Assignment 1

Object Oriented Analysis and Design

Group 5

1. The key questions answered in the analysis phase are about its system's user (who uses the system), its functions (what system must do), and the time and place of its use. The project team will go through any existing systems, identify potential improvements, and formulate new concepts for new systems.

   There are three steps in the analysis phase:

   1. The initial step includes the making of an examination technique to guide the endeavors of the venture group. This methodology regularly incorporates an assessment of the ongoing framework, distinguishing proof of its issues, and investigation of ways of planning another framework.
   2. The second step is the assortment of necessities, which should be possible through strategies like meetings or surveys. The data accumulated from this cycle, alongside input from the task support and different partners, is broken down to foster an idea for another framework. This framework idea then shapes the establishment for the making of business investigation models, which frame how the business will work assuming that the new framework is carried out.
   3. The last step includes the combination of the examinations, framework idea, and models into a record known as the framework proposition. This proposition is then introduced to the venture support and other key leaders who decide if the undertaking ought to continue.

2.

Root Cause Analysis	Problem Analysis
Ask users to identify problems with the current system	Focus is on the cause of a problem, not its solution.
Ask users how they would solve these problems	Create a prioritized list of problems
Good for improving efficiency or ease-of-use	Once the causes are known, solutions can be developed

These are the conditions under which will use Root cause analysis:

1. At the point when the goal isn't just to understand the quick issues yet additionally to devise long haul arrangements that forestall their repeat.
2. To understand root causes, RCA systematically analyzes these causes.
3. To solve complex issues that keep repeating.

These are the condition under which will use problem analysis are:

1. When your essential objective is to understand the basic reasons for an issue, without quickly zeroing in on expected arrangements.
2. When it's important to draw in clients or partners in pinpointing issues with the current framework or cycle. It empowers quick ID of issues.
3. You can incorporate a rundown of perceived issues. This rundown can therefore be positioned by direness or effect, subsequently advancing a deliberate approach to handling them.

3.

COMPARISON:

	DURATION ANALYSIS	**ACTIVITY BASED COSTING**
FOCUS	Time Efficiency	Cost Allocation
MEASUREMENT	Measures Time Duration	Measures Cost
APPLICATION	Process bottlenecks	Cost Management
SOLUTIONS	Process Related Solutions	Financial Decision Making
COMMONALITY	Process Optimization	Process Optimization

CONTRAST:

	DURATION ANALYSIS	**ACTIVITY-BASED COSTING**
FOCUS	TIME	COSTS
METRICS	Time Metrics	Financial Metrics
PURPOSE	Operational Efficiency	Financial accuracy
OUTPUT	Process efficiency Improvements	Provides cost insights
METHODOLOGY	They have distinct methodologies cutout to their respective focuses even though they share some similarities.	

4.

The five major steps in conducting interviews are:

1. **Selecting people to interview & Creating Schedules:**
   a. The initial step is to make a meeting plan, which frames the reason for the meeting and distinguishes the people who will be evaluated.
   b. Key clients of the application, project supports, business clients, and other significant colleagues assist with figuring out who can give important data about prerequisites.
   c. The request for interviews is resolved in view of the significance and pertinence of every interviewee's bit of knowledge.

d. It is vital to incorporate people from various levels of the association to acquire different points of view on the framework.

2. **Designing Interview Questions:**
   a. These types of questions are commonly used: closed-ended, open-ended, and probing questions.
   b. Close-ended questions are general and have foreordained answer choices.
   c. Open-ended question allows you to get more information and a more detailed description.
   d. Probing type questions circle back to past reactions to join extra experiences.

3. **Prepare for the Interview:**
   a. Getting ready for the interview is essential and should be approached similarly to getting ready for a presentation.
   b. The interviewee must be adequately prepared for the interview procedure.
   c. Different interview formats, such as organized or unstructured ones, need different amounts of preparation.

4. **Conduct Interview:**
   a. Building entrust with the interviewees is fundamental to energize transparent reactions.
   b. The interview ought to start with an outline of the interview's motivation and why the interviewee was picked.
   c. It is urgent to cause the interviewee to feel that their time was very much spent, and their feedback was significant.

5. **Follow up after Interview:**
   a. After the interview, the analyst readies a report summing up the data accumulated.
   b. The report incorporates interview notes and might be imparted to the interviewee for explanation or updates.
   c. It is critical to pass on to the interviewee that their input is esteemed and that any amendments or updates are gladly received.

5.

The requirements definition report, also referred to as the requirements definition, is an easy-to-read text document that provides a thorough explanation of both functional and nonfunctional needs. The development team and other stakeholders might use it as a reference guide.

The functional and nonfunctional criteria are often listed in an outline fashion at the beginning of the report. Functional requirements are concerned with the system's skills, such as scheduling, organizing appointments, and documenting doctors' availability. Non-functional requirements include things like how long it takes to store a new appointment, whether wireless printing is supported, and how different system components can be accessed based on the responsibilities of the users.

A distinct number is given to each need to allow easy identification. The needs are categorized by certain categories or functions and then grouped according to whether they are functional or nonfunctional. Business needs may occasionally be given a higher priority in the requirements specification. They can be labeled with the relevant system release that will meet the requirement (for example, release 1, release 2, release 3), or they can be ranked as high, medium, or low importance. When employing object-oriented approaches that deliver systems progressively, this prioritizing is very important.

The specifications definition's main duty is to specify the system's scope, even if it also acts as an essential input for other analytical deliverables including functional, structural, and behavioral models. It clearly lays out what the system should achieve, giving the analysts context. The criteria definition should always be consulted for clarification in the event of any questions or contradictions.

6.

An actor in an environment is a person or system that contributes to but is not a primary component of the system. If it is not a human, it can be represented by a straightforward stick figure or a rectangle with the word "actor" in it. The performer is assigned a role, much like a position or a task. It could connect to other performers through a unique kind of connection.

A use case encapsulates a sizable portion of the system's capabilities. It resembles a particular task or action that the system can carry out. It can be linked to different use cases in various ways. It is shown within the system and has a label with a sentence describing what it accomplishes.

The subject boundary displays the boundaries of the system in the form of a box. On top of it or inside of it, it bears the name of the system. It aids in our understanding of how the system works.

An include connection for instance, denotes the inclusion of a one-use case inside another. In an extended connection, one use case provides more features for another use case. Additionally, a generalization connection denotes that one use case is an advanced variation of another use case.

7.

a)

1) Review the requirements definition.
2) Identifying the subject’s boundaries.
3) Identifying the primary actors and their goals.
4) Identifying the business processes and major use cases.
5) Reviewing the current set of use cases.
6) Split or combine use cases.
7) Identifying additional use cases.

b)

- Based on the principles of cognitive load and manageability, a business process should aspire to have between three and nine key use cases.
- The overall amount of mental effort put into working memory is referred to as cognitive load. Only a certain amount of information may be held in working memory at once. According to psychologist George A. Miller's "Magic Number 7, Plus or Minus 2" guideline, an average person can keep roughly seven things in working memory. This idea has been applied to use cases, with a three to nine number range being deemed reasonable and understandable.
- A system may become extremely complicated and challenging to comprehend, administer, and maintain if there are too many use cases.
- On the other side, too few use cases could oversimplify the system and leave out crucial features.
- The system is comprehensive yet manageable and user-friendly by aiming for three to nine key use cases, which achieves a balance between complexity and simplicity.

c)

1. Place & draw the use-cases.
2. Place & draw the actors.
3. Draw the subject boundary.
4. Add the associations.

d) Both use case diagramming and functional modeling are used to express the system's functionalities, hence they are connected. Use case diagrams show how users interact with the system graphically, whereas functional modeling describes how the system should work or what it should be able to do. Functional modeling frequently includes use case diagrams, which aid in the clarification and validation of these requirements.

8.

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- Activity diagrams help us comprehend how a business operates and how operations and data are distributed.
- They are primarily utilized for business process planning and improvement.
- Consider it like sketching a map of how a business runs, demonstrating what happens and how information flows.
- You may use them to plan how things should be done in the future or to map out the way things are done currently.
- These diagrams are applicable to all types of businesses, and whether they utilize computers or not.
- They're just one way among many to map out how a business works.

b.

Activity	Action
	
Consider an activity to be an enormous task or job that you must do. It consists of multiple tiny activities or phases.	An action is the tiniest, most basic thing you can do. It's like a single operation in a task.
We give it a name that describes what it is, such as "Baking a Cake" or "Building a House."	We give it a name that describes what it is, such as "Mixing Ingredients" or "Hammering a Nail."
We can divide an activity into smaller tasks.	We can't divide action into smaller tasks as they are the building block of activities.

In Brief, activities are large tasks composed of actions, while actions are the small stages that comprise activities.

9.

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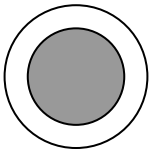
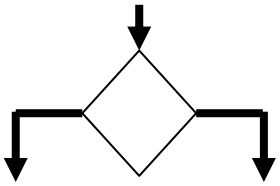
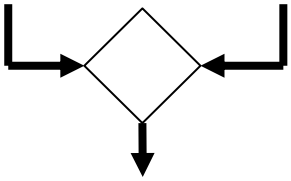
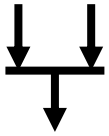
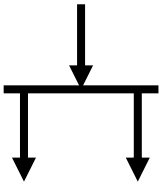
Control Flow	**Object Flow**
Control flows are used in activity diagrams to represent the step-by-step sequencing of actions in a business process. They represent how control, or actual work, passes from one task or process to the next.	In activity diagrams, object flows are used to represent how objects move through a business process.
Control flows are visually portrayed as continuous lines with arrowheads indicating control movement direction.	Object flows are depicted in diagrams utilizing dotted lines with arrowheads indicating the direction of item movement.
Control flows are related activities or actions in a diagram, showing how these elements are carried out in a sequential manner inside the process.	Object flows must be connected at one end to an action or activity and at the other end to an object node in order to be displayed properly. This link describes how certain objects interact with the flow.

To summarize, control flows emphasize the order and sequence of events and activities, whereas object flows emphasize how objects move and change as they move through the business process. Control flows and object flows both are crucial components of an activity diagram, giving an in-depth understanding of how a process behaves.

b.

There are seven types of Control nodes named as initial, final-activity, final flow, decision, merge, fork, & join nodes.

Initial Node: Initial Node is the start of a set of activities or action.	
Final Activity Node: It's used to stop all control & object flows in an activities or actions.	
Final Flow Node: Final-flow Node is the stop button for every activity or action.	
Decision Node: **Decision Node** is used to represent a test condition to ensure that the control flow or object flow only goes down one path.	
Merge Node: A Merge Node is analogous to a meeting point on a map. It's utilized to connect many pathways that have been divided apart by a decision point.	
Fork Node: A Fork Node is analogous to a branching road. It is used to divide a task into many pieces that can occur concurrently, such as various lanes on a highway.	
Join Node: A Join Node is like a point on a map where two independent pathways intersect. It's utilized to bring back all the various tasks that were going on at the same time, combining them into one.	

c. **Object Nodes:** Object nodes indicate how the data flow from one activity to the next or an object that is connected to a collection of object flows. Its activities and actions cause objects to change or transform. It is identified by its class name.

Class Name

10. **We are using use-case and activity diagrams as examples from the textbook Figure 1, 2 & 3. In this section, we propose a set of rules to ensure that these three representations are related to one another**

i) When comparing an activity diagram to a use-case description, there should be at least one event listed in the use-case description's regular flow of events, sub flows, or alternative/exceptional flows for each activity or action that is represented on the activity diagram. Get Patient Information is an activity that is connected to the first two events in the use-case description's typical sequence of events.

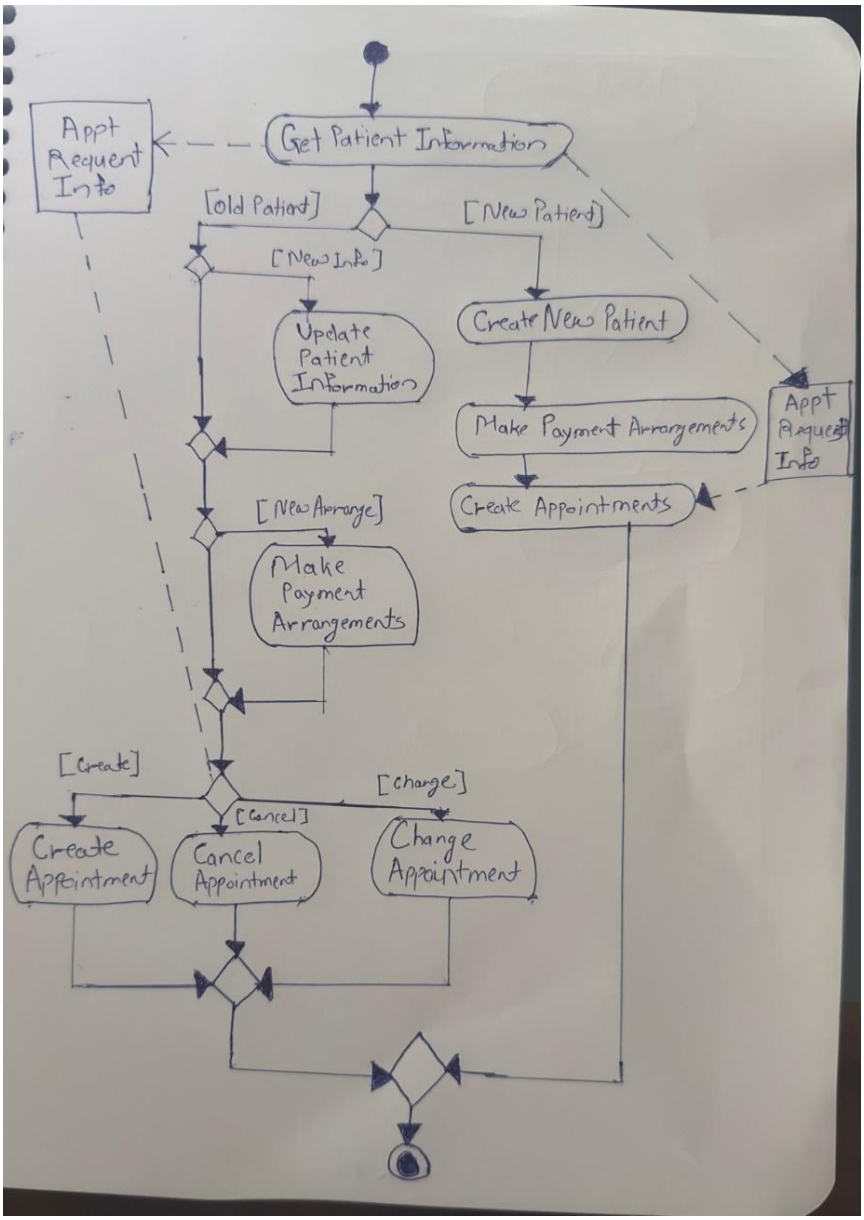


Figure 1 Activity Diagram

ii) For an item to appear as an object node in an activity diagram, it must appear in at least one event in the use-case description's usual flow of events, sub flows, or alternative/exceptional flows. For instance, the use case description for the Appt object shown in the activity diagram in Figure 1 mentions making new appointments as well as modifying or canceling existing ones.

iii) The sequence of events in a use-case description should follow the sequence of activities shown in an activity diagram. For instance, in Figure 1 & 3, the Get Patient Information activity's related events (events 1 and 2) should take place before the Make Payment Arrangements activity's associated events (event 4).

iv) There must be one and only one use-case description for each use case, and vice versa, when comparing a use-case diagram to a use-case description. The use-case description for the Make Old Patient Appoint use case, for instance, is depicted in Figure 3. However, there are discrepancies between the use-case diagram in Figure 1, and the use-case description in Figure 3. Regardless of whether the patient is a new or returning patient, the use-case diagram in this instance suggests that the Make Payment Arrangements use case is unnecessary. When we look at the activity diagram, we can see that it is a necessary activity for a new patient but optional for elderly patients. Only one of the diagrams is accurate as a result. The use-case diagram in this scenario needs to be updated. In Figure 2, the updated and revised use-case diagram is displayed.

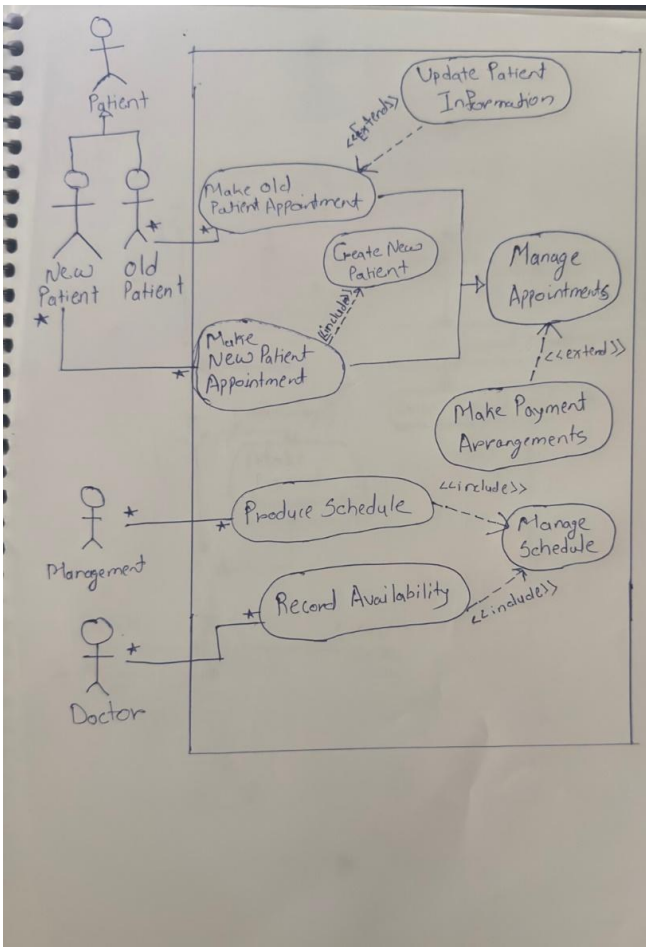


Figure 2: Use-Case Diagram

Use Case Name: Make Old Patient Appt	ID: 2	Importance Level: Low
Primary Actor: Old Patient	Use Case Type: Detail, Essential	

Stakeholders and Interests:
Old Patient – wants to make, change, or cancel an appointment
Doctor – wants to ensure patient's needs are met in a timely manner

Brief Description: This use case describes how we make an appointment as well as changing or canceling an appointment for a previously seen patient.

Trigger: Patient calls and asks for a new appointment or asks to cancel or change an existing appointment

Type: External

Relationships:
Association: Old Patient
Include:
Extend: Update Patient Information
Generalization: Manage Appointments

Normal Flow of Events:
1. The Patient contacts the office regarding an appointment.
2. The Patient provides the Receptionist with his or her name and address.
3. If the Patient's information has changed
   Execute the Update Patient Information use case.
4. If the Patient's payment arrangements has changed
   Execute the Make Payments Arrangements use case.
5. The Receptionist asks Patient if he or she would like to make a new appointment, cancel an existing appointment, or change an existing appointment.
   If the patient wants to make a new appointment,
   the S-1: new appointment subflow is performed.
   If the patient wants to cancel an existing appointment,
   the S-2: cancel appointment subflow is performed.
   If the patient wants to change an existing appointment,
   the S-3: change appointment subflow is performed.
6. The Receptionist provides the results of the transaction to the Patient.

SubFlows:
S-1: New Appointment
1. The Receptionist asks the Patient for possible appointment times.
2. The Receptionist matches the Patient's desired appointment times with available dates and times and schedules the new appointment.
S-2: Cancel Appointment
1. The Receptionist asks the Patient for the old appointment time.
2. The Receptionist finds the current appointment in the appointment file and cancels it.
S-3: Change Appointment
1. The Receptionist performs the S-2: cancel appointment subflow.
2. The Receptionist performs the S-1: new appointment subflow.

Alternate/Exceptional Flows:
S-1, 2a1: The Receptionist proposes some alternative appointment times based on what is available in the appointment schedule.
S-1, 2a2: The Patient chooses one of the proposed times or decides not to make an appointment.

Figure 3:Sample Use-Case Description