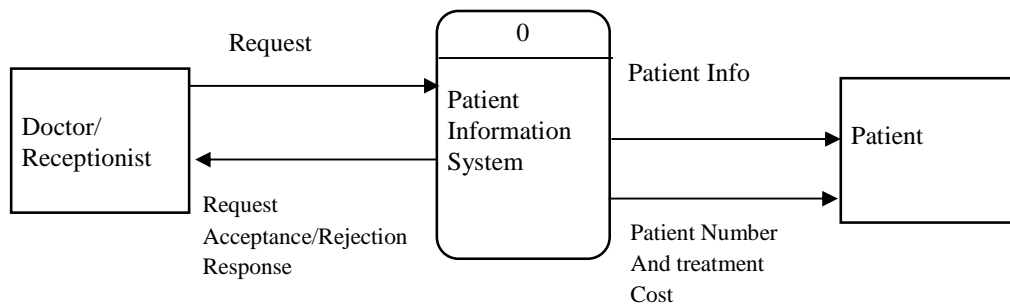
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Table No.:		7				
Table Name:		Total billing details				
Table Description:		Maintains all the billing of the patient in patient billing system.				
Seq. #	Column Name	Column Description	Column Type	PK/FK?	Null/ Not Null	Remarks
1	P id	Patient id	varchar			
2	P name	Patient name	varchar			
3	P age	Patient age	Integer			
4	Psex	Sex of the patient	varchar			
5	P add	Address of the patient	Varchar			
6	P ph.no.	Patient phone no.	integer			
7	D id	Doctor id.	Varchar			
8	D name	Doctor name	Varchar			
9	D add	Doctor address	Varchar			
10	D ph.no	Doctor phone no.	integer			
11	T perf	Tests performed.	Varchar			
12	T fee	Test fees	Integer			
13	Treat fee	Treatment fees	integer			
14	Crs dur	Course duration	Integer			
15	D fee	Doctor fees	Integer			
16	W allot	Ward allotted	varchar			
17	W fees	Ward fees	integer			
18	M bill	Medicine bill	integer			
19	T bill	Total bill	integer			

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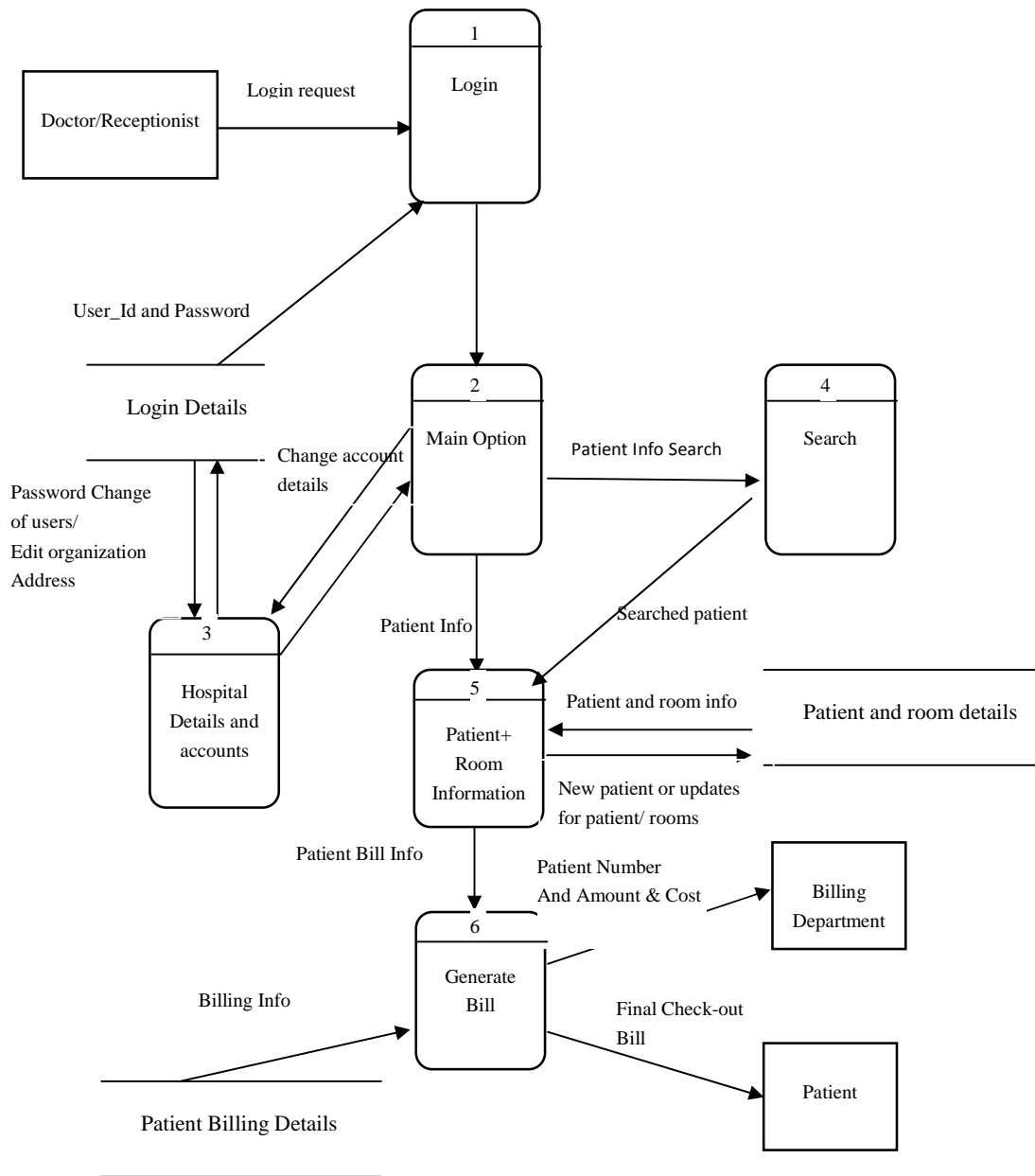
2.10 Architecture diagram

Level 0



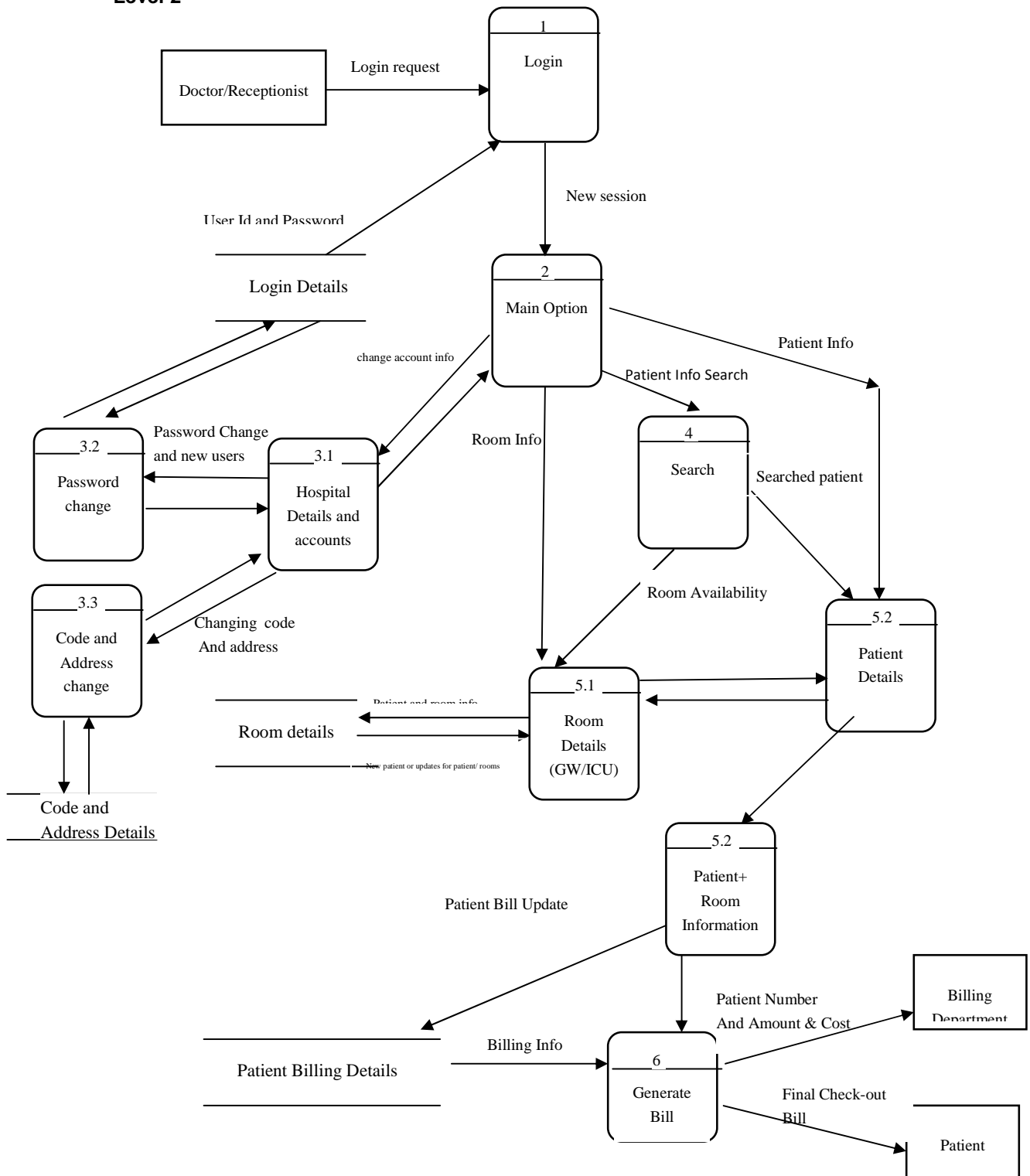
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Level 1



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Level 2



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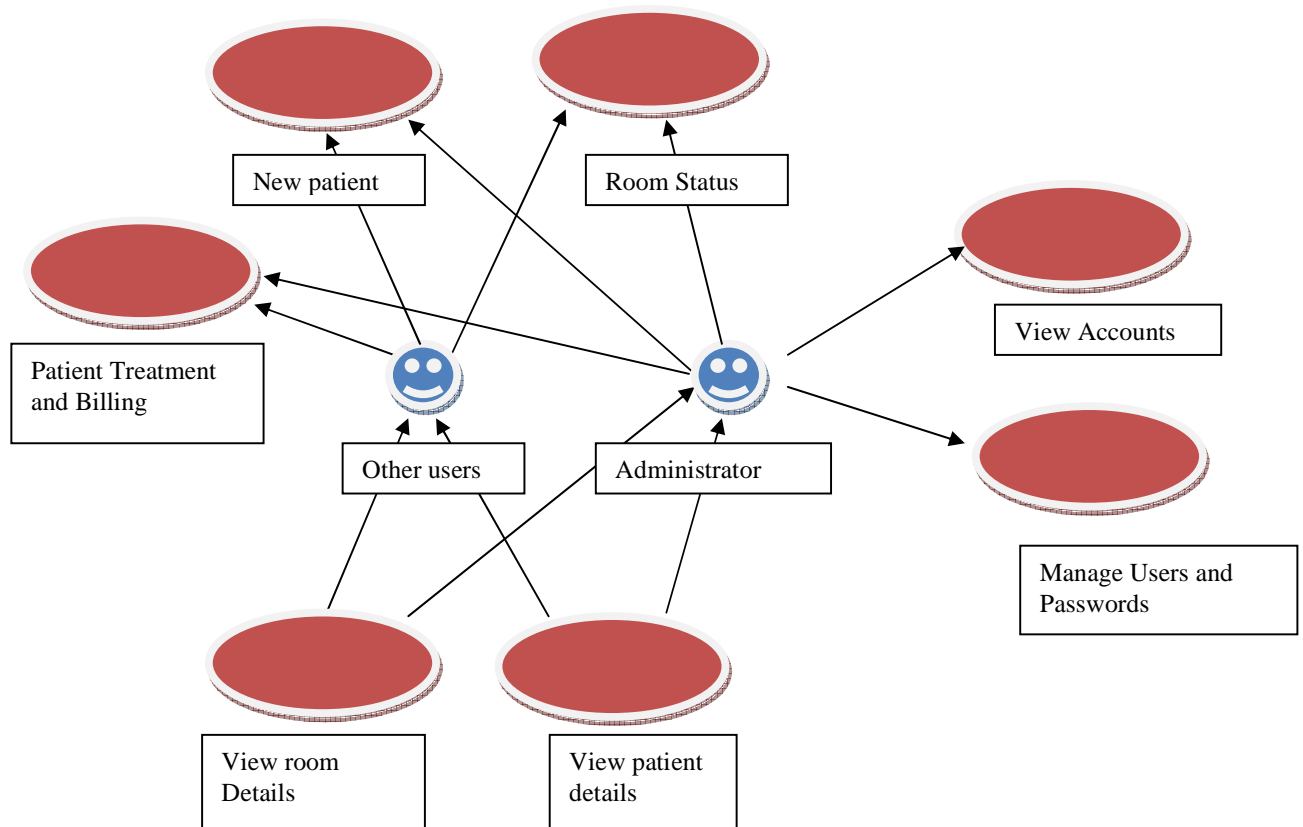
2.11 Assumptions and Dependencies

- The details related to the User, Patients, Room Details, payment and service transaction provided manually.
- Administrator is created in the system already.
- Roles and tasks are predefined.

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3. Specific Requirements

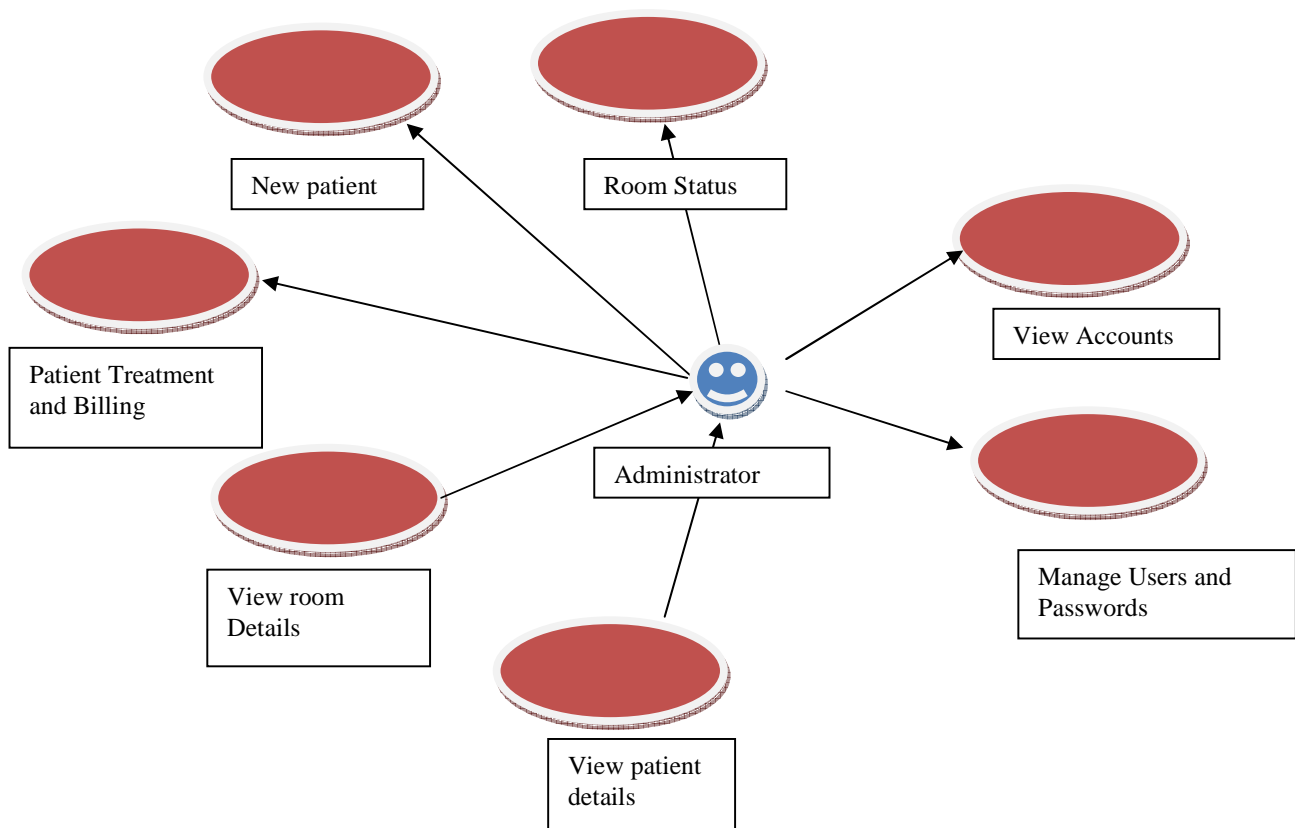
3.1 Use-Case Reports



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Name of use case: View Accounts

Description: View the system using Hospital's detail and changing code or address details.

Preconditions:

Administrator is already logged in.

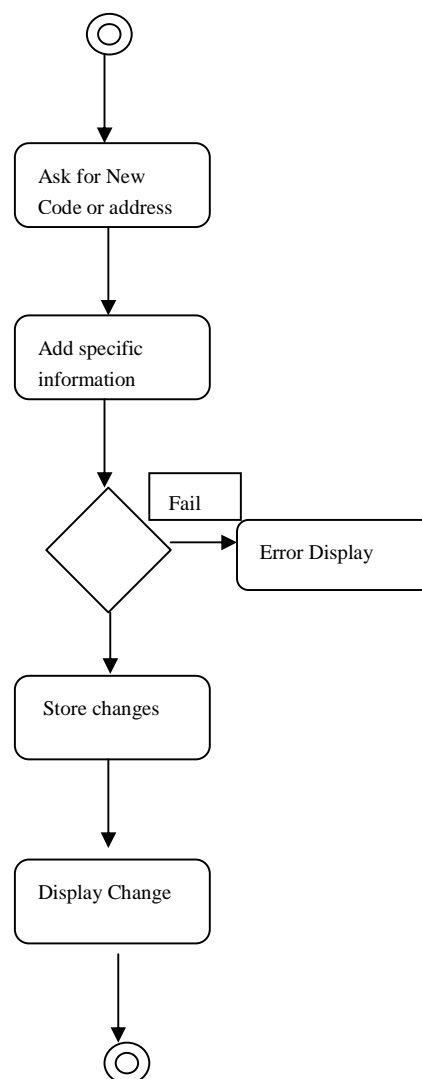
Normal flow of events:

Account updated

Query will be submitted.

Alternate flow of events: None.

Post Condition: None



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Name of use case: Manage Users and Passwords

Description: Changing password and maintaining user passwords

Preconditions:

Administrator is already logged in.

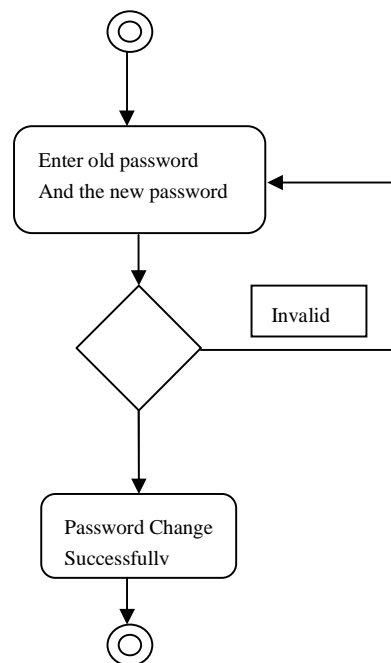
System users have already been created and assigned some roles, tasks and permissions.

Normal flow of events:

- The system user or a role will be selected.
- Query will be submitted.
- Relevant output will be displayed.

Alternate flow of events: None.

Post Condition: None



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Name of use case: Room Status

Description: View the list of Rooms allotted and Rooms/Wards free.

Preconditions:

User or Administrator is already logged in.

Normal flow of events:

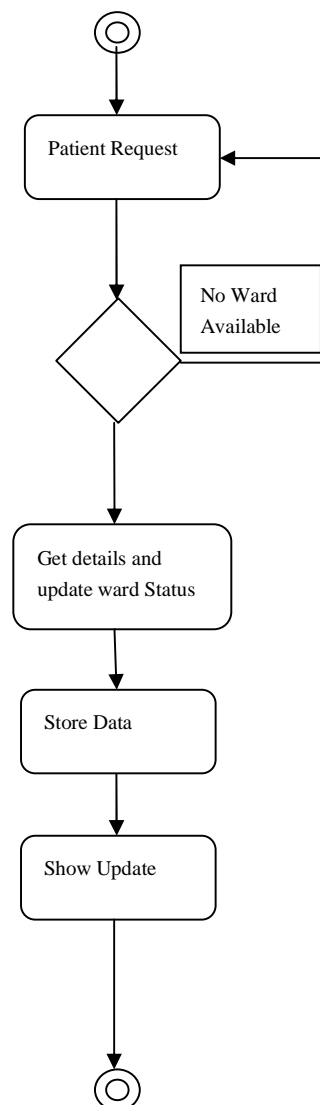
□ The system user or a role will be selected.

□ Query will be submitted.

□ Relevant output will be displayed

Alternate flow of events: None.

Post Condition: None



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Name of use case: New patient

Description: New Patient entry is made, ward and assigned

Preconditions:

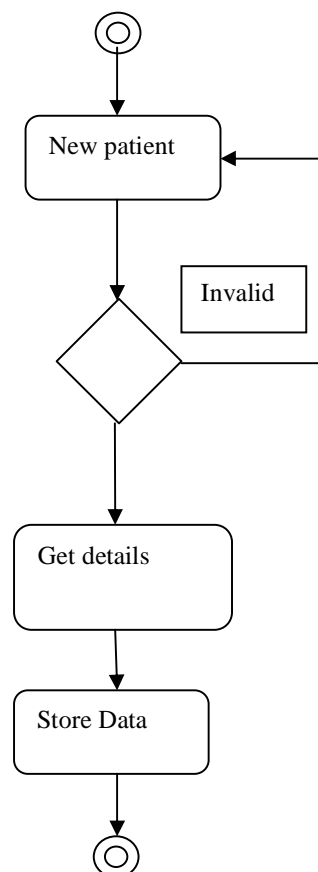
User or Administrator is already logged in.

Normal flow of events:

- Query will be submitted.
- New Account created
- Relevant output will be displayed.

Alternate flow of events: None.

Post Condition: None



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Name of use case: Patient Treatment and Billing

Description: View Details of the patient's treatment, ward billing

Preconditions:

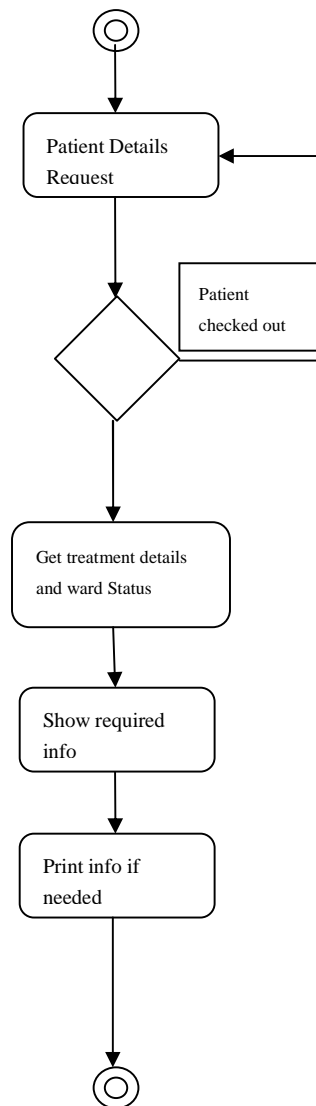
Administrator is already logged in.

Normal flow of events:

- The patient will be selected.
- Query will be submitted.
- Relevant output will be displayed

Alternate flow of events: None.

Post Condition: None



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Name of use case: View Room Details

Description: View the list of Ward (ICU A/C and none A/C) Free and allotted to the patient

Preconditions:

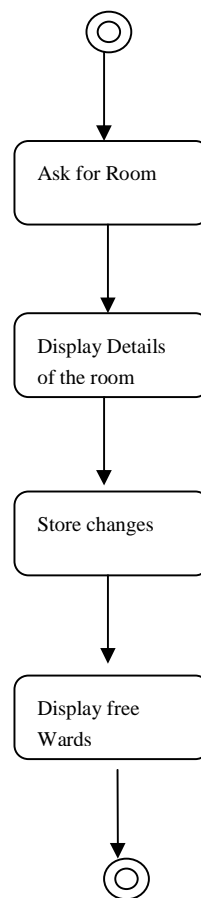
Administrator is already logged in.

Normal flow of events:

- The system user or a role will be selected.
- Query will be submitted.
- Relevant output will be displayed

Alternate flow of events: None.

Post Condition: None



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Name of use case: View Patient Details

Description: View the list of patient's admitted to the hospital with their current treatment and ward information

Preconditions:

Administrator is already logged in.

Normal flow of events:

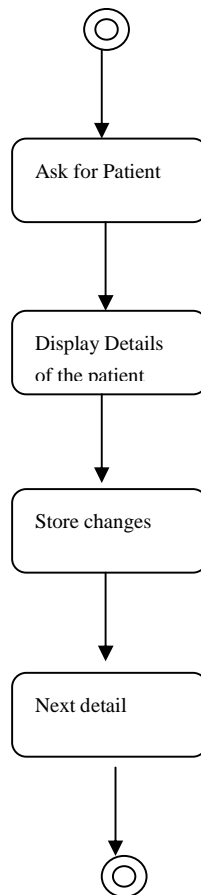
The system user or a role will be selected.

Query will be submitted.

Relevant output will be displayed.

Alternate flow of events: None.

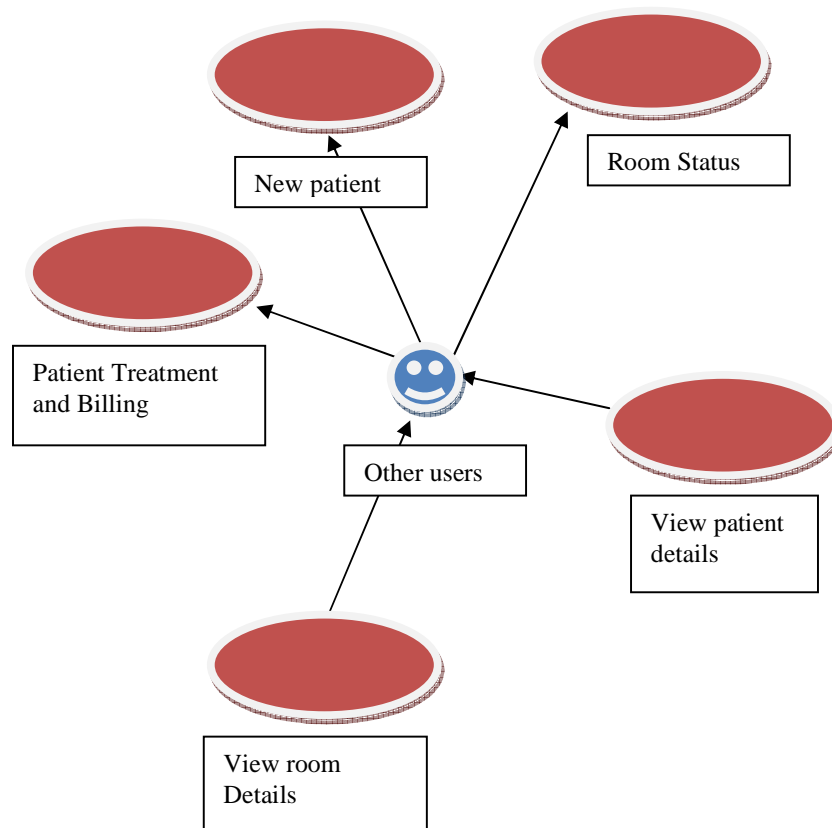
Post Condition: None



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2. Other Users: Responsible for managing Patient and Room Status along with billing

- **View patient details:** View the patient details, payment details, doctor assigned, daily service transaction details, and treatment details.
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Description: View the list of Rooms allotted and Rooms/Wards free.

Preconditions:

User or Administrator is already logged in.

Normal flow of events:

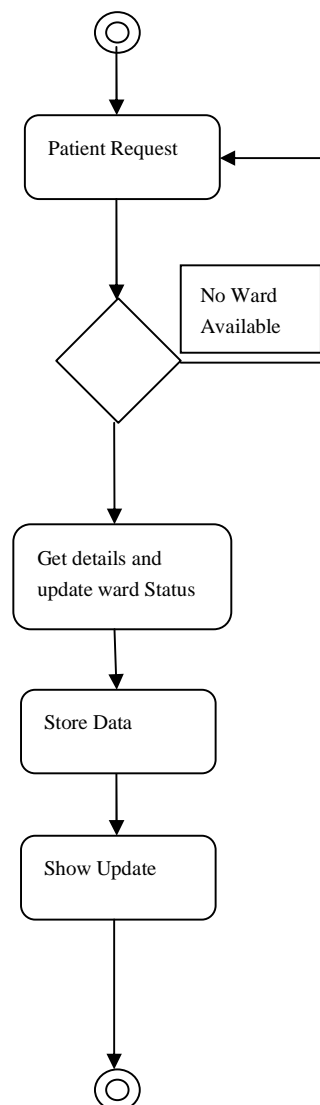
□ The system user or a role will be selected.

□ Query will be submitted.

□ Relevant output will be displayed

Alternate flow of events: None.

Post Condition: None



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Name of use case: New patient

Description: New Patient entry is made, ward and assigned

Preconditions:

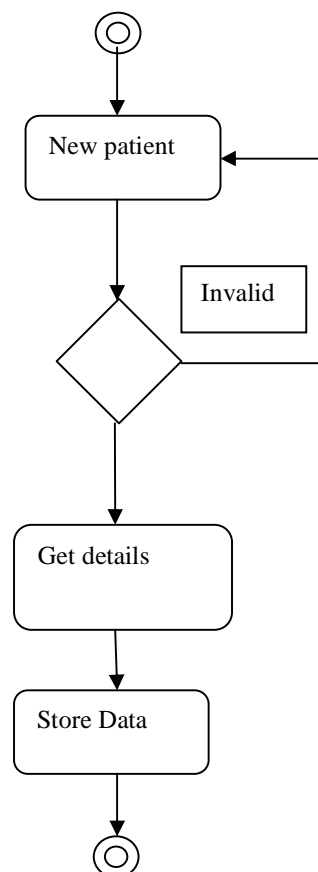
User or Administrator is already logged in.

Normal flow of events:

- Query will be submitted.
- New Account created
- Relevant output will be displayed.

Alternate flow of events: None.

Post Condition: None



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Name of use case: Patient Treatment and Billing

Description: View Details of the patient's treatment, ward billing

Preconditions:

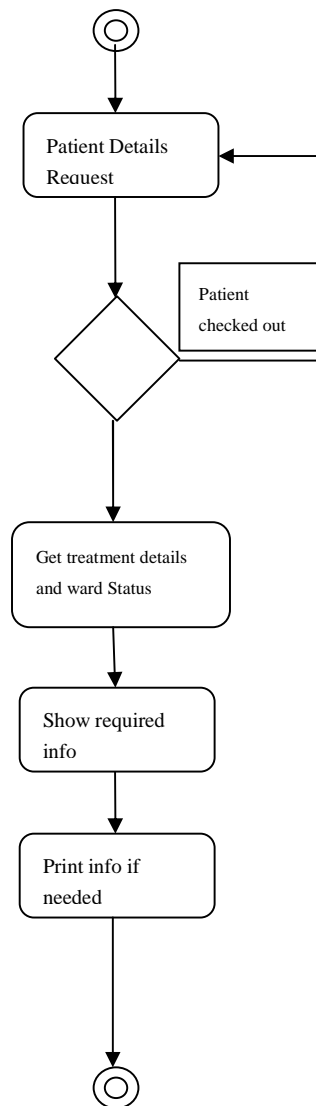
Administrator is already logged in.

Normal flow of events:

- The patient will be selected.
- Query will be submitted.
- Relevant output will be displayed

Alternate flow of events: None.

Post Condition: None



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Preconditions:

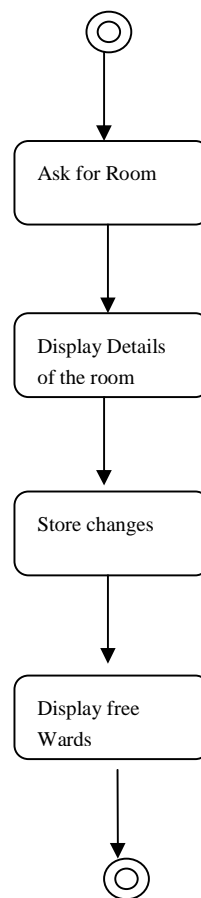
Administrator is already logged in.

Normal flow of events:

- The system user or a role will be selected.
- Query will be submitted.
- Relevant output will be displayed

Alternate flow of events: None.

Post Condition: None



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Name of use case: View Patient Details

Description: View the list of patient's admitted to the hospital with their current treatment and ward information

Preconditions:

Administrator is already logged in.

Normal flow of events:

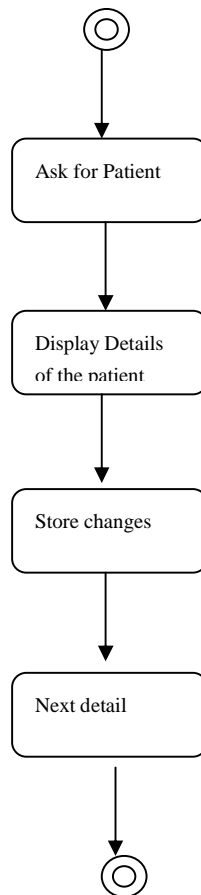
The system user or a role will be selected.

Query will be submitted.

Relevant output will be displayed.

Alternate flow of events: None.

Post Condition: None



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3.2 Supplementary Requirements

1. Have hours of operation that are 24 x 7

Because system can be an automated process, so it can stay open for 24 hours a day. If the base is now the entire world, staying open 24 hours a day becomes critical. System is required to be available 24X7 so UPS support must be on server site for at least 8 hours in case of power failure. System will remain inaccessible to users at 2:00 to 4:00 am for backup and maintenance purpose.

2. Make the existing Web site more dynamic in nature

Many early Web implementations consisted of static HTML pages. This becomes very difficult to manage if the number of pages gets too large. An effective system should be largely dynamic taking dvantage of technology that automates this process rather than relying on manual processes. Application should serve dynamic user based customized web pages to its clients from server.

3. Tie the existing Web site into existing enterprise systems

Any existing Web site that relies on the manual duplication of data from another system is one that can be improved. Most of the business data in the world today exists in enterprise servers that can be connected to the Web servers to make this process far more effective.

4. Provide good performance and the ability to scale the server

The Web Application Server should provide good performance and the ability to manage performance with techniques, such as support for caching, clustering, and load balancing.

5. Providing session management capability

Web application developers should not spend valuable time worrying about how to maintain sessions within the application. The Web Application Server should provide these services.

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4. Concerns / Queries / Doubts if any:

NONE