

SOFTWARE ENGINEERING

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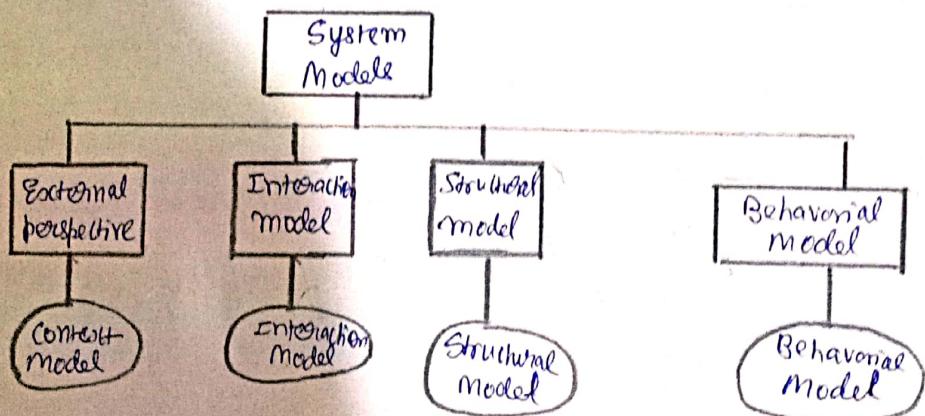
ASSIGNMENT - 2

Q1 What is System modelling & types of System Modelling

Ans SYSTEM MODELLING

- System modelling is the process of developing abstract models of a system with each model presenting a different view or perspective of that system.
- System Modelling has now come to mean representing a system using some kind of graphical notation which is based on notations of the UML [Unified Modelling Language]
- System modelling helps the analyst to understand the functionality of the system and models are used to communicate with customers.

TYPES OF SYSTEM MODELS



- An External perspective:- Where you model the context or environment of the system
- An Interaction perspective:- Where you model the interactions between a system and its environment as b/w the components of a system
- A Structural perspective:- where you model the organization of a system

on the structure of the data that is processed by the system

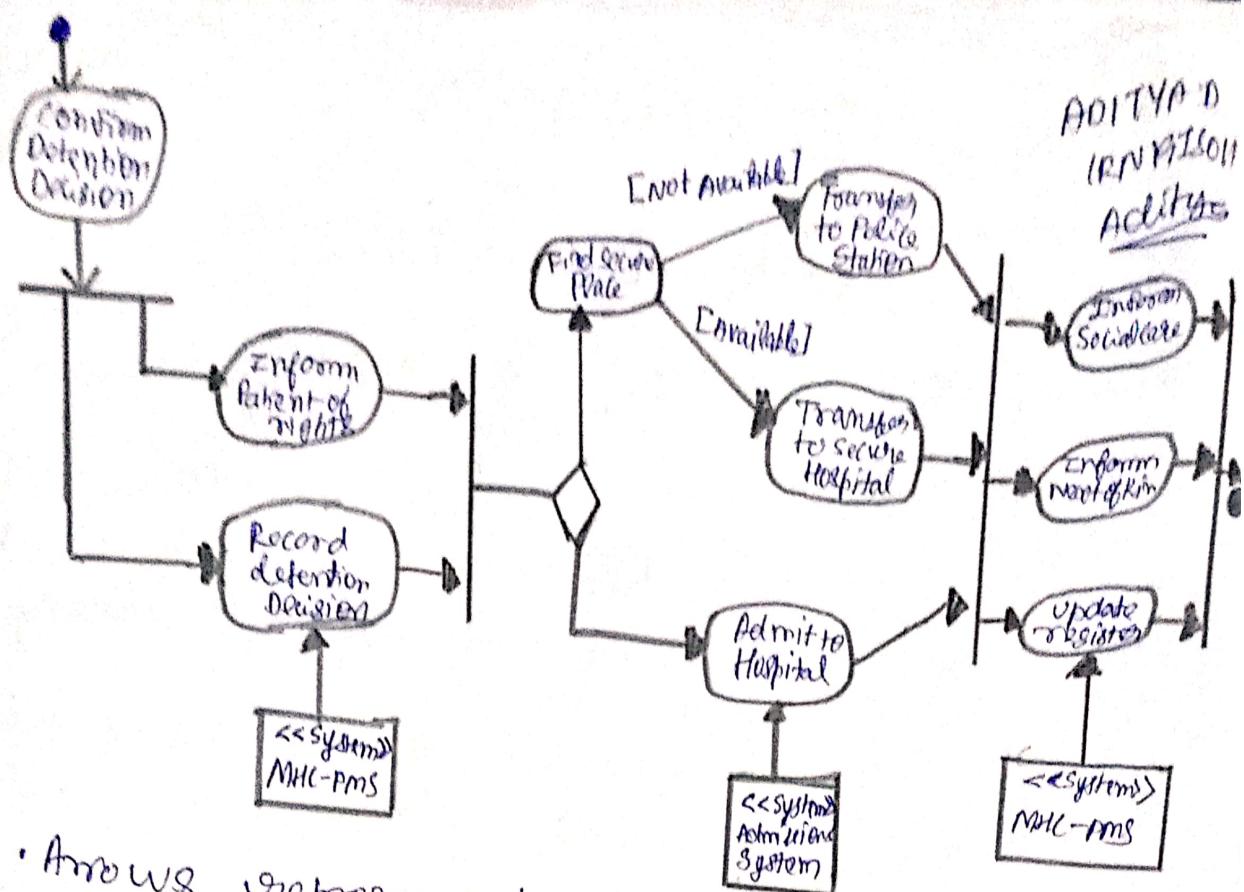
- A behavioral perspective: where you model the dynamic behaviour of the system and how it responds to events.

Q2 Demonstrate process model of Involuntary Detention.

- Ans
- Process model is a model of an important system process that shows the procedure in which the MHR-PMS is used. Sometimes patients who are suffering from mental health problems may be a danger to others or to themselves. They may have to be detained against their will in a hospital so that treatment can be administered.
 - Such detention is subject to strict legal safeguards ex:- the decision to detain a patient must be regularly reviewed so that people are not held indefinitely without good reason. One of the functions of the MHR-PMS is to ensure that such safeguards are implemented.
 - Activity diagrams are intended to show the activities that make up a system process and the flow of control from one activity to another.

WORKFLOW

1. The start of a process is indicated by a filled circle
2. End by a filled circle inside another circle
3. Rectangles with rounded corners represent activities that is the specific sub-processes that must be carried out.

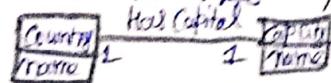


- Arrows represent the flow of work from one activity to another.
- A Solid Bar is used to indicate activity coordination when the flow from more than one activity leads to a Solid bar. Then all of these activities must be complete before progress is possible.
- When the flow from a Solid bar leads to a no of activities , there may be executed in parallel.
- Activities to inform Social care and the patient may be concurrent.
- Arrows may be annotated with guards that indicate the condition when that flow is taken.
- Guards showing the flows for patients who are dangerous and not dangerous to society . Patients who are dangerous to society must be detained in a secure facility.
- Patients who are suicidal and are a danger to themselves may be detained in an appropriate hospital.

Q3 with example differentiate between
(i) links and associations

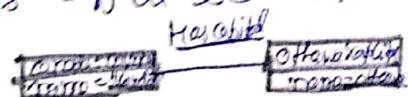
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Ans Link:- is a physical or conceptual connection among objects Eg:- Joe Smith works - For Simplex Company



Pls: Example of association

• Most links relate two objects - but some relate three or more objects



• A link is a tuple i.e. list of objects . A link is an instance of an association

Association:-

• An association is a description of a group of links with common structure and common semantics

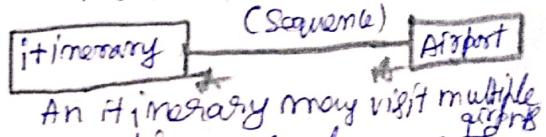
Eg :- a person works for a company

• The links of an association connect objects from the same class.

• An Association describes a set of potential links in the same way that a class describes a set of potential objects . ~~Links and association~~

(ii) bags and sequence

• A bag is a collection of elements - with duplicates allowed



An Itinerary may visit multiple airports

• A sequence is an ordered collection of elements with duplicates allowed

Q4 What is generalization hierarchy? Give examples

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Ans. Generalization is the relationship between a class and one or more Variations of the class

• Generalization organizes classes by their similarities and differences structuring the description of objects

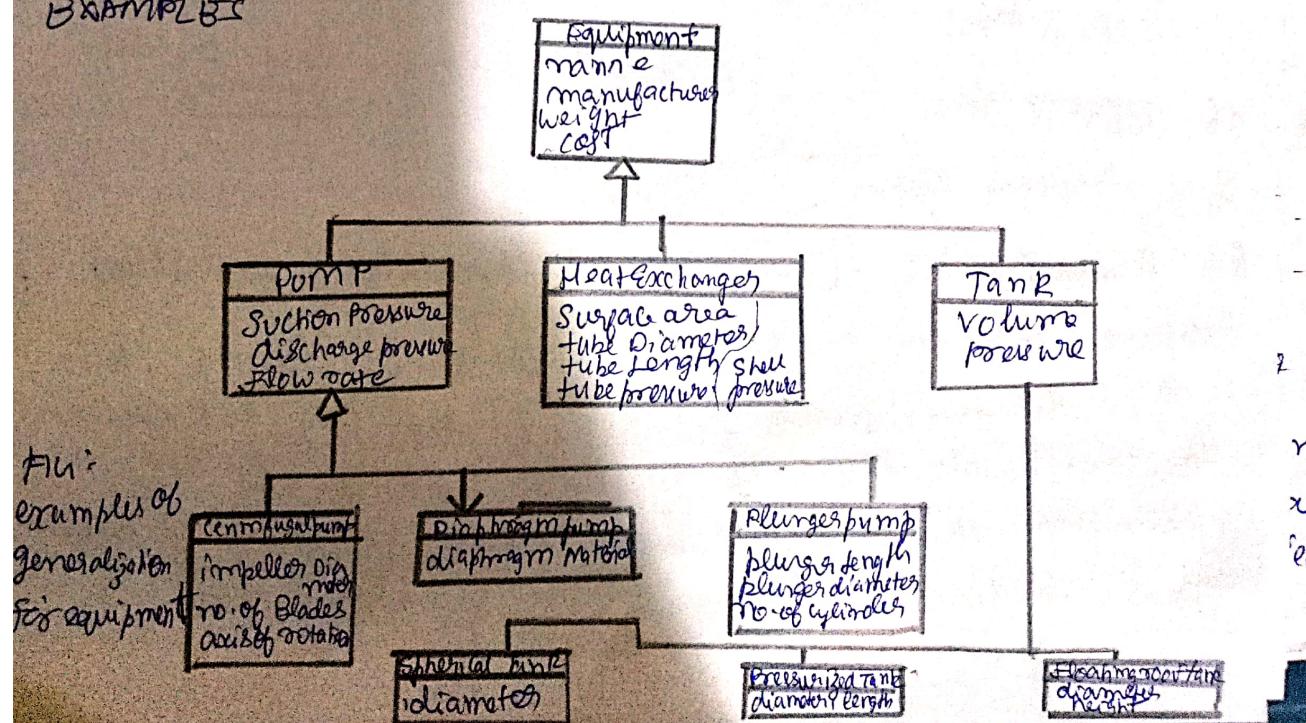
• Super class holds common attributes, operations and association

• Each subclss is said to inherit from superclss

• Generalization is sometimes called as is-a relationship because each instance of a subclss is an instance of superclss as well

• Simple generalization organizes classes into a hierarchy; each subclss has single immediate superclss

EXAMPLES



Q 5 Define multiplicity and explain with an example

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Ans MULTICITY

- Multiplicity specifies the no. of instances of one class that may relate to single instance of an associated class. Multiplicity constrains no. of related objects. The literature often describes multiplicity as being "one" or "many". Example.



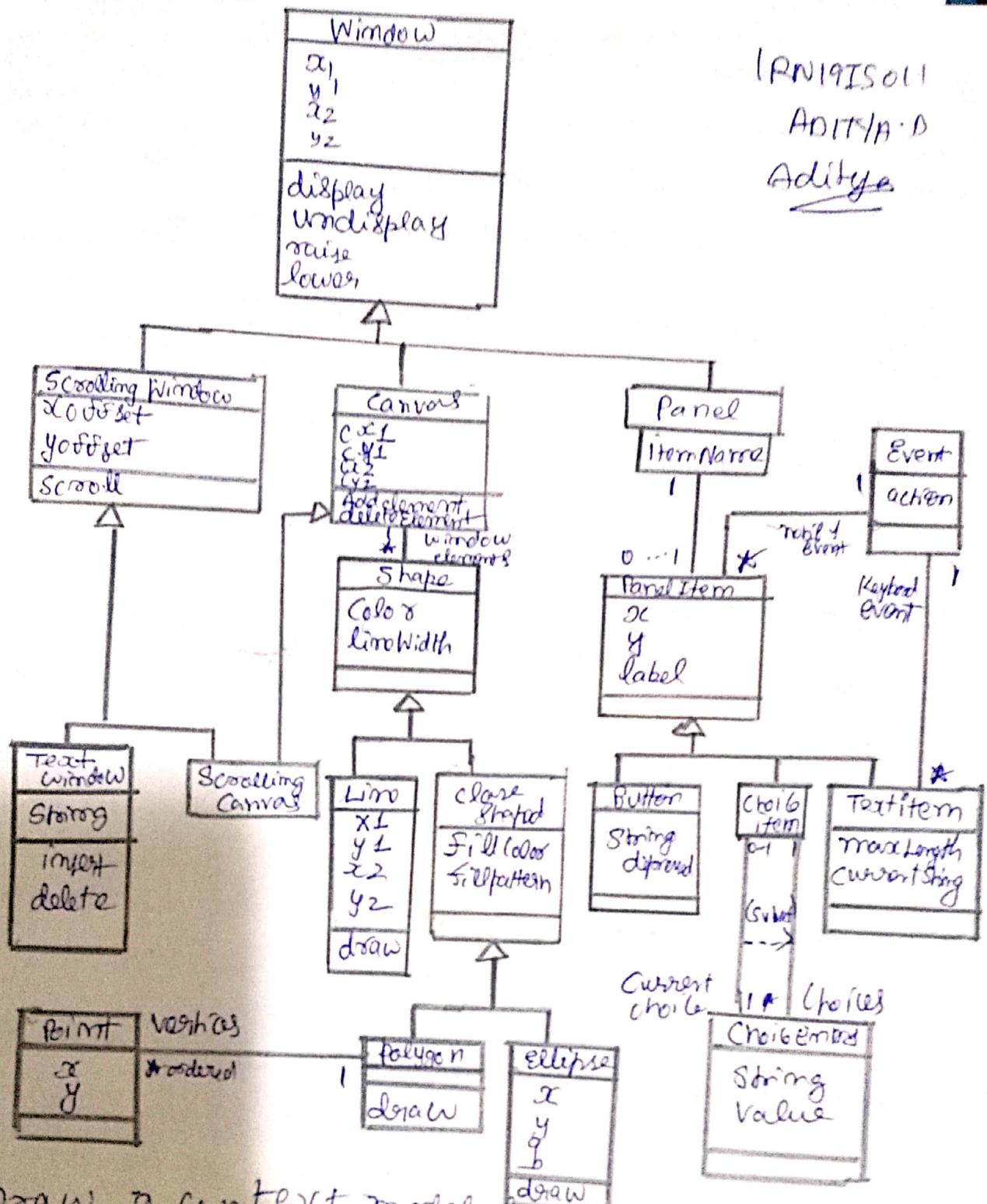
- A workstation may have one of its windows designated as the console to give a general error messages. It is possible that no console window exists.
- Multiplicity is constraint on size of collection.

concept? written class model of what is modelling of windowing system?

Ans: A model is an abstraction of something for the purpose of understanding it before building it.

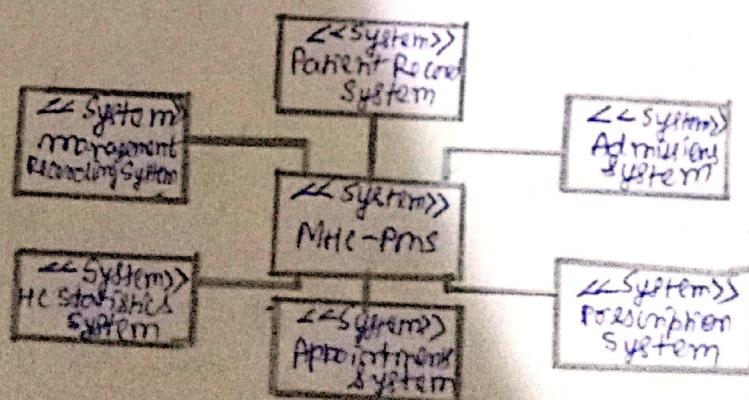
- A model omits non-essential details, it is easier to manipulate than the original entity.
- Abstraction is a fundamental human capability that deal with complexity.

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Q7 Draw a context model for patient management system. How are interactions are modelled?

Ans



Q7 Interactions are modelled using two ways

(a) Use Case Diagram

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• Use Cases were developed originally to support requirements elicitation and analysis activity

- Each use case represents a discrete task that involves external interaction with a system
- Actors in a use case may be people or other systems
- Represented diagrammatically to provide overview in more detailed textual form

(b) Sequence Diagrams

- Sequence diagrams are part of UML and are used to model interactions b/w actors and the objects within a system
- Sequence diagram shows the sequence of interactions that take place during a particular use case or use case instance
- The objects and actors involved are listed along top with dotted lines drawn vertically from these
- Interactions b/w objects is denoted by annotated arrows

Q8 Write a note on Behavioral model

A8 Behavioral models

- Behavioral models are models of the dynamic behaviour of a system as it is executing they show what happens or what is supposed to happen when a system responds to a stimulus from its environment

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stimuli are of 2 types

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(a) Data Driven.

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- Many business systems are data processing systems that are primarily driven by data. They are controlled by data input to the system with relatively little external event processing.
- Data -driven models show sequence of actions involved in processing input data and generating an associated output

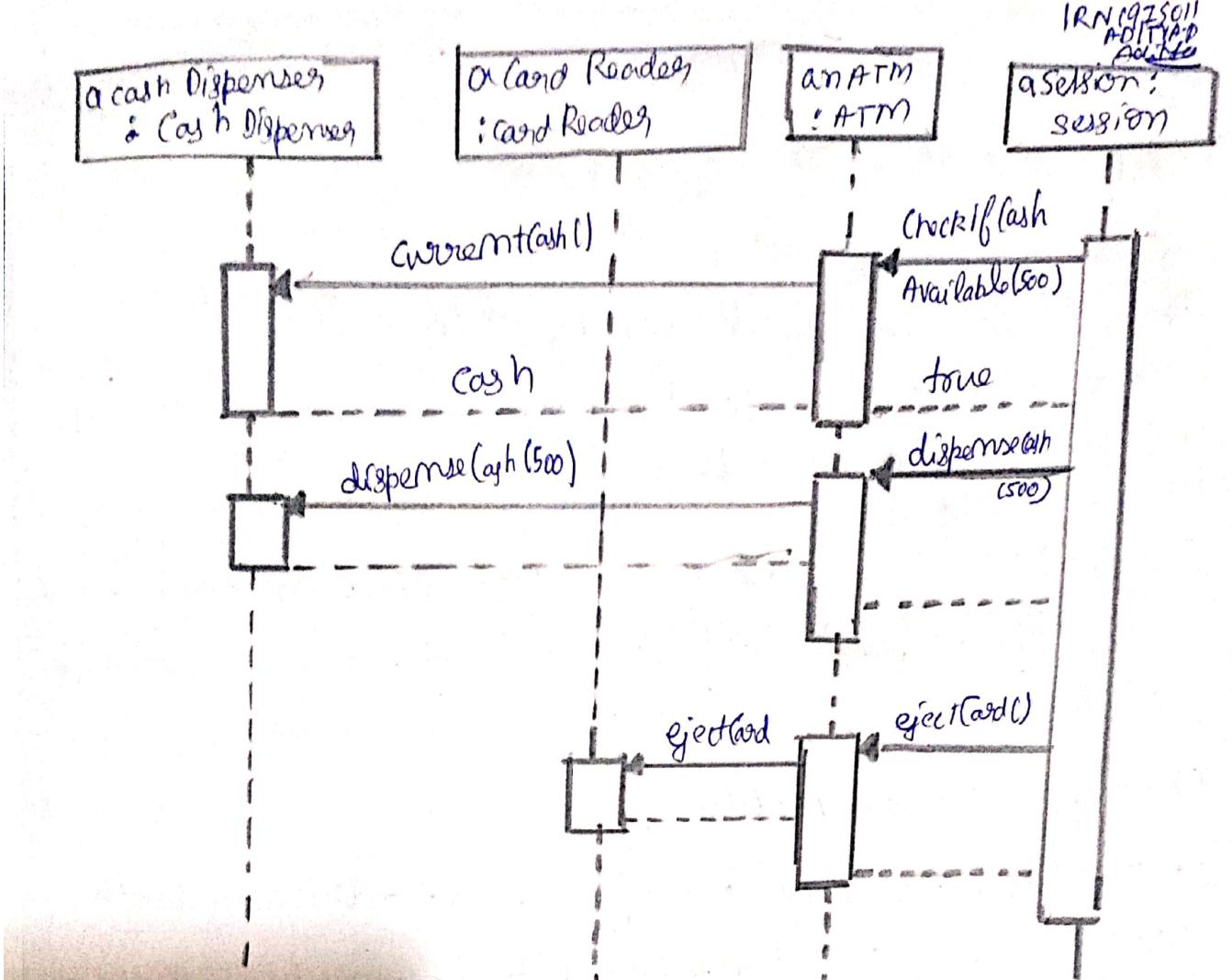
(b) Event Driven Modelling

- Realtime systems are often event-driven with ~~data~~ minimal data processing e.g. Landline phone switching system responds to events such as 'receives off hook' by generating a dial tone
- Event-driven modeling shows how a system responds to external and internal events
- It is based on the assumption that a system has a finite number of states and that events may cause a transition from one state to another

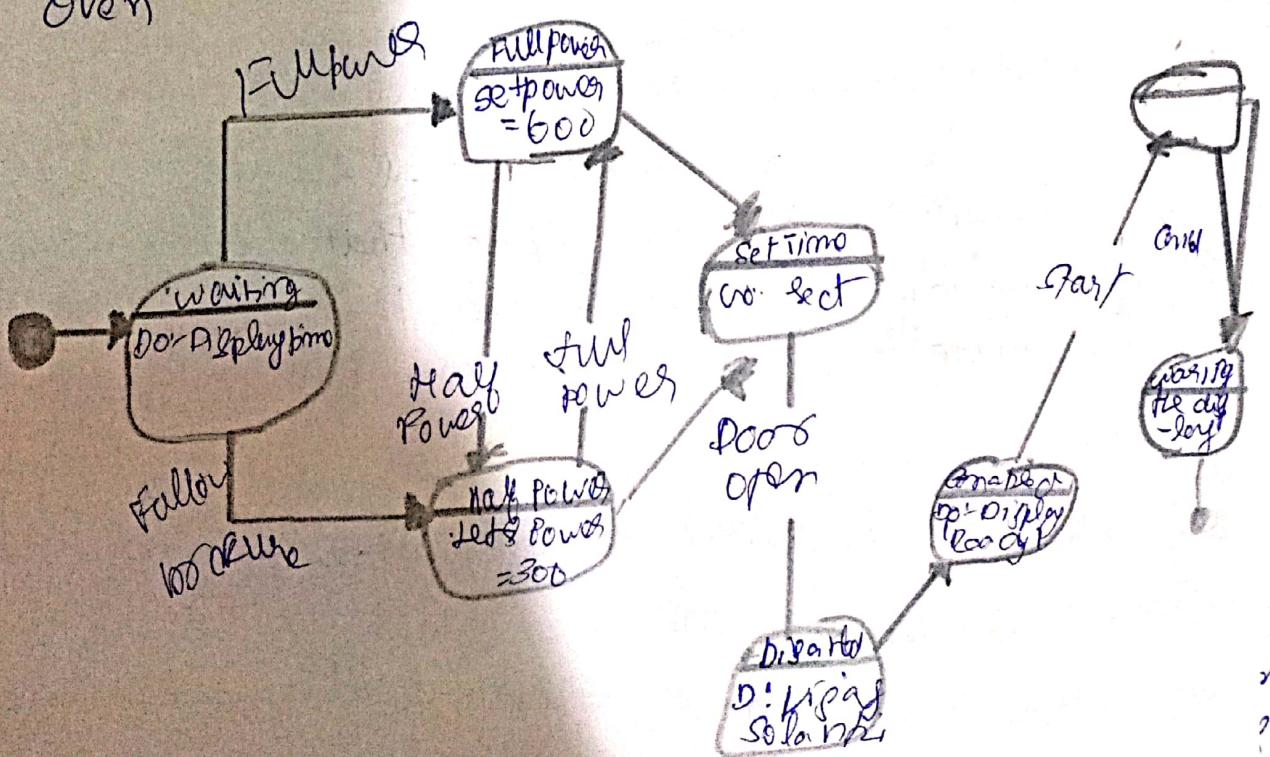
Q9 Draw a sequence diagram for withdrawing money from ATM

Ans Sequence diagram for a cash withdraw scenario

on an ATM



Q10 Draw and explain State diagram of micro oven



An example of control software for a very simple microwave oven is shown by event driven modelling

- The simple microwave has a switch to select full or half power, a numeric keypad to input the cooking time, a start/stop button and an alphanumeric display.
- Sequence of action :-

 - Select power level
 - Input the cooking time using a numeric keypad
 - Press start and the food is cooked for given time

- For safety reasons, oven should not operate when the door is open and on completion of cooking buzzer is sounded.
- Oven has a very simple alphanumeric display that is used to display ~~very~~ various alerts and warning messages.
- UML state diagrams rounded rectangles represent system states. They may include brief description on what are the work flows and its description in Rational unified process.

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As Workflow	Description
Business modelling	The business process are modelled using business use cases
Requirements	Actors who interact with the system are identified and use cases are developed to model the system requirements
Analysis and Design	A design model is created and documented using architectural models, component models, object models and sequence models

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- UML state diagrams, rounded rectangles represent system states. They may include brief description

Q11) What are the work flows and its description in Rational Unified Process

As Workflow

Description

Business modelling

The business process are modelled using business use cases

Requirements

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Analysis and Design

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Version 06

(i) Reuse

most modern software is constructed by ~~growing~~ existing components or systems. When you are developing software, you should make as much use as possible of existing code.

(ii) Configuration management

During the development process you have to keep track of many different versions of each software component in a configuration management system.

(iii) Host-target development

Production software doesn't usually execute on the same computer as the software development environment - Rather you develop it on one computer and execute it on a separate computer i.e target system.

Q13 Briefly explain software configuration management activities?

Ans Configuration Management Activities

(a) Version management:-

where support is provided to keep track of different versions of software components. Version management system include facilities to co-ordinate development by several programmers.

(b) System Integration:- where support is

provided to help developers define what version of components are used to create each

each version of system. This description is then used to build a system automatically by combining and linking the required ^{version}
~~version~~
~~edit~~
Components.

(c) Problem tracking:- Where support is provided to allow user to report bugs and other problems and to all developers to see who is working on these problems and when they are fixed.

Q4 Define design pattern. Explain four elements of design pattern

A:- Design pattern - Is general reusable solution to commonly occurring problem within a given context in software design.
It has four essential Elements

(a) pattern name :- observer
Description:- Separates the display of the state of an object from the object itself and allows alternative displays to be provided. When the object state changes, all displays are automatically notified and updated to reflect the change.

b) Problem :- Description:-

In many situations you have to provide multiple displays of state information such as graphical display and a tabular display. Not all of these may be known when the information is specified. To minimize optimizations in rendering many

All alternative presentations should ~~fix~~
support interaction and when state is changed
all displays must be updated

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This pattern may be used in all situations where more than one display format for state information is required and where it is not necessary for the object that maintains the state information to know about the specific display formats used.

(c) Solution description:-

This involves abstract objects, Subject and Observer and two concrete objects, Concrete Subject and ConcreteObserver which inherit attributes of related abstract objects. Object include general operations that are applicable in all situation. State to be displayed is maintained in ConcreteSubject which inherits operations from Subject allowing it to add and remove observers and to issue a notification when state has changed.

- The ConcreteObserver maintains a copy of the state of ConcreteSubject and implement the update() interface of Observer that allows these copies to be kept in step. The ConcreteObserver automatically displays the state and changes whenever state is updated.

(d) Consequence:-

The Subject only knows the abstract Observer and doesn't know details of concrete ones; there is minimal coupling between these objects because of this lack of knowledge, optimizations that enhance display

performance are impractical. Changes to subject may cause a set of linked updates to observers to be generated some of which may not be necessary

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Q15 Write a note on Open source development?

Ans It is an approach in which source code is freely available

The open source licences are derived from one of three license models

(a) The GNU General Public License:-

This is so called reciprocal license that means that if you use Open source software that is licensed under the GPL license then you must make that software open source with

(b) The GNU Lesser General Public License:- is a variant of GPL license where you can write components that is licensed under GPL to code without having to publish the source of these components

(c) The Berkley Standard Distribution:- This is a non-reciprocal license which means you are not obliged to re-publish any changes or modifications made to open source code. You can include code in proprietary systems that are solid.

EXAMPLES:-

best known open source product is Linux operating system widely used as server system and increasingly as desktop on & soon more server system and increasingly other imp open source products are Java, apache server, MySQL DBMS