BHARATI VIDYAPEETH'S

INSTITUTE OF COMPUTER APPLICATIONS & MANAGEMENT

(Affiliated to Guru Gobind Singh Indraprastha University, Approved by AICTE, New Delhi)

Object-Oriented Software Engineering (MCA-164) Practical File

Submitted To:

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MCA 2nd Sem, Sec 2

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	WEEK 1
AP1	Create a Use Case Diagram for a Digital Sound Recorder with the following main features: • The recorder stores up to 10 messages • Each message is max. 2 minutes long • The user can record message • Recording of a message ends after 2 minutes or when the user stops recording • Recording destroys the original message at chosen slot • Sufficient level of battery is checked before recording message • Message of a given slot can be replayed • Sufficient level of battery is checked before replaying message • Messages can be locked/unlocked • Locked messages cannot be deleted or over-written by recording to the same slot • User uses LCD display and buttons to interact with recorder
AP2	Formulate use case descriptions for 5 major use cases identified in the digital sound recorder

AP3	As the head of Information Technology at Acme Airlines, you are tasked with building a new booking system to replace the existing system. Acme needs a new system to allow employees to book ticket electronically and check the status of the booked tickets. The new system will be state of the art and will have a Windows-based desktop interface to allow employees to enter booking details and view employee details. The system will run on individual employee desktops throughout the entire company. For reasons of security and auditing, employees can access only their data. The employees would only be able to view their information, and for any changes they would have to send an E-Mail to the administrator. Administrator would only have the right to make any changes in the records. For the cost being a factor Acme wants to use their old server with the existing database. The system will retain information on all employees in the company. The administrator maintains employee information. He is responsible for adding new employees, deleting employees and changing all employee information such as name, address, and paycheck generation, as well as running administrative reports
AP4	• Consider the following use-case of a travel agency. Use-Case Name: Ticket Purchasing Description: • The use-case begins when the customer calls the travel agency to

	ask it to issue a ticket that (s)he has booked. • The travel agency operator asks the customer to give his/her booking number. • The customer gives the booking number. • The operator types in the booking number and the flight reservation system displays the details of the reservation made. • The operator asks the customer to confirm the details of thereservation made. • The customer confirms the reservation made. • The operator asks the customer for a credit card number. • The customer gives his/her credit card number. • The operator types in the customer's credit card number and when the system confirms that the credit card transaction has been authorised (s)he asks the system to print the tickets, the details of the flights, and an invoice. • When the system confirms that the requested items have beenprinted, the operator informs the customer that the tickets have been issued. Think of at least two alternative courses of events for this use-case. Describe the alternative courses as separate use-cases. Modify the description of the original use-case to make evident where exactly these alternative use-cases may be called and under which conditions. Create a use-case diagram to illustrate the relationships between the alternative use-cases and the use-case given.
	WEEK 2
BP1	Create a Class Diagram for a Digital Sound Recorder with the following main features: • The recorder stores up to 10 messages • Each message is max. 2 minutes long • The user can record message • Recording of a message ends after 2 minutes or when the user stops recording • Recording destroys the original message at chosen slot • Sufficient level of battery is checked before recording message • Message of a given slot can be replayed • Sufficient level of battery is checked before replaying message • Messages can be locked/unlocked • Locked messages cannot be deleted or over-written by recording to the same slot • User uses LCD display and buttons to interact with recorder

BP2	Forward engineer the model obtained in BP1 to automatically generate equivalent Java stub Code?

	WEEK 3
CP1	**Purpose:** Describe major services (functionality) provided by a hospital's reception. **Summary**: **Hospital Management System** is a large system including several subsystems or modules providing variety of functions. **Hospital Reception** subsystem or module supports some of the many job duties of hospital receptionist. Receptionist schedules patient's appointments and admission to the hospital, collects information from patient upon patient's arrival and/or by phone. For the patient that will stay in the hospital ("inpatient") she or he should have a bed allotted in a ward. Receptionist may also receive and process patient's payments, record them and provide receipts. She also is responsible to file insurance claims and generate medical reports. • Make the use case diagram • Provide description for atleast 04 use cases • Make the class diagram • Generate Java stub code • Create Object Diagram
CP2	Create an object diagram for a Digital Sound Recorder with the following main features: • The recorder stores up to 10 messages • Each message is max. 2 minutes long • The user can record message • Recording of a message ends after 2 minutes or when the user stops recording • Recording destroys the original message at chosen slot • Sufficient level of battery is checked before recording message • Message of a given slot can be replayed • Sufficient level of battery is checked before replaying message • Messages can be locked/unlocked • Locked messages cannot be deleted or over-written by recording to the same slot User uses LCD display and buttons to interact with recorder
CP3	Create a package diagram for the Digital Sound Recorder in AP1
	WEEK 4

DP1	Create an activity diagram for record message use case of AP1?
DP2	Create an activity diagram for any two use cases of Hospital Reception Susbsystem in CP1
	WEEK 5
EP1	Create a sequence diagram for the playback message use case of AP1?
EP2	Create a sequence diagram for any two use cases of Hospital Reception Susbsystem in CP1
	WEEK 6
FP1	Create a state diagram for any two use cases of Hospital Reception Susbsystem in CP1
FP2	Create a state diagram for a BANK ATM machine?
	WEEK 7
GP1	Create a communication diagram for the playback message use case of AP1?
GP2	Create a communication diagram for any two use cases of Hospital Reception Susbsystem in CP1?
	WEEK 8
HP1	Create a component diagram for the Hospital Reception Subsystem?
HP2	Create a component diagram for ATM Machine
	WEEK 9
IP1	Create a deployment diagram for the Hospital Reception Subsystem?
IP2	Create a deployment diagram for ATM machine?
	PERT /GANTT CHART
JP1	Create a PERT Chart on Powerpoint for the following

	Activity	Description	Predecessor	Estimated Time (hours)	
	A	Drive Home	None	0.5	
	B	Wash Clothes	A	4.0	
	C	Pack	B	0.5	
	D	Go to Bank	A	1.0	
	E	Pay Bill	D	0.5	
	F	Pack Car	C,E	0.5	
	G	Drive to Bus	F	0.5	

JP2

Task	Prec Task	Description	Time (in hrs)	
A	None	Decide on Date for the Party	1	
B	A	Book a bouncy Castle	1	
C	A	Send Invitations	5	
D	C	Receive Replies	7	
E	D	Buy Toys and Balloons	1	

JP2		Task	Prec Task	Description	Time (in hrs)	
		A	None	Decide on Date for the Party	1	
		B	A	Book a bouncy Castle	1	
		C	A	Send Invitations	5	
		D	C	Receive Replies	7	
		E	D	Buy Toys and Balloons	1	
		F	D	Buy Food	3	
		G	E	Blow up Balloons	2	
		H	F	Make Food	1	
		I	H, G	Decorate	1	
		J	B	Get Bouncy Castle	1	
		K	J, I	Have Party	2	
		L	K	CleanUp	4	
		M	K	Send Back Bouncy Castle	1	
		N	M	Donate Unwanted Gifts	3	
	• label hours 0 to 30 across the horizontal axis • Mark a review stage at hour 14 to monitor the progress • Assume and illustrate that tasks A, B, C and D have beencompleted at hour 14 • State which tasks are ahead and which tasks are behindschedule Make a Gantt chart for the above?					

Assignment Set: A

1. Each message is max. 2 minutes long

2. The user can record message

3. Recording of a message ends after 2 minutes or when the user stops recording

4. Recording destroys the original message at chosen slot

5. Sufficient level of battery is checked before recording message

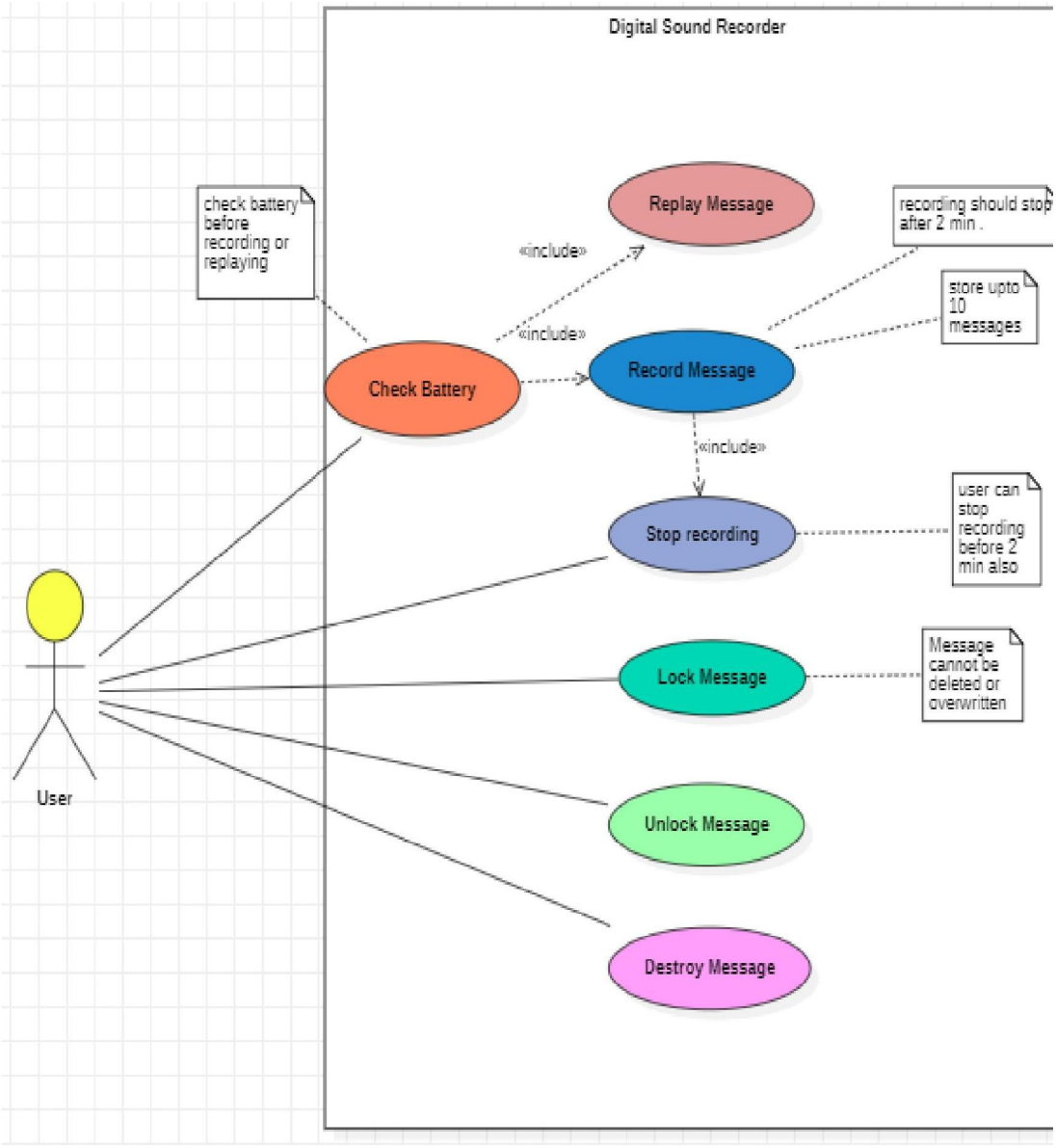
6. Message of a given slot can be replayed

7. Sufficient level of battery is checked before replaying message

8. Messages can be locked/unlocked

9. Locked messages cannot be deleted or over-written by recording to the same slot

User uses LCD display and buttons to interact with recorder



AP2. Formulate use case descriptions for 5 major use cases identified in the digital sound recorder

Check battery = Battery is checked before recording message and replaying message.There should be sufficient battery before doing

anything.

Lock message = User can lock message which means that user cannot delete or over-write the locked message while recording in the same slot.

Record message = If the digital sound recorder has sufficient battery , then only user can record a message. Recording can be of maximum 2 minutes and after 2 minuter it is including stop recording as it will stop automatically after 2 minutes there can be upto 10 messages stored in the recorder , after 10 it will not record more messages.

Stop recording = User can manually stop the recording before completion of 2 min also.

Destroy Message = This use case gives the user the authority to destroy the selected message in the particular slot. Recording destroys the original message at chosen slot

AP3. As the head of Information Technology at Acme Airlines, you are tasked with building a new booking system to replace the existing system. Acme needs a new system to allow employees to book ticket electronically and check the status of the booked tickets.

The new system will be state of the art and will have a Windows-based desktop interface to allow employees to enter booking details and view employee details. The system will run on individual employee desktops throughout the entire company. For reasons of security and auditing, employees can access only their data. The employees would only be able to view their information, and for any changes they would have to send an E-Mail to the administrator. Administrator would only have the right to make any changes in the records. For the cost being a factor Acme wants to use their old server with the existing

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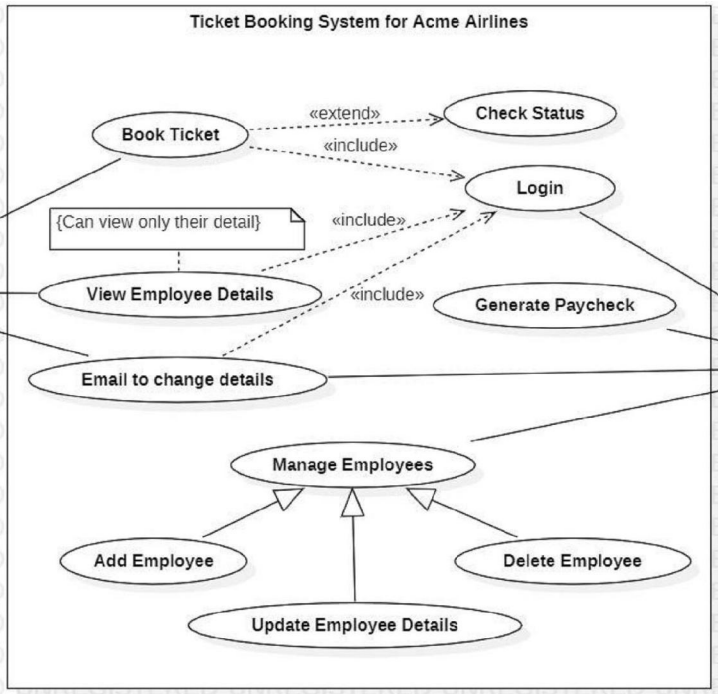


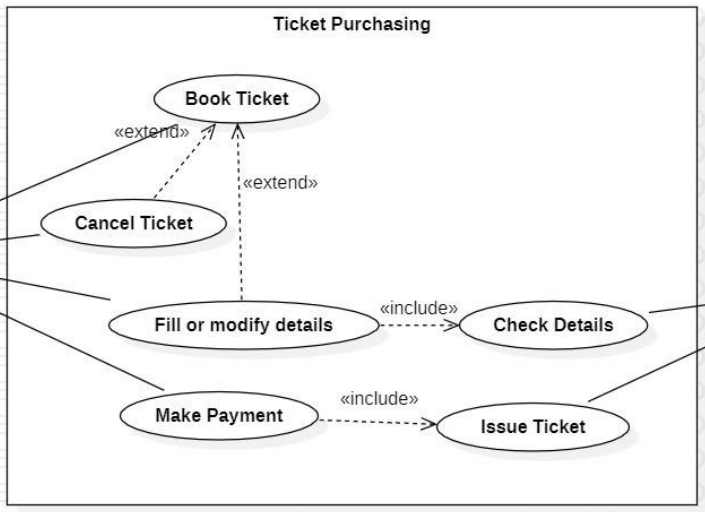
AP4. Consider the following use-case of a travel agency.Use-Case Name: Ticket Purchasing

Description:

- **The use-case begins when the customer calls the travel agency to ask it to issue a ticket that (s)hehas booked.**
- **The travel agency operator asks the customer to give his/her booking number.**

- **The customer gives the booking number.**
- **The operator types in the booking number and the flight reservation system displays the details ofthe reservation made.**
- **The operator asks the customer to confirm the details of the reservation made.**
- **The customer confirms the reservation made.**
- **The operator asks the customer for a credit card number.**
- **The customer gives his/her credit card number.**
- **The operator types in the customer's credit card number and when the system confirms that the credit card transaction has been authorized (s)he asks the system to print the tickets, the details of the flights, and an invoice.**
- **When the system confirms that the requested items have been printed, the operator informs thecustomer that the tickets have been issued.**

Think of at least two alternative courses of events for this use-case. Describe the alternative courses as separate use-cases. Modify the description of the original use-case to make evident where exactlythese alternative use-cases may be called and under which conditions. Create a use-case diagram to illustrate the relationships between the alternative use-cases and the use-case given.



Assignment Set: B

BP1. Create a Class Diagram for a Digital Sound Recorder with the following main features:

1. The recorder stores up to 10 messages

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3. The user can record message

4. Recording of a message ends after 2 minutes or when the user stops recording

5. Recording destroys the original message at chosen slot

6. Sufficient level of battery is checked before recording message

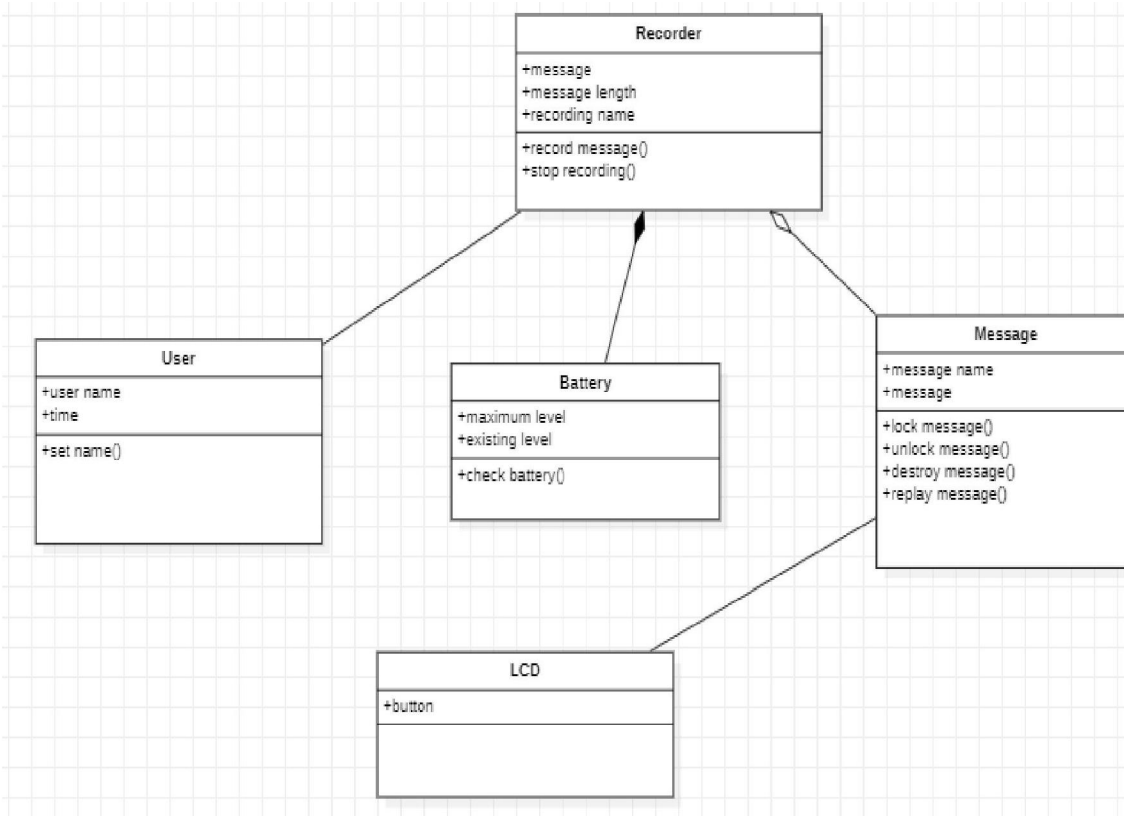
7. Message of a given slot can be replayed 8. Sufficient level of

battery is checked before replaying message

9. Messages can be locked/unlocked

10. Locked messages cannot be deleted or over-written by recording to the same slot

11. User uses LCD display and buttons to interact with recorder



BP2. Forward engineer the model obtained in BP1 to automatically generate equivalent Java stub Code?

Battery.java

```
import java.util.*;

/**
 *
 */
public class Battery {

    /**
     * Default constructor
     */
    public Battery() {
    }

    /**
     *
     */
    public void battery_level;

    /**
     * @param battery_level
     */
    public void checkBattery(void battery_level) {
        // TODO implement here
    }

}
```

Digital Sound Recorder.java

```
import java.util.*;

/**
 *
 */
public class Digital Sound Recorder {

    /**
     * Default constructor
     */
    public Digital Sound Recorder() {
    }

    /**
     *
     */
```

```
    public void no_of_messages;

    /**
     *
     */
    public void battery_level;

    /**
     *
     */
    public void dname;

    /**
     *
     */
    public void record() {
        // TODO implement here
    }

    /**
     *
     */
    public void replay() {
        // TODO implement here
    }

    /**
     *
     */
    public void delete() {
        // TODO implement here
    }

    /**
     *
     */
    public void start_recording() {
        // TODO implement here
    }

    /**
     *
     */
    public void stop_recording() {
        // TODO implement here
    }

}
```

Message.java

```
import java.util.*;

/**
 *
 */
public class Message {

    /**
     * Default constructor
     */
    public Message() {
    }

    /**
     *
     */
    public void message_length;

    /**
     *
     */
    public void Attribute1;

    /**
     *
     */
    public void message_id mid;

    /**
     *
     */
    public void message_name mname;

    /**
     *
     */
    public void msgLocked() {
        // TODO implement here
    }

    /**
     *
     */
    public void msgUnlocked() {
        // TODO implement here
    }

    /**
     * @param mid
```

```
     */
    public void replay(string mid) {
        // TODO implement here
    }
```

```
    /**
     * @param mid
     */
    public void delete(string mid) {
        // TODO implement here
    }
```

```
}
```

User.java

```
import java.util.*;
```

```
/**
 *
 */
public class User {
```

```
    /**
     * Default constructor
     */
    public User() {
    }
```

```
    /**
     *
     */
    public void name n;
```

```
    /**
     *
     */
    public void age a;
```

```
    /**
     *
     */
    public void contact_no cn;
```

```
    /**
     *
     */
    public void user_id id;
```

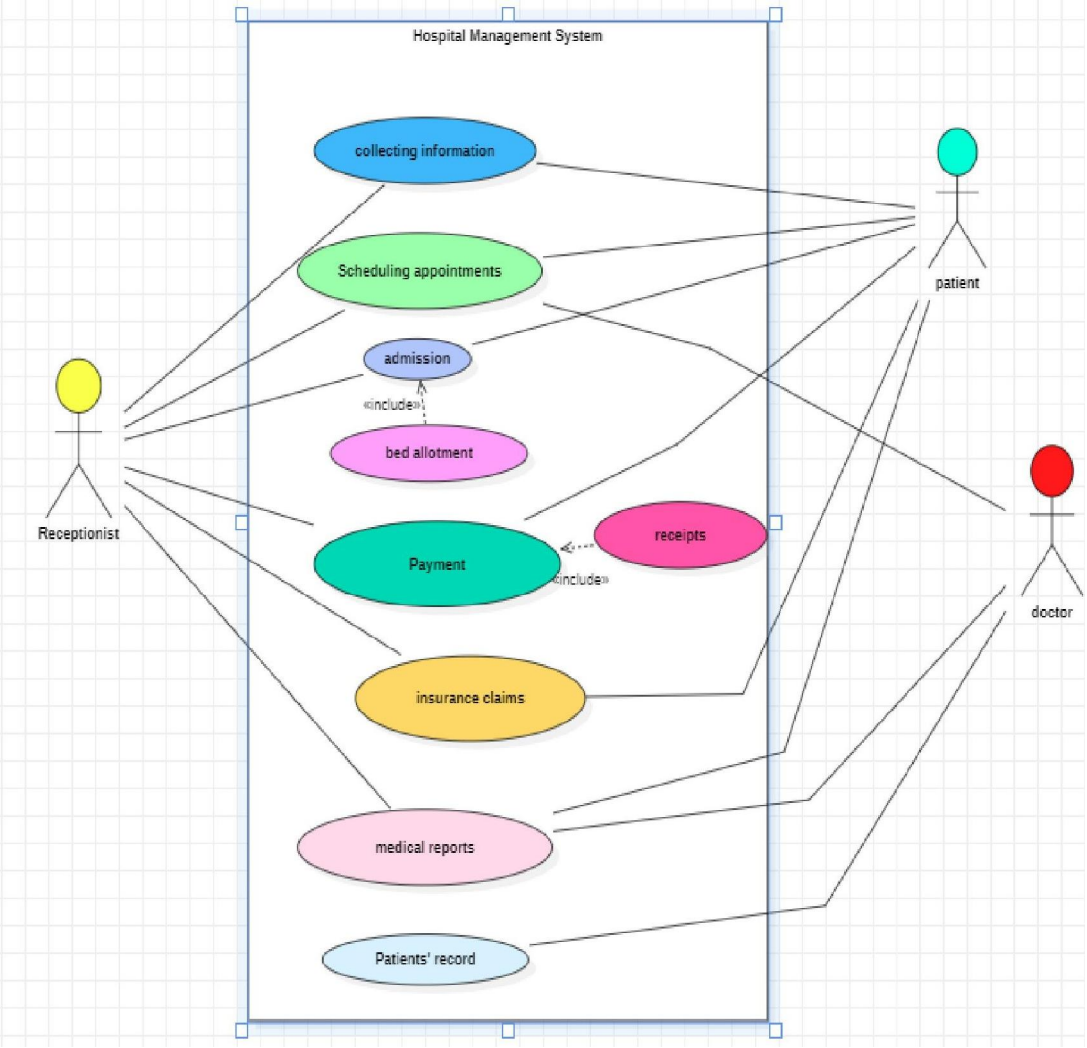
```
    /**
     * @param n
     */
    public void setname(string n) {
        // TODO implement here
    }

    /**
     * @param a
     */
    public void setAge(int a) {
        // TODO implement here
    }

    /**
     * @param cn
     */
    public void setContactNo(int cn) {
        // TODO implement here
    }

    /**
     * @param id
     */
    public void setUserId(string id) {
        // TODO implement here
    }

}
```

Assignment Set: C

CP1. Purpose: Describe major services (functionality) provided by a hospital's reception. Summary: Hospital Management System is a large system including several subsystems or modules providing variety of functions. Hospital Reception subsystem or module supports some of the many job duties of hospital receptionist. Receptionist schedules patient's appointments and admission to the hospital, collects information from patient upon patient's arrival and/or by phone. For the patient that will stay in the hospital ("inpatient")

she or he should have a bed allotted in a ward. Receptionist may also receive and process patient's payments, record them and provide receipts. She also is responsible to file insurance claims and generate medical reports.

a. Make the use case diagram



b. Provide description for at least 04 use cases

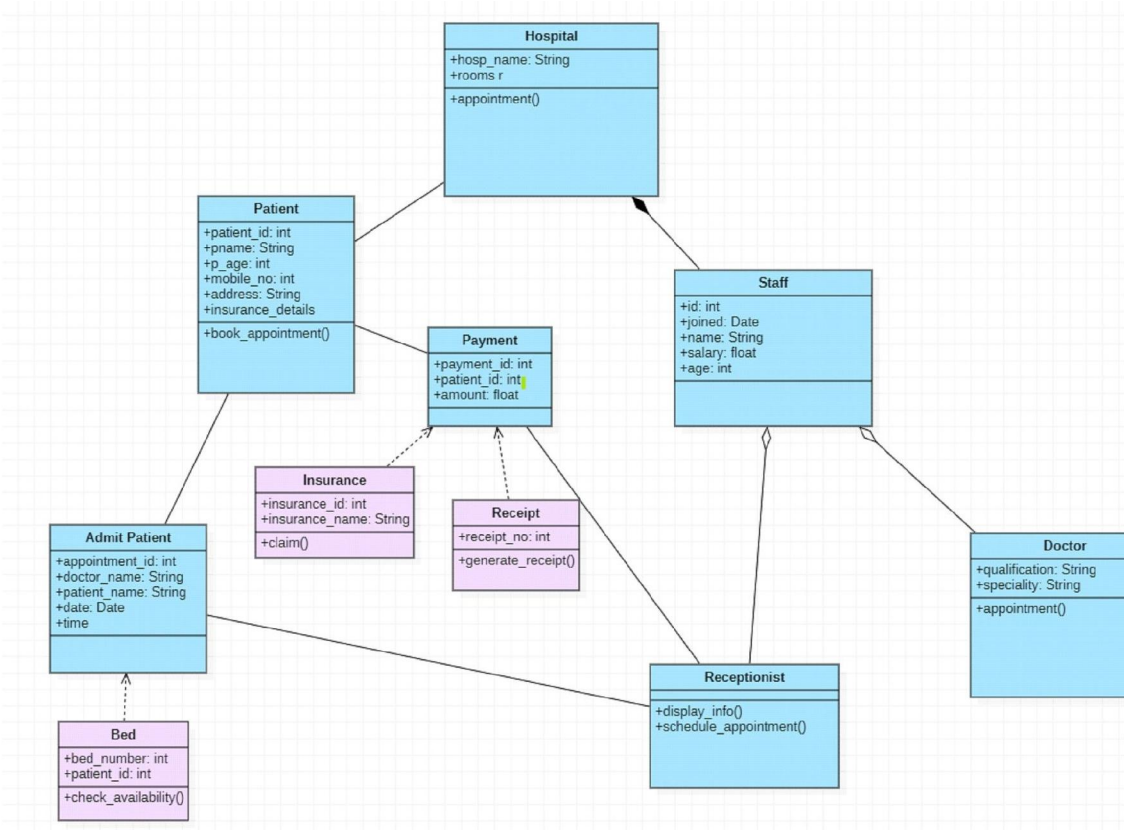
- Scheduling Appointments- The receptionist schedules appointments for patients either in person or over the phone. The receptionist collects necessary information from the patient, such as their name, contact details, etc. The receptionist then enters this information into the hospital's appointment scheduling system, which generates a confirmation for the patient.

- Collecting Information- The receptionist collects and verifies the patient's information. This includes the patient's name, address, contact details, insurance information, and medical history.

- Payment- The receptionist collects and process payments from patients for hospital services, such as consultation fees, tests, procedure, and room charges. The receptionist generates receipts for the patient and records the payment details.

- Insurance claims- This use case involves the receptionist filing insurance claims on behalf of patients. The receptionist collects relevant information from the patient and submits the insurance claims to the appropriate insurance provider.

c. Make the class diagram



d. Generate Java stub code

Admit Patient.java

```
import java.util.*;

/**
 *
 */
public class Admit Patient {

    /**
     * Default constructor
     */
    public Admit Patient() {
```

```
    }

    /**
     *
     */
    public int appointment_id;

    /**
     *
     */
    public String doctor_name;

    /**
     *
     */
    public String patient_name;

    /**
     *
     */
    public Date date;

    /**
     *
     */
    public void time;

}
```

Bed.java

```
import java.util.*;

/**
 *
 */
public class Bed {

    /**
     * Default constructor
     */
    public Bed() {
    }

    /**
     *
     */
    public int bed_number;
```

```
    /**
     *
     */
    public int patient_id;

    /**
     *
     */
    public void check_availability() {
        // TODO implement here
    }

}
```

Doctor.java

```
import java.util.*;

/**
 *
 */
public class Doctor {

    /**
     * Default constructor
     */
    public Doctor() {
    }

    /**
     *
     */
    public String qualification;

    /**
     *
     */
    public String speciality;

    /**
     *
     */
    public void appointment() {
        // TODO implement here
    }

}
```

Hospital.java

```
import java.util.*;

/**
 *
 */
public class Hospital {

    /**
     * Default constructor
     */
    public Hospital() {
    }

    /**
     *
     */
    public String hosp_name;

    /**
     *
     */
    public void rooms r;

    /**
     *
     */
    public void appointment() {
        // TODO implement here
    }

}
```

Insurance.java

```
import java.util.*;

/**
 *
 */
public class Insurance {

    /**
     * Default constructor
```

```
     */
    public Insurance() {
    }

    /**
     *
     */
    public int insurance_id;

    /**
     *
     */
    public String insurance_name;

    /**
     *
     */
    public void claim() {
        // TODO implement here
    }

}
```

Patient.java

```
import java.util.*;

/**
 *
 */
public class Patient {

    /**
     * Default constructor
     */
    public Patient() {
    }

    /**
     *
     */
    public int patient_id;

    /**
     *
     */
    public String pname;

    /**
```

```
     *
     */
    public int p_age;

    /**
     *
     */
    public int mobile_no;

    /**
     *
     */
    public String address;

    /**
     *
     */
    public void insurance_details;

    /**
     *
     */
    public void book_appointment() {
        // TODO implement here
    }

}
```

Payment.java

```
import java.util.*;

/**
 *
 */
public class Payment {

    /**
     * Default constructor
     */
    public Payment() {
    }

    /**
     *
     */
    public int payment_id;

    /**
```

```
     *
     */
    public int patient_id;

    /**
     *
     */
    public float amount;

}
```

Receipt.java

```
import java.util.*;

/**
 *
 */
public class Receipt {

    /**
     * Default constructor
     */
    public Receipt() {
    }

    /**
     *
     */
    public int receipt_no;

    /**
     *
     */
    public void generate_receipt() {
        // TODO implement here
    }

}
```

Receptionist.java

```
import java.util.*;

/**
 *
```

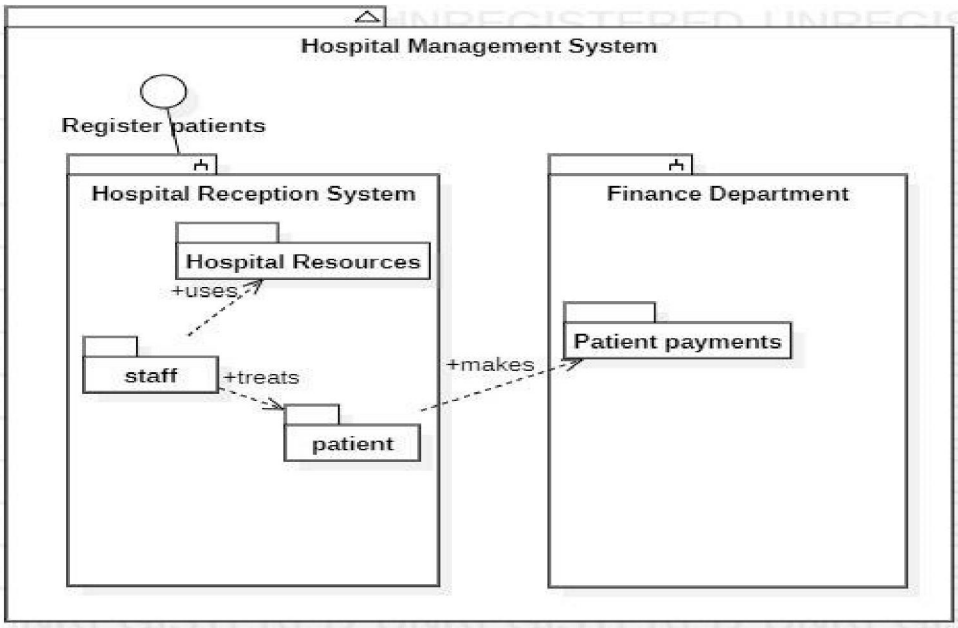
```
 */
public class Receptionist {

    /**
     * Default constructor
     */
    public Receptionist() {
    }

    /**
     *
     */
    public void display_info() {
        // TODO implement here
    }

    /**
     *
     */
    public void schedule_appointment() {
        // TODO implement here
    }

}
```

Staff.java

```
import java.util.*;

/**
 *
 */
public class Staff {

    /**
     * Default constructor
     */
    public Staff() {
    }

    /**
     *
     */
    public int id;

    /**
     *
     */
    public Date joined;
```

```
    /**
     *
     */
    public String name;

    /**
     *
     */
    public float salary;

    /**
     *
     */
    public int age;

}
```

e. Create Object Diagram



CP2. Create an object diagram for a Digital Sound Recorder with the following main features:

1. The recorder stores up to 10 messages

2. Each message is max. 2 minutes long

3. The user can record message

4. Recording of a message ends after 2 minutes or when the user stops recording

5. Recording destroys the original message at chosen slot

6. Sufficient level of battery is checked before recording message

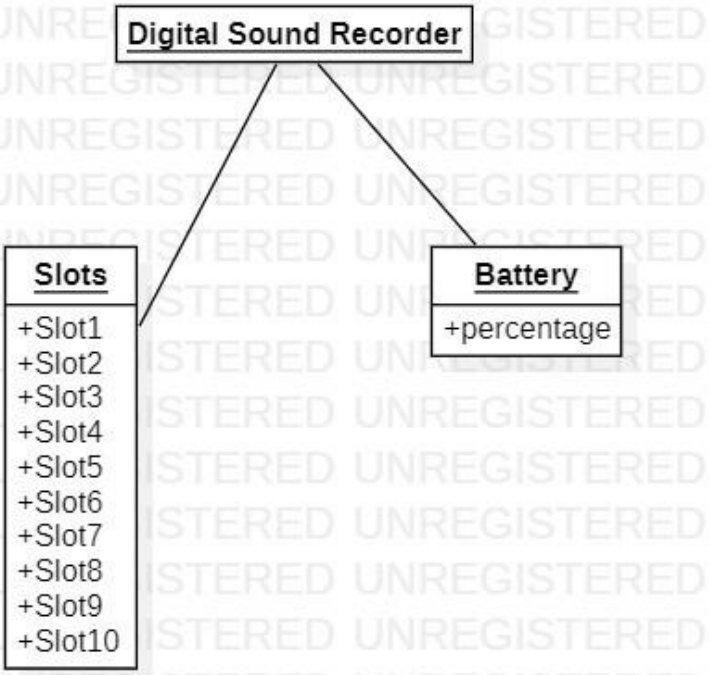
7. Message of a given slot can be replayed

8. Sufficient level of battery is checked before replaying message

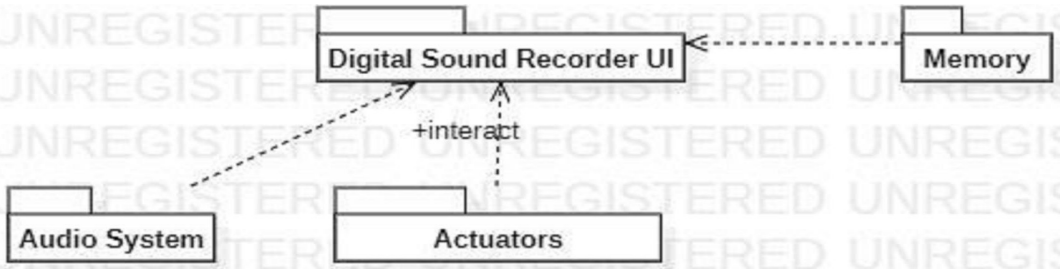
9. Messages can be locked/unlocked

10. Locked messages cannot be deleted or over-written by recording to the same slot

User uses LCD display and buttons to interact with recorder

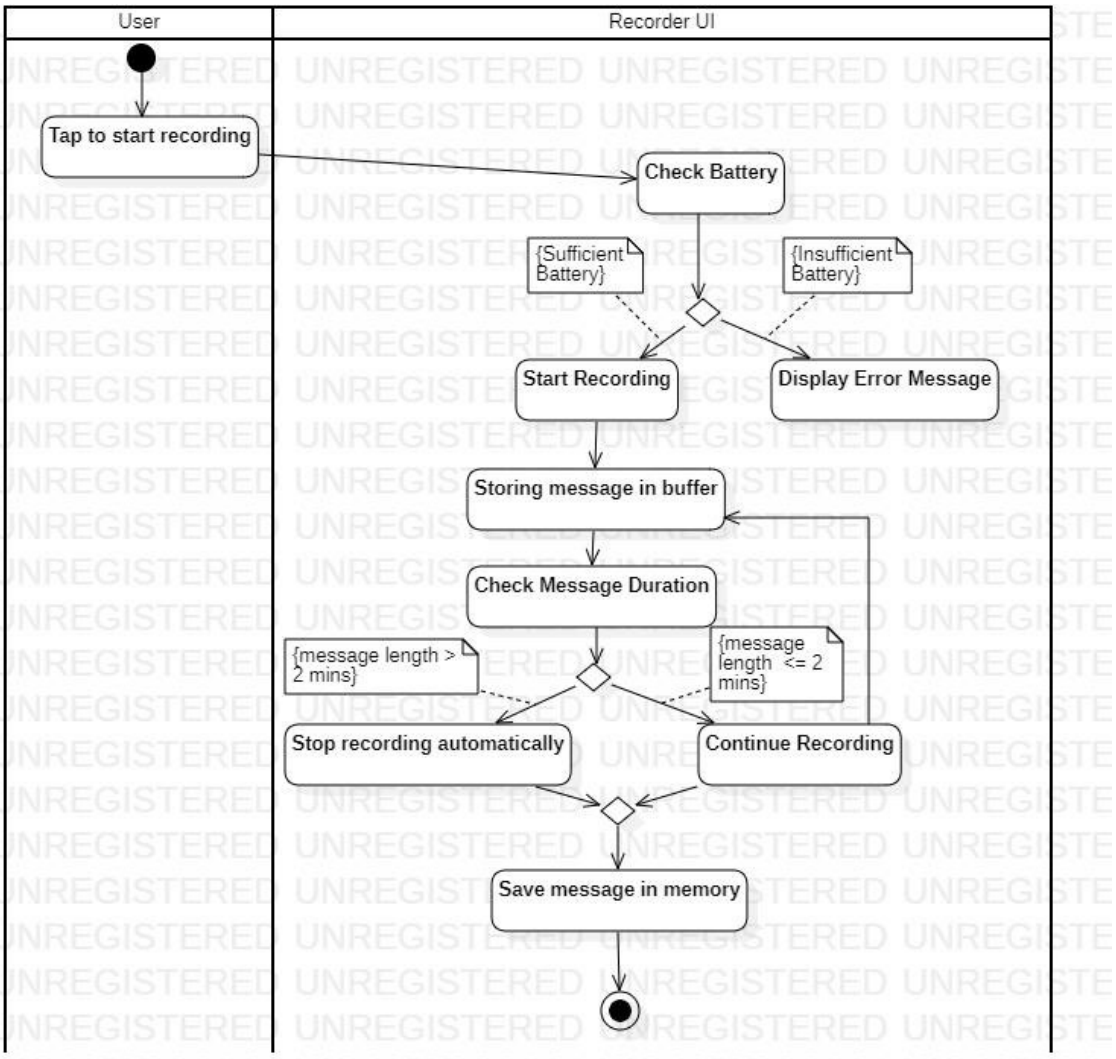


CP3. Create a package diagram for the Digital Sound Recorder in AP1

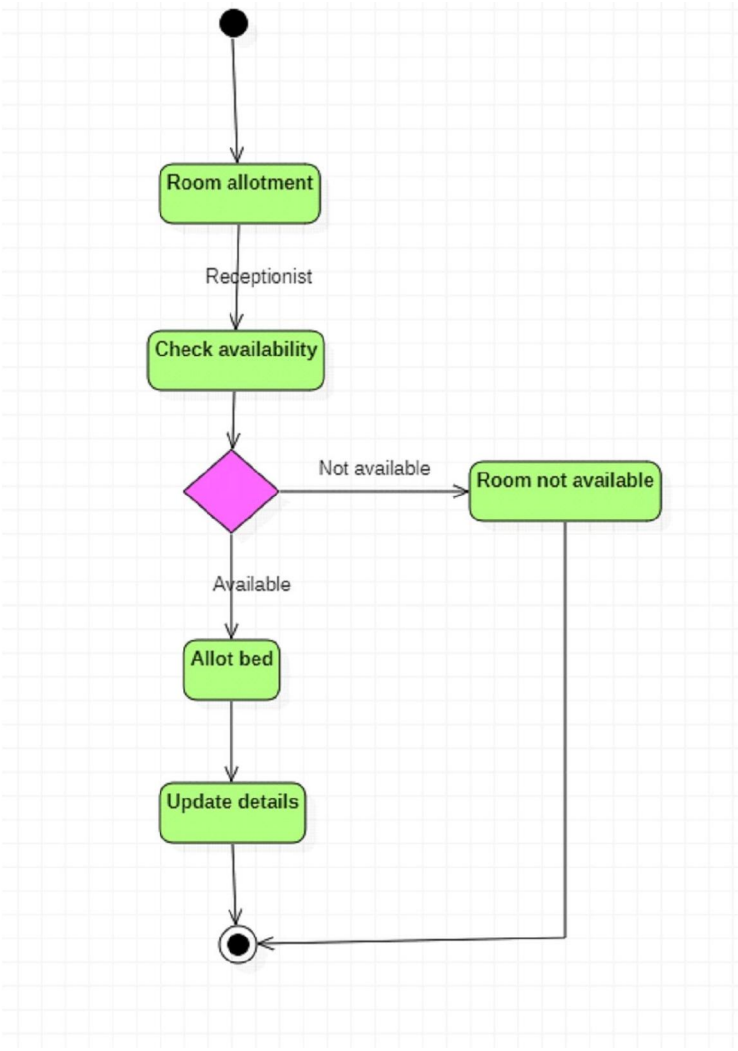


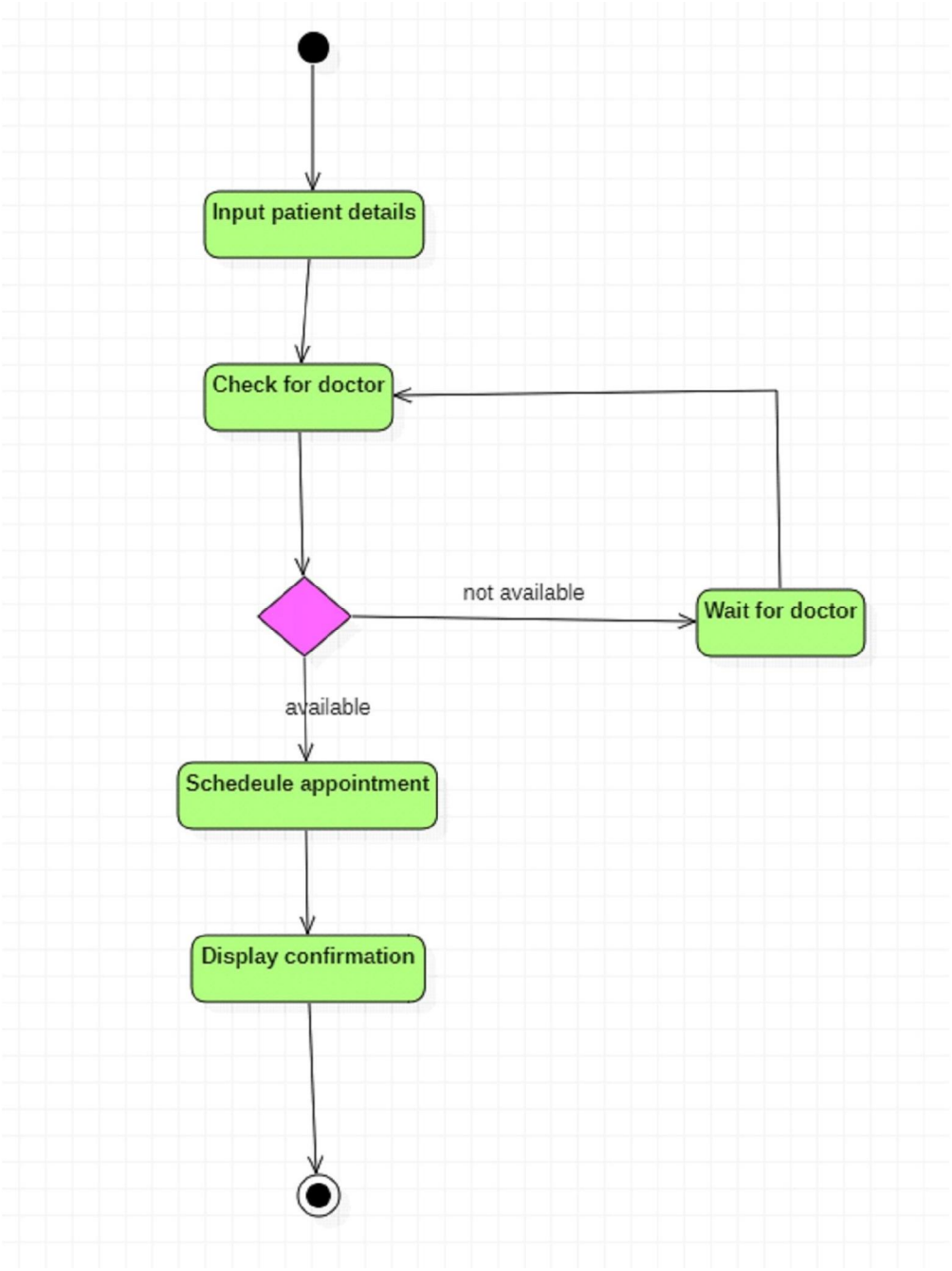
Assignment Set: D

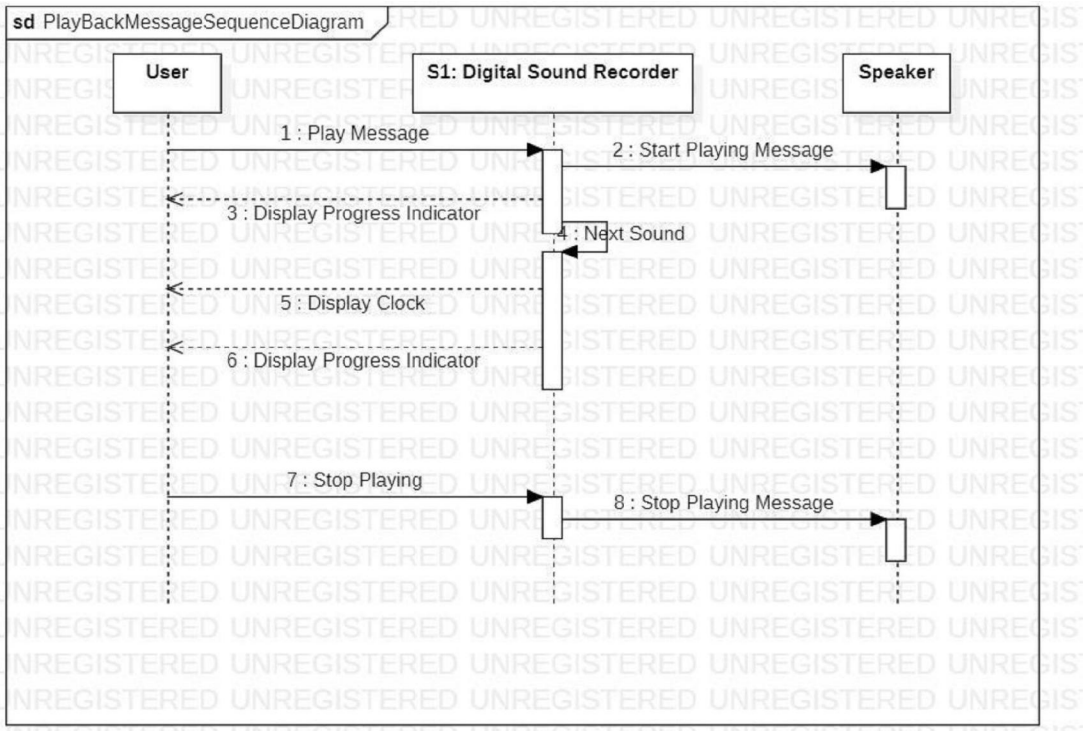
DP1. Create an activity diagram for record message use case of AP1?



DP2. Create an activity diagram for any two use cases of Hospital Reception Subsystem in CP1.

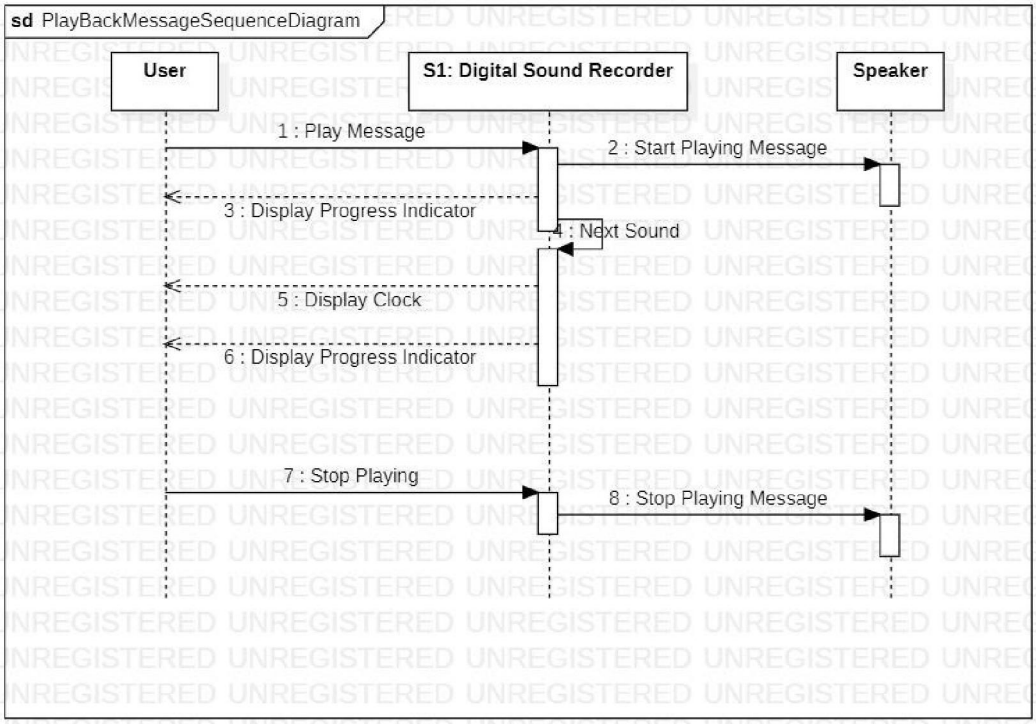

Room allotment
Receptionist
Check availability
Not available
Room not available
Available
Allot bed
Update details


Input patient details
Check for doctor
not available
Wait for doctor
available
Schedeule appointment
Display confirmation

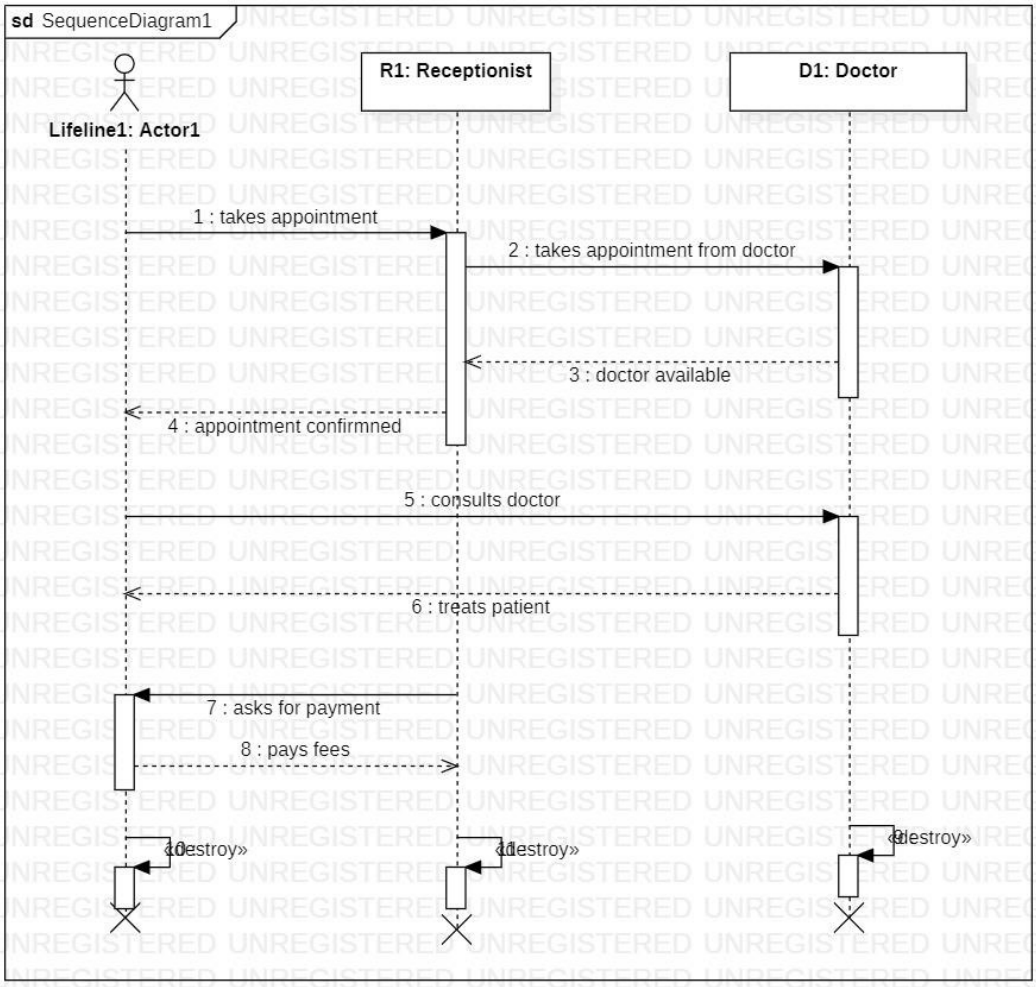


Assignment Set: E

EP1. Create a sequence diagram for the playback message use case of AP1?

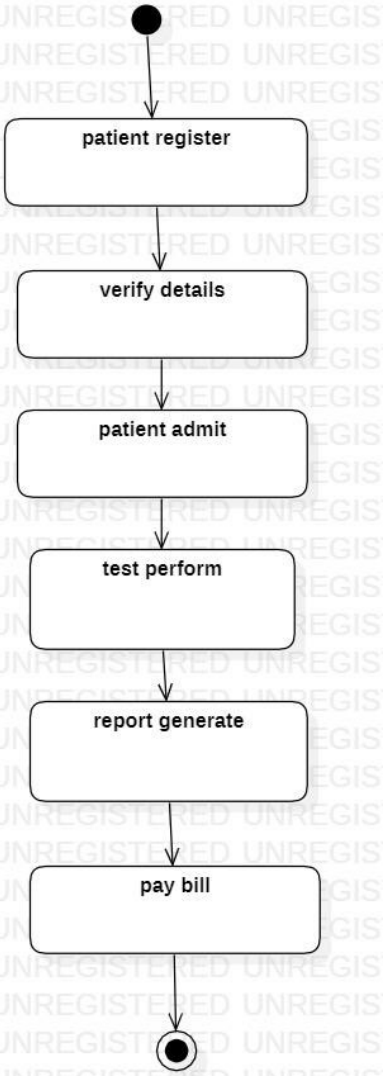


EP2. Create a sequence diagram for any two use cases of Hospital Reception Subsystem in CP1.

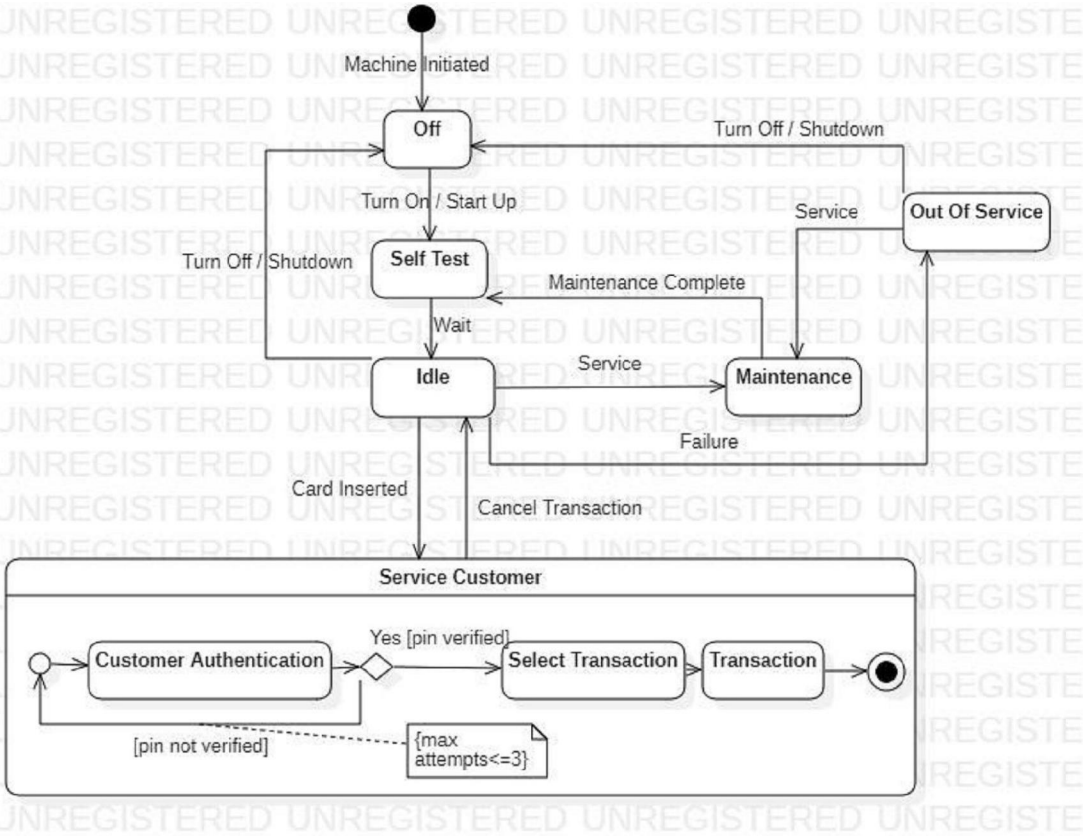


Assignment Set: F

FP1. Create a state diagram for any two use cases of Hospital Reception Subsystem in CP1.

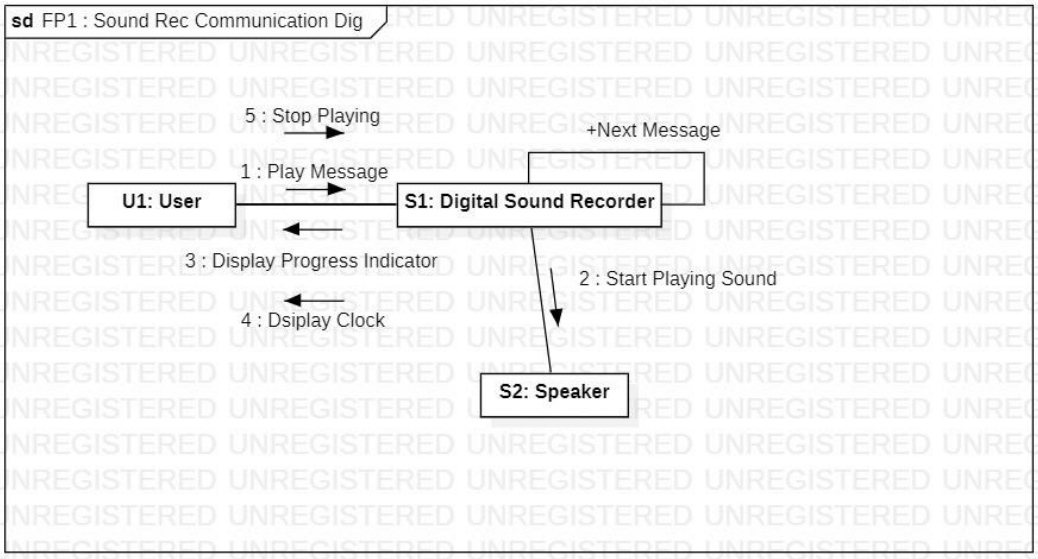


FP2. Create a state diagram for a BANK ATM machine?

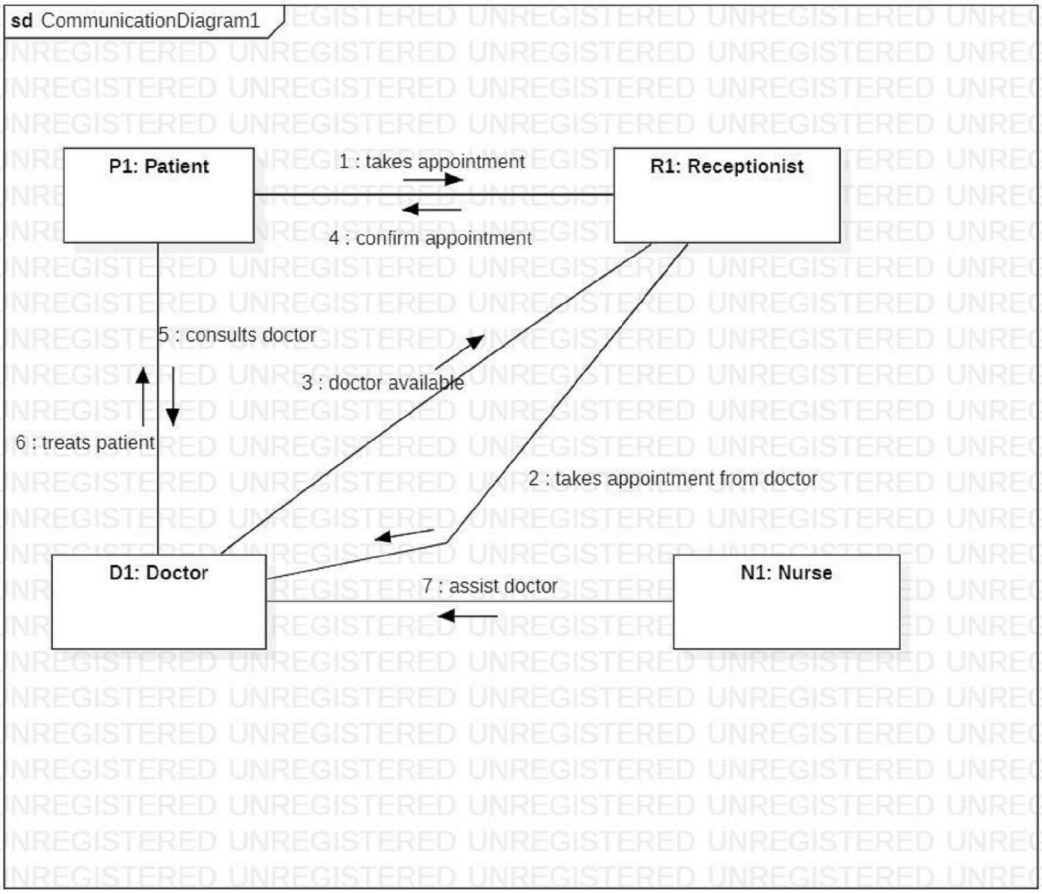


Assignment Set: G

GP1. Create a communication diagram for the playback message use case of AP1?

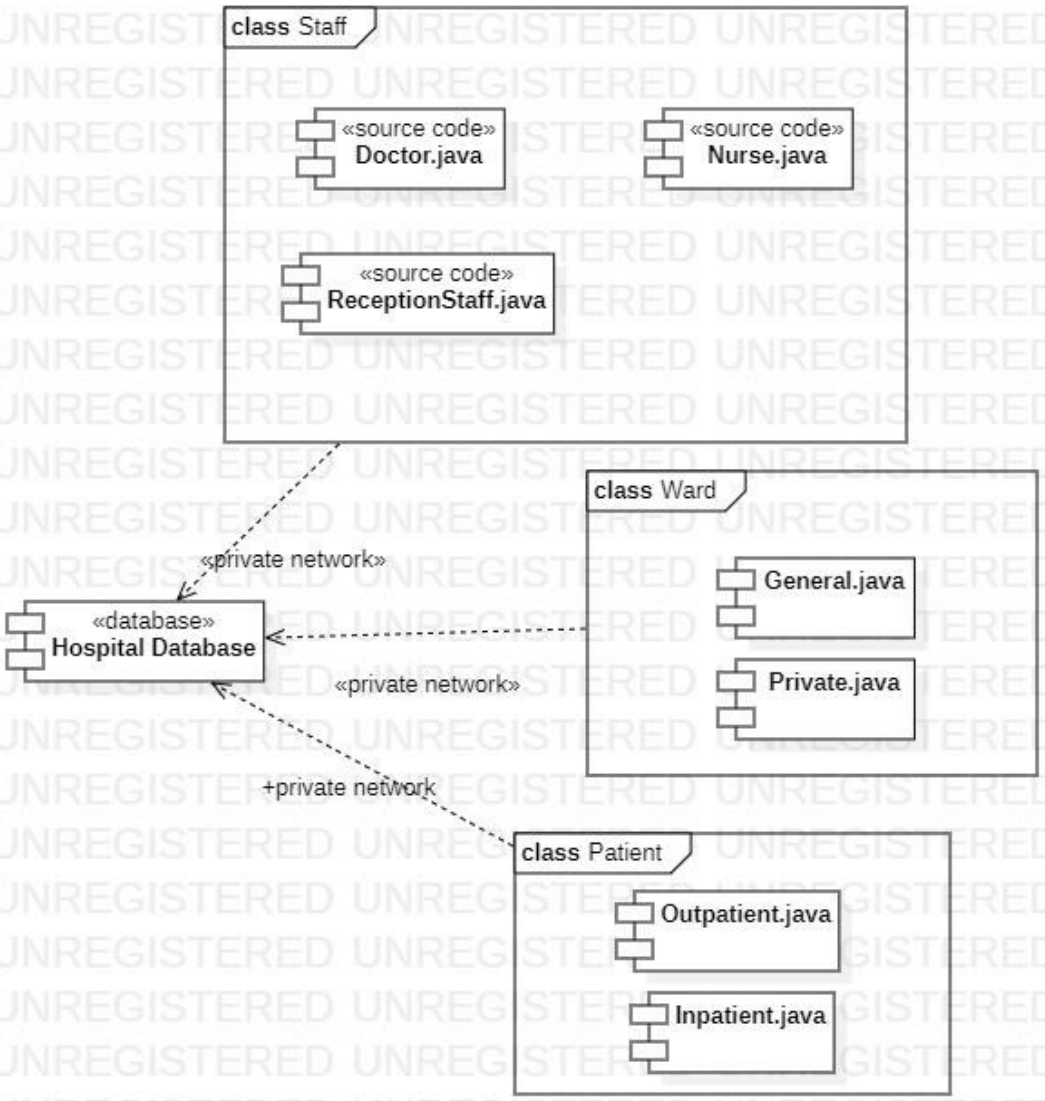


GP2. Create a communication diagram for any two use cases of Hospital Reception Subsystem in CP1?

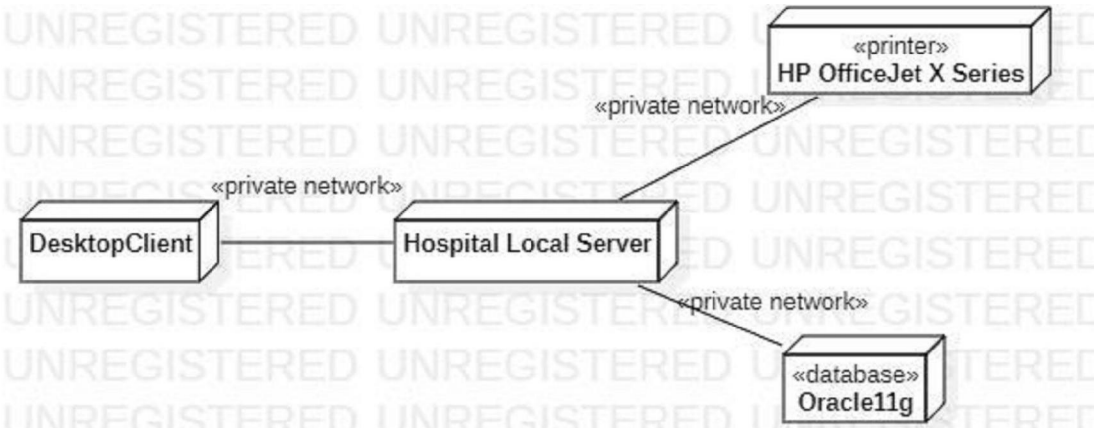


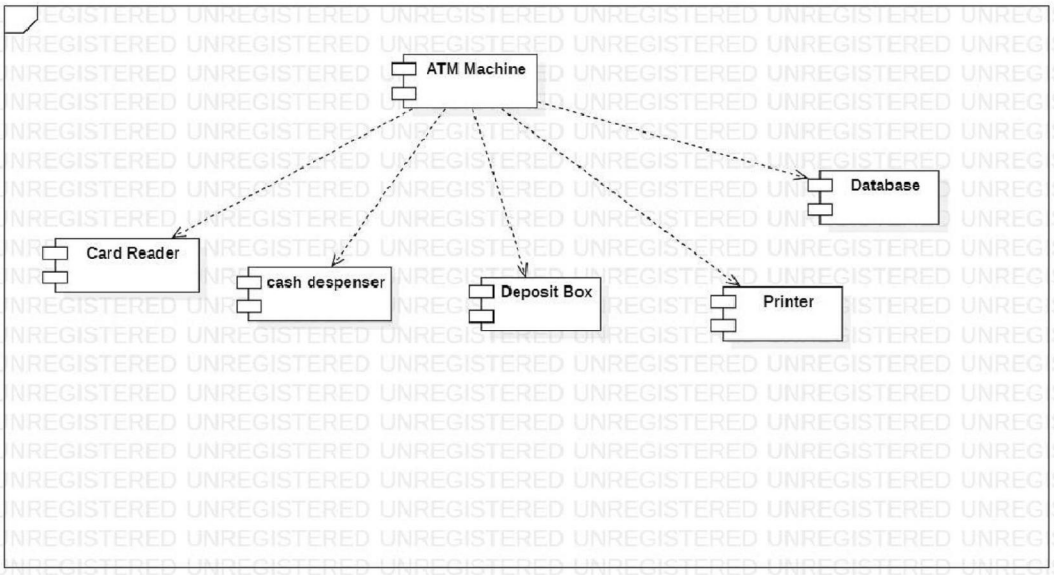
Assignment Set: H

HP1. Create a component diagram for the Hospital Reception Subsystem?



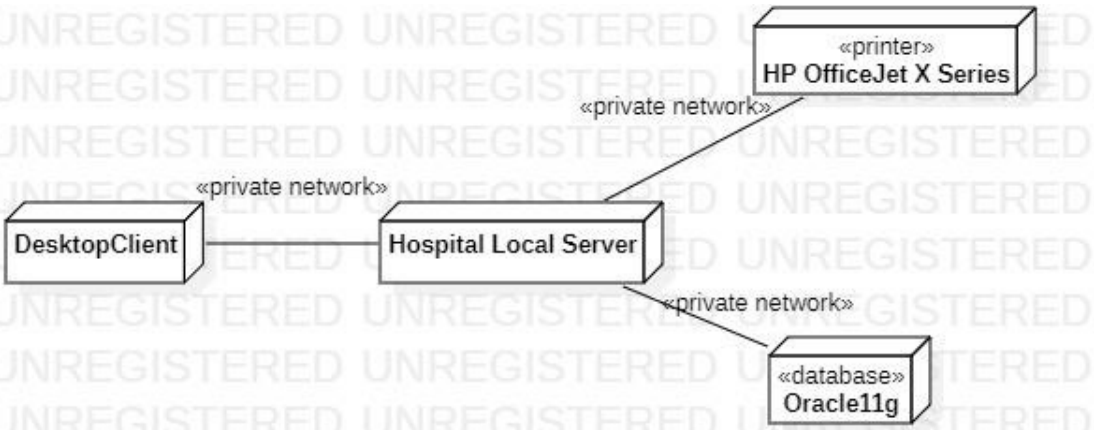
HP2. Create a component diagram for ATM Machine.



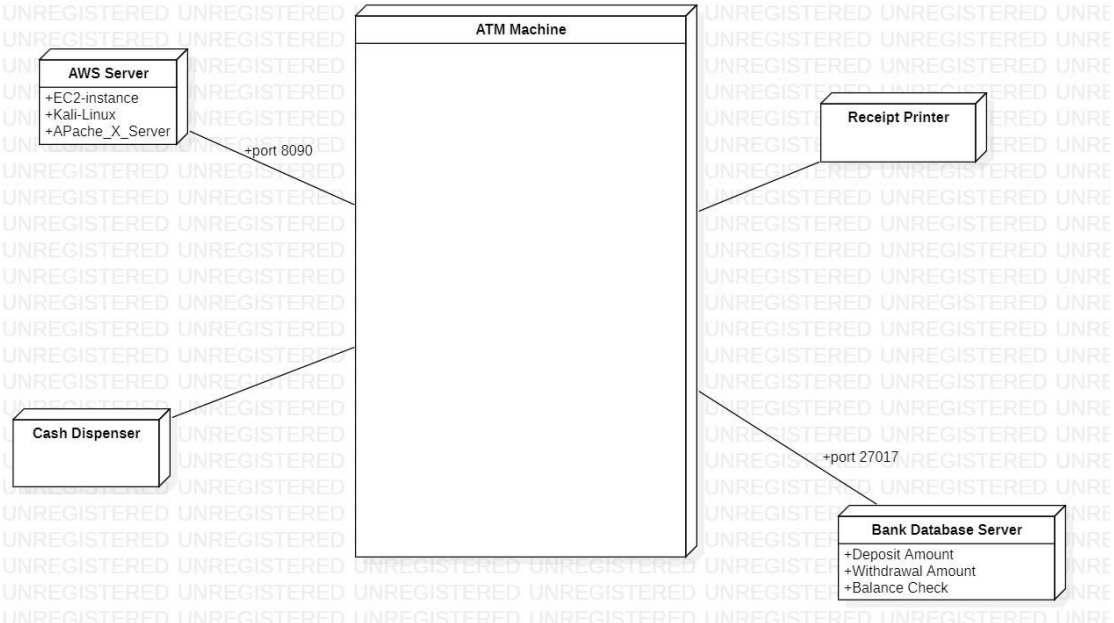


Assignment Set: I

IP1. Create a deployment diagram for the Hospital Reception Subsystem?



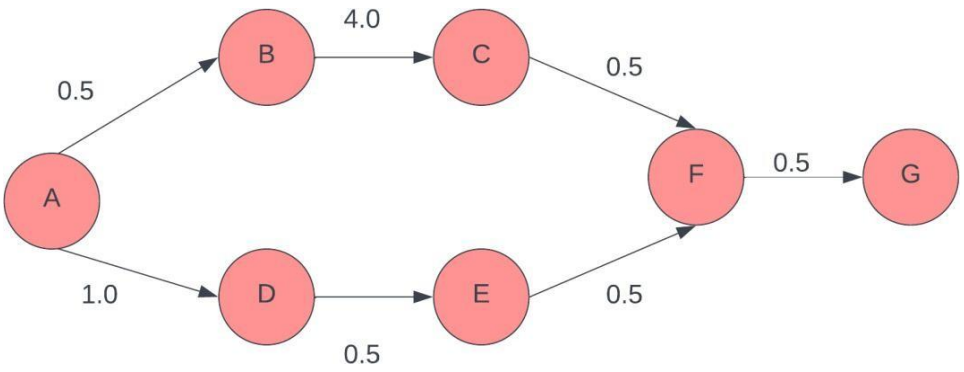
IP2. Create a deployment diagram for ATM machine?



Assignment Set: J

JP1. Create a PERT Chart on Powerpoint for the following

Activity	Description	Predecessor	Estimated Time (hours)
A	Drive Home	None	0.5
B	Wash Clothes	A	4.0
C	Pack	B	0.5
D	Go to Bank	A	1.0
E	Pay Bill	D	0.5
F	Pack Car	C,E	0.5
G	Drive to Bus	F	0.5



Note Duration in Hours:

P1 = A->B->C->F->G =

5.5 hoursP2 = A->D->
E->F->G = 2.5 hours

JP2. Create a GANTT Chart on PowerPoint for the following

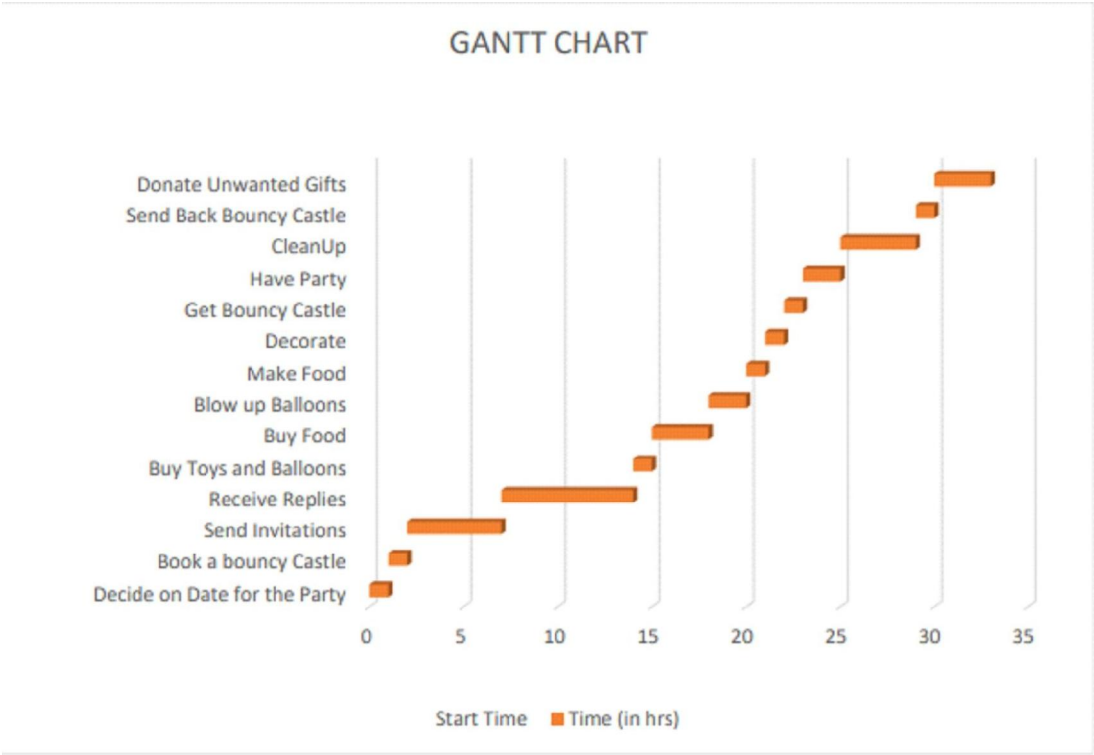
	Task	Prec Task	Description	Time (in hrs)	
	A	None	Decide on Date for the Party	1	
	B	A	Book a bouncy Castle	1	
	C	A	Send Invitations	5	
	D	C	Receive Replies	7	
	E	D	Buy Toys and Balloons	1	
	F	D	Buy Food	3	
	G	E	Blow up Balloons	2	
	H	F	Make Food	1	
	I	H, G	Decorate	1	
	J	B	Get Bouncy Castle	1	
	K	J, I	Have Party	2	
	L	K	CleanUp	4	
	M	K	Send Back Bouncy Castle	1	
	N	M	Donate Unwanted Gifts	3	

• label hours 0 to 30 across the horizontal axis

• Mark a review stage at hour 14 to monitor the progress

• Assume and illustrate that tasks A, B, C and D have been completed at hour 14

• State which tasks are ahead and which tasks are behind schedule


GANTT CHART
Donate Unwanted Gifts
Send Back Bouncy Castle
CleanUp
Have Party
Get Bouncy Castle
Decorate
Make Food
Blow up Balloons
Buy Food
Buy Toys and Balloons
Receive Replies
Send Invitations
Book a bouncy Castle
Decide on Date for the Party
0
5
10
15
20
25
30
35
Start Time
Time (in hrs)