ME -CP4212-Software Engineering Manual

Software Engineer (Anna University)

CP4212 - SOFTWARE ENGINEERING LAB MANUAL

Name of the Student : ……………………………….

Register Number : ……………………………….

Year / Semester / Section : ………………………………

Branch : ……………………………….

Department of Computer Science and Engineering

M.E.- CSE- Regulation 2021

CHENNAI INSTITUTE OF TECHNOLOGY
Transforming Lives

CHENNAI
INSTITUTE OF TECHNOLOGY
(Approved by AICTE, New Delhi & Affiliated to Anna University Chennai), Sarathy Nagar, Kundrathur, Chennai - 600069.

Department of Computer Science and Engineering

Vision of the Department

To Excel in theot emerging areas of Computer Science and Engineering by imparting knowledge, relevant practices and inculcating human values to transform the students as potential resources to contribute innovatively through advanced computing in real time situations.

Mission of the Department

DM1. To provide strong fundamentals and technical skills for Computer Scienceapplications through effective teaching learning methodologies.

DM2. To transform lives of the students by nurturing ethical values, creativity, andnovelty to become Entrepreneurs and establish start-ups.

DM3. To habituate the students to focus on sustainable solutions to improve thequality of life and the welfare of the society.

DM4. To enhance the fabric of research in computing through collaborative linkageswith industry and academia.

DM5. To inculcate learning of the emerging technologies to pursue higher studies leading to lifelong learning.

COURSE OBJECTIVES AND OUTCOMES

OBJECTIVES:

The student should be made:

- To acquire the knowledge of using advanced tree structures
- To learn the usage of heap structures
- To understand the usage of graph structures and spanning trees
- To understand the problems such as matrix chain multiplication, activity selection
- and Huffman coding
- To understand the necessary mathematical abstraction to solve problems.

OUTCOMES:

Upon completion of the course, the students will be able to:

- ❖ Can produce the requirements and use cases the client wants for the software being Produced.
- ❖ Participate in drawing up project plan. The plan will include at least extent and work assessments of the project, the schedule, available resources, and risk management can model and specify the requirements of mid-range software and their architecture.
- ❖ Create and specify such a software design based on the the requirement specification that the software can be implemented based on the design.
- ❖ Can assess the extent and costs of a project with help of several different assessment methods.

CP4212 Software Engineering Laboratory

Course Name	**C2117**	**Course Year**	**2021 – 22**
Course Outcomes			
C2117.1	Process big data using Hadoop framework		
C2117.2	Build and apply linear and logistic regression models		
C2117.3	Perform data analysis with machine learning methods		
C2117.4	Perform graphical data analysis		

EX NO	DATE	TITLE	CO's MAPPED	PO's MAPPED	MARKS	SIGN
1		**Write a Problem Statement to define a title of the project with bounded scope of project**	CO1	PO1,PO2,		
2		**Select relevant process model to define activities and related task set for assigned project**	CO1,CO2	PO1,PO2,		
3		**Prepare broad SRS (Software Requirement Specification) for the above selected projects**	CO1,CO2	PO1,PO2,PO6		
4		**Prepare USE Cases and Draw Use Case Diagram using modelling Tool**	CO1,CO2	PO1,PO2, PO4		
5		**Develop the activity diagram to represent flow from one activity to another for software development**	CO1,CO2	PO1,PO2,PO6		
6		**Develop data Designs using DFD Decision Table & ER Diagram**	CO1,CO2	PO1,PO2, PO6		
7		**Draw class diagram, sequence diagram, Collaboration Diagram, State Transition Diagram for the assigned project**	CO1,CO2	PO1,PO2, PO4		
8		**Write Test Cases to Validate requirements of assigned project from SRS Document**	CO1,CO2	PO1,PO2, PO6		
9		**Evaluate Size of the project using function point metric for the assigned project**	CO1,CO2	PO1,PO2, PO5		
10		**Estimate cost of the project using COCOMO and COCOCMOII for the assigned project**	CO1,CO2	PO1,PO2, PO5		
11		**Use CPM/PERT for scheduling the assigned project**	CO1,CO2	PO1,PO2,PO4		
12		**Use timeline Charts or Gantt Charts to track progress of the assigned project**	CO1,CO2	PO1,PO2,PO4		

EX NO: 1	Write A Problem Statement To Define A Title Of The Project With Bounded Scope Of Project
DATE:	

AIM:

To Write a Problem Statement to define a Customer Satisfaction at a Local Restaurant Chain title of the Project with bounded scope of project.

SYSTEM REQUIREMENTS

Open source Tools: StarUML / UMLGraph / Topcased/ Umberollo

Proposed System:

The development of the new system contains the following activities, which try to automate the entire processkeeping in view of the Customer Satisfaction database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.
- It provides high level of security with different level of authentication

Problem Statement:

The local restaurant chain has been experiencing declining customer satisfaction ratings in recent months. The management team has observed a decrease in customer traffic and an increase in negative feedback regarding food quality, customer service, and wait times. These issues have led to a decrease in revenue and a negative impact on the reputation of the restaurant chain.

To address these problems, the management team has decided to launch a project aimed at improving customer satisfaction across all of its restaurant locations. The scope of the project will be limited to addressing the following areas: food quality, customer service, and wait times. The project will not address other issues such as pricing or marketing strategies.

The goal of the project is to improve customer satisfaction ratings by a minimum of 10% within the next six months. To achieve this, the project team will conduct research, gather customer feedback, identify areas for improvement, and implement changes to the menu, training programs, and processes.

The success of the project will be measured by tracking customer satisfaction ratings through surveys, online reviews, and other feedback channels. The project team will also monitor customer traffic and revenue to determine the impact of the changes

By addressing the issues of food quality, customer service, and wait times, the restaurant chain can improve its reputation, attract new customers, and increase revenue.

RESULT:

Thus, the project will also benefit the employees by providing them with better training and support, which will improve job satisfaction and retention rates

EX NO: 2	**Select Relevant Process Model To Define Activities And Related Task Set For Assigned Project**
DATE:	

AIM:

To find the Process Model to define activities and related task set for assigned project.

INTRODUCTION:

There are many process models to choose from, but based on the scope and nature of the assigned project, Here we recommend using the Agile methodology. Agile is a flexible and iterative approach that is well-suited for projects with changing requirements and a focus on continuous improvement.

Here are some key steps and tasks that you can incorporate into an Agile process model for your project:

1. **Define the project goals and objectives**

- Identify the scope of the project and its intended outcomes
- Define the key performance indicators (KPIs) that will be used to measure success
- Develop a project charter that outlines the purpose, goals, and stakeholders of the project

2. **Conduct a planning phase**

- Create a backlog of project tasks and requirements
- Prioritize tasks based on customer and stakeholder needs
- Break tasks into smaller units and create a work breakdown structure (WBS)
- Estimate time and effort required for each task and create a project timeline

3. **Execute the project in iterative sprints**

- Conduct daily stand-up meetings to discuss progress, challenges, and next steps
- Assign tasks to team members and track progress using a task board
- Complete sprints and demonstrate completed work to stakeholders for feedback
- Use feedback to adjust requirements and priorities and plan the next sprint

4. **Monitor and control the project**

- Track progress against the project timeline and adjust as needed
- Monitor and report on KPIs to measure project success
- Manage risks and issues as they arise
- Hold retrospective meetings to review project progress and identify opportunities for improvement

Using an Agile process model for your project can help you to focus on customer needs, deliver value quickly, and continuously improve your processes.

RESULT:

Thus by breaking down tasks into smaller units and working in iterative sprints, you can ensure that your team is making steady progress towards your project goals, while staying responsive to changing requirements and feedback from stakeholders.

EX NO: 3	**Prepare Broad SRS (Software Requirement Specification) For The Above Selected Projects**
DATE:	

AIM:

To find the Software Requirement Specification for Improving Customer Satisfaction at a Local Restaurant Chain Using the Agile methodology.

1. **INTRODUCTION:**

   The goal of this project is to improve customer satisfaction ratings across all restaurant locations in the local restaurant chain. The software solution will be designed to address issues related to food quality, customer service, and wait times. This SRS document outlines the requirements and specifications for the software solution.

2. **USER REQUIREMENTS:**

- The software solution must be user-friendly and easy to navigate for customers and employees
- The software should be accessible from a variety of devices including mobile devices, tablets, and desktop computers
- The software must be secure and protect customer data
- The software must have the capability to gather feedback from customers in real-time
- The software must provide employees with tools to manage customer orders and preferences efficiently

3. **FUNCTIONAL REQUIREMENTS:**

- The software must have the capability to collect and analyze data related to customer feedback, food quality, customer service, and wait times
- The software must have a user-friendly interface for customers to provide feedback
- The software must provide employees with tools to manage customer orders and preferences efficiently
- The software must provide employees with real-time data related to customer feedback, food quality, customer service, and wait times
- The software must be integrated with the restaurant's POS system to manage orders and payments

4. NON-FUNCTIONAL REQUIREMENTS:

- The software must be reliable and available 24/7
- The software must be scalable to accommodate the increasing number of customers and restaurant locations
- The software must be secure and protect customer data
- The software must be responsive and fast to provide real-time data to customers and employees

5. ASSUMPTIONS AND CONSTRAINTS:

- The software solution will be developed using the Agile methodology
- The project will have a fixed timeline of 6 months
- The software solution will be designed for use by customers and employees of the restaurant chain only
- The software solution will be integrated with the restaurant's existing POS system

6. DELIVERABLES:

- User-friendly interface for customers to provide feedback
- Real-time data analysis and reporting system for food quality, customer service, and wait times
- Tools for employees to manage customer orders and preferences efficiently
- Integration with the restaurant's POS system

7. ACCEPTANCE CRITERIA:

- The software solution must meet all the requirements outlined in this SRS document
- The software solution must be delivered within the fixed timeline of 6 months
- The software solution must be tested and validated by stakeholders

RESULT:

Thus, the software solution must provide measurable improvements in customer satisfaction ratings by a minimum of 10% within 6 months of deployment.

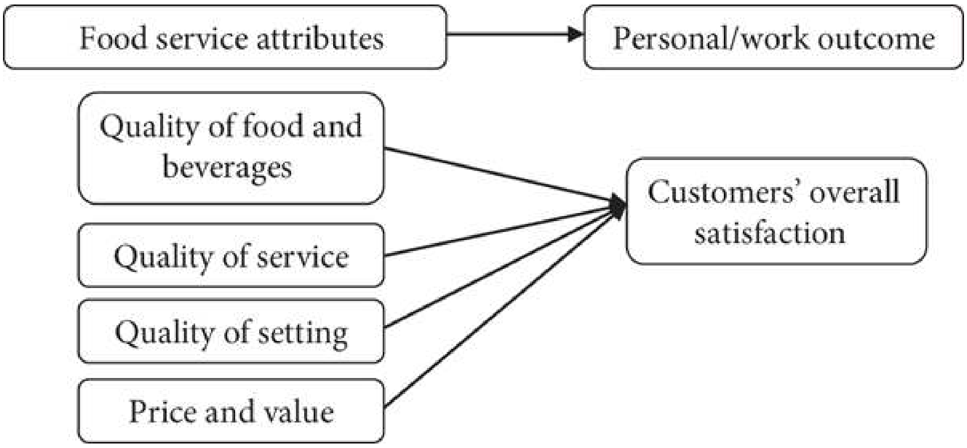
EX NO: 4	**Use Cases And Draw Use Case Diagram Using Modelling Tool**
DATE:	

AIM:

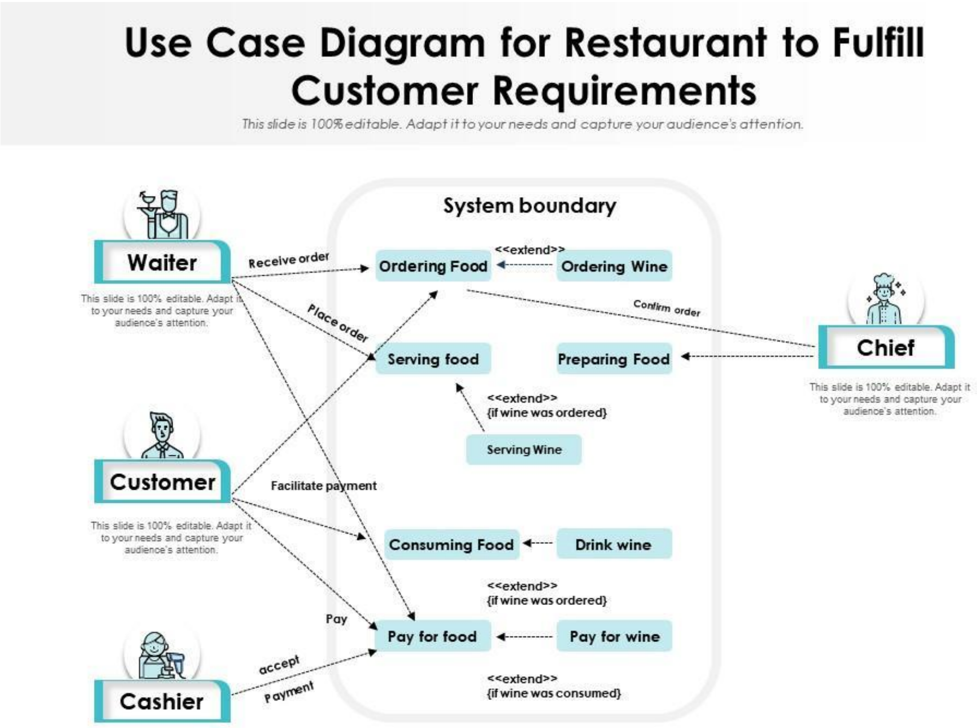
To find the "Improving Customer Satisfaction at a Local Restaurant Chain" project, along with a use case diagram created using a modelling tool:

Use Cases:

1. Collect Customer Feedback: This use case involves the customer providing feedback on their experience at the restaurant.
2. Analyze Customer Feedback: This use case involves analyzing the feedback provided by the customers to identify areas for improvement.
3. Manage Orders and Preferences: This use case involves the employee managing customer orders and preferences efficiently.
4. Real-Time Data Analysis and Reporting: This use case involves providing real-time data analysis and reporting to employees and management to make informed decisions.
5. Integration with POS System: This use case involves the software solution being integrated with the restaurant's POS system to manage orders and payments.



Use Case Diagram: Here is the use case diagram for the "Improving Customer Satisfaction at a Local Restaurant Chain" project:



Use Case Diagram for Restaurant to Fulfill Customer Requirements

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

In this diagram, the actors are the customer and employee. The use cases are represented by the ovals, and the arrows show the relationships between the actors and the use cases.

RESULT:

Thus, the "System" actor represents the software solution that will be developed to improve customer satisfaction at the restaurant chain.

EX NO: 5	**Activity Diagram To Represent Flow From One Activity To Another For Software Development**
DATE:	

AIM:

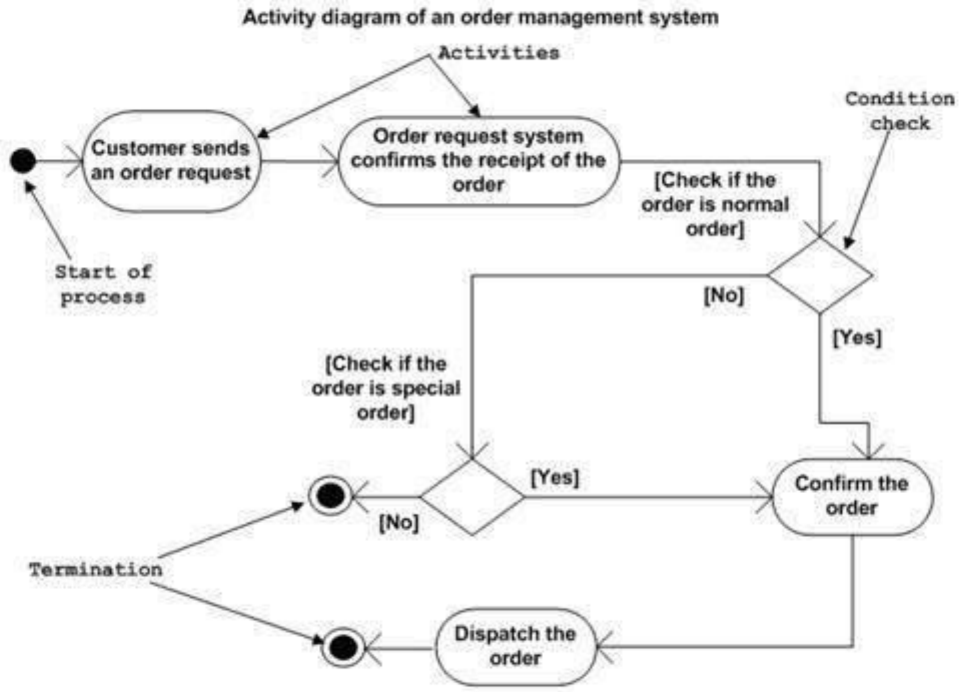
To find an activity diagram that represents the flow from one activity to another for software development:

ACTIVITIE DIAGRAM:

The activities involved in software development include:

1. Requirements Gathering: This activity involves gathering and analysing user requirements for the software solution.
2. Design: This activity involves designing the software solution based on the user requirements gathered in the previous activity.
3. Development: This activity involves coding and programming the software solution based on the design specifications.
4. Testing: This activity involves testing the software solution to ensure that it meets the user requirements and design specifications.
5. Deployment: This activity involves deploying the software solution to the production environment.
6. Maintenance: This activity involves maintaining the software solution and making updates and improvements as needed.

At the decision point between testing and deployment, there are two branches: one for successful testing and one for unsuccessful testing. If the testing is successful, the software solution is deployed to the production environment. If the testing is unsuccessful, the software solution goes back to the development phase for further improvements.


Activity diagram of an order management system
Activities
Condition check
Customer sends an order request
Order request system confirms the receipt of the order
[Check if the order is normal order]
Start of process
[No]
[Yes]
[Check if the order is special order]
[Yes]
Confirm the order
[No]
Termination
Dispatch the order

In this activity diagram, the rectangular boxes represent the activities involved in software development. The diamonds represent decision points or branches in the process. The rounded rectangles represent the start and end points of the process.

RESULT:

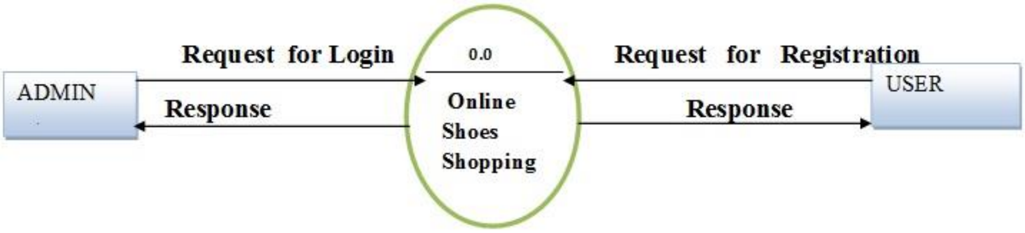
Thus, the process ends with the maintenance activity, which ensures the ongoing success of the software solution.

EX NO: 6	**Data Designs Using DFD Decision Table & ER Diagram**
DATE:	

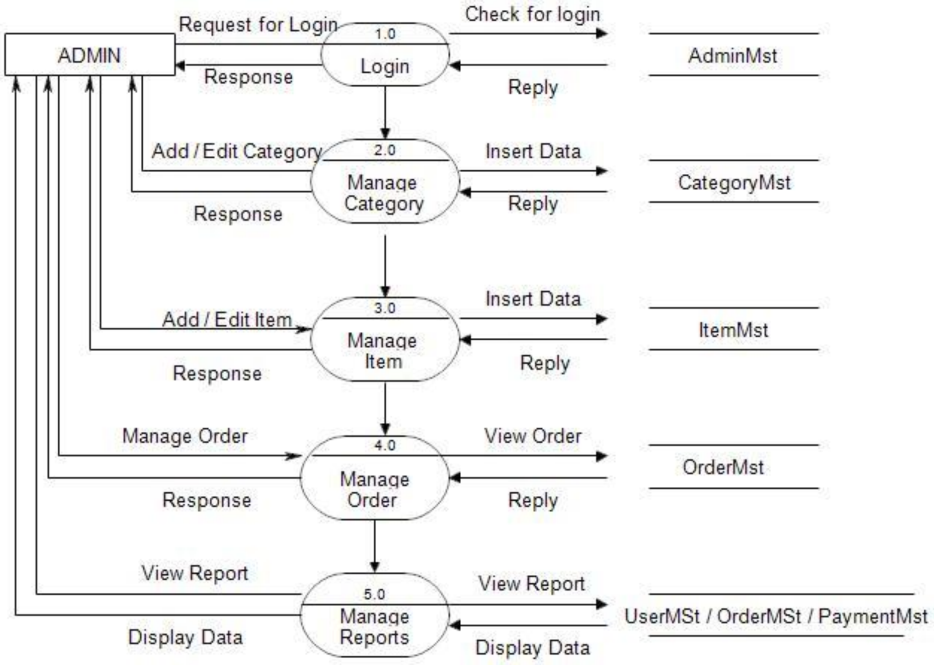
AIM:

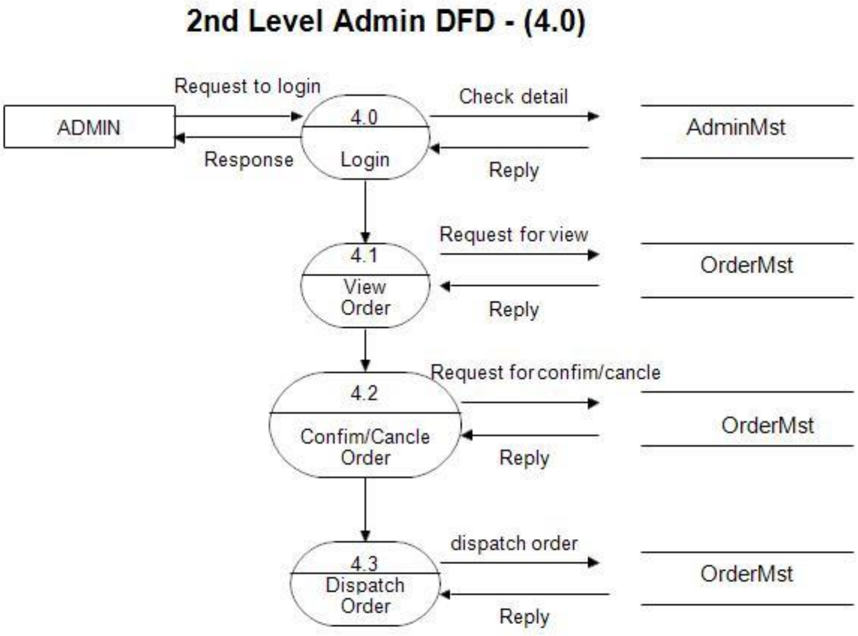
To find the data designs using DFD, decision table, and ER diagram for a simple e-commerce website:

1. Data Flow Diagram (DFD): The following is a level 1 DFD for the e-commerce website:



Admin Side DFD - 1st Level

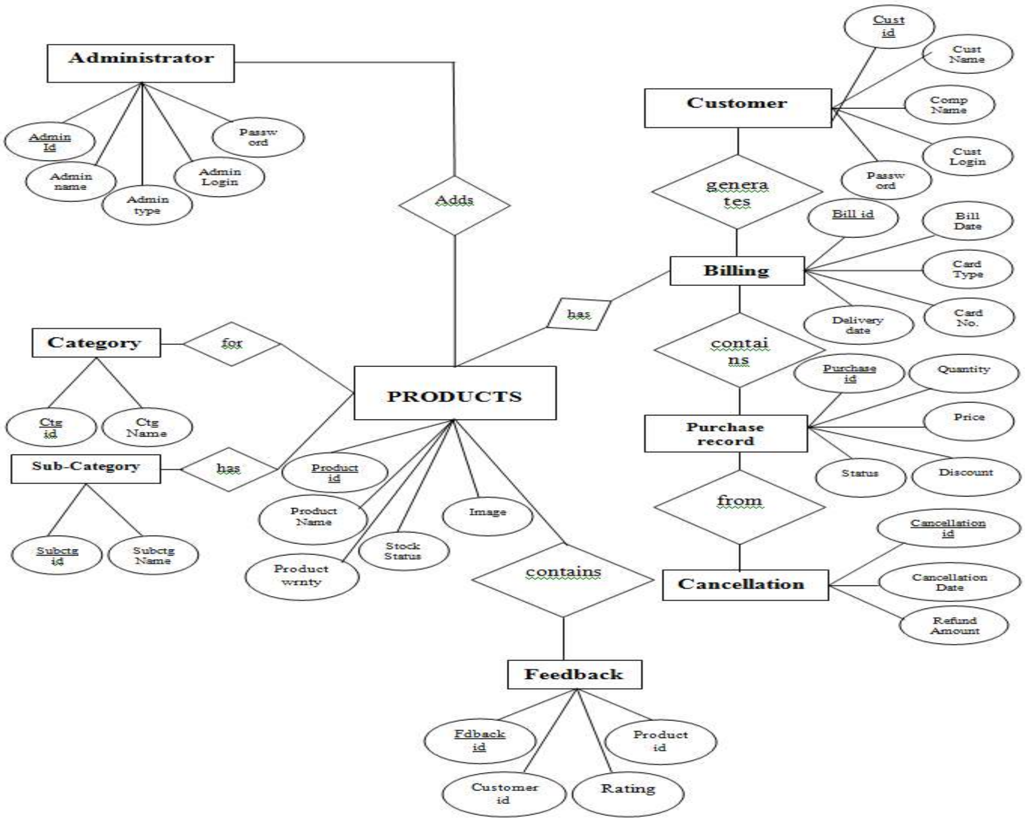




Condition	Action
Customer places an order	Notify supplier and update order status to "Pending"
Payment is received	Update order status to "Processing"
Order is shipped	Update order status to "Shipped"
Customer cancels order	Update order status to "Cancelled"
Supplier cancels order	Update order status to "Cancelled"
Order is delivered and confirmed by customer	Update order status to "Delivered"

In this diagram, there are three main external entities: the customer, the supplier, and the administrator. The customer can place orders, make payments, and view their order status. The supplier can view orders and update order status. The administrator can manage products, manage customers, and generate reports.

2. Decision Table: Here is a decision table for the order placement process:
3. Entity-Relationship Diagram (ER Diagram): Here is an ER diagram for the e-commerce website:



In this diagram, there are three main entities: Customer, Product, and Order. The Customer entity has attributes such as Customer ID, Name, Email, and Phone Number. The Product entity has attributes such as Product ID, Name, Description, and Price. The Order entity has attributes such as Order ID, Date, Total Price, and Order Status.

RESULT:

Thus, The relationship between Customer and Order is one-to-many, as a customer can have many orders. The relationship between Product and Order is also one-to-many, as an order can contain multiple products.

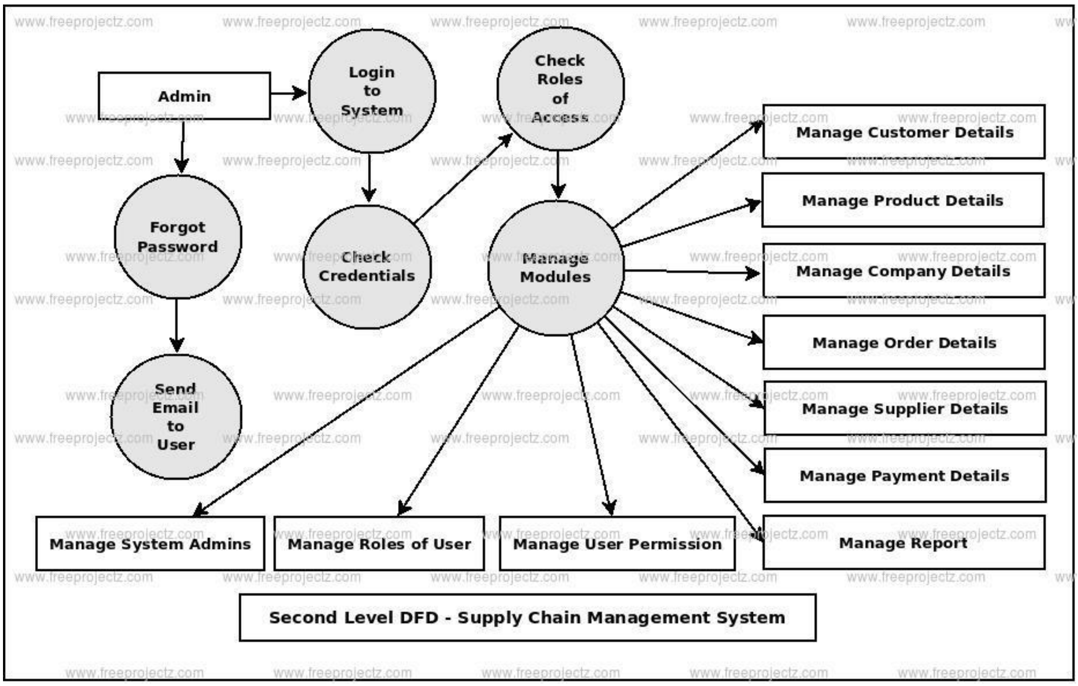
EX NO: 7	Class Diagram, Sequence Diagram, Collaboration Diagram, State Transition Diagram For The Assigned Project
DATE:	

AIM:

To Illustrate the Class Diagram, Sequence Diagram, Collaboration Diagram, State Transition Diagram For The diagrams for a supply chain in a company.

CLASS DIAGRAM:

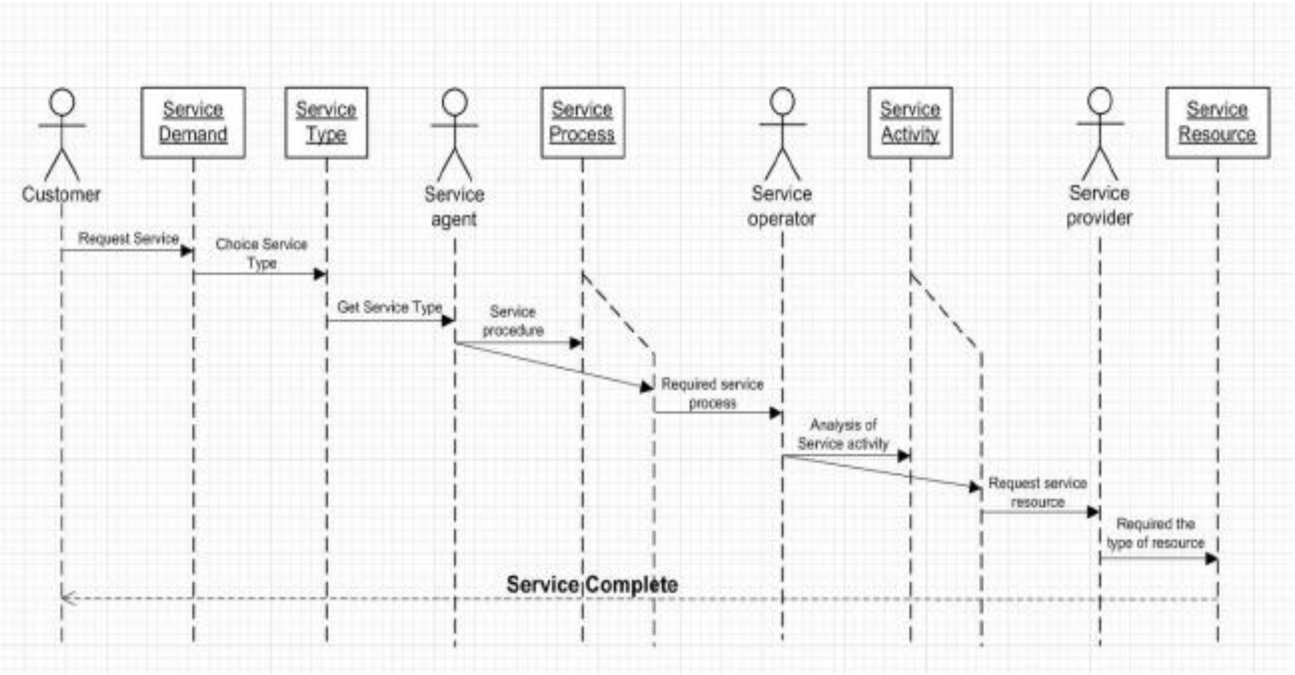
1. Class Diagram: The class diagram for the supply chain in a company is as follows:



Order class represents the orders placed by customers for finished goods. In this diagram, there are six main classes: Supplier, Raw Material, Production, Finished Goods, Customer, and Order. The Supplier class represents the suppliers who provide raw materials to the company. The Raw Material class represents the raw materials used in the production process. The Production class represents the production process used to manufacture finished goods. The Finished Goods class represents the finished products produced by the company. The Customer class represents the customers who purchase finished goods from the company. The

SEQUENCE DIAGRAM:

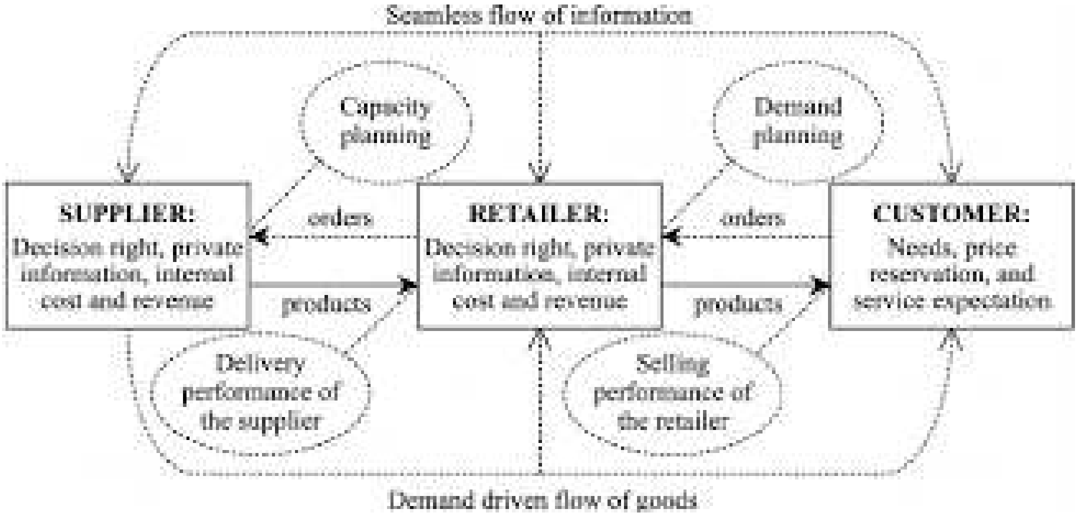
Sequence Diagram: The sequence diagram for the supply chain in a company is as follows:



In this diagram, there are three main actors: Customer, Production, and Supplier. The sequence diagram starts with the customer placing an order for finished goods. The order is then processed by the Production class, which checks the availability of raw materials and schedules production accordingly. If the raw materials are not available, the Production class contacts the Supplier class to request the required raw materials. Once the production process is complete, the finished goods are shipped to the customer.

COLLABORATION DIAGRAM:

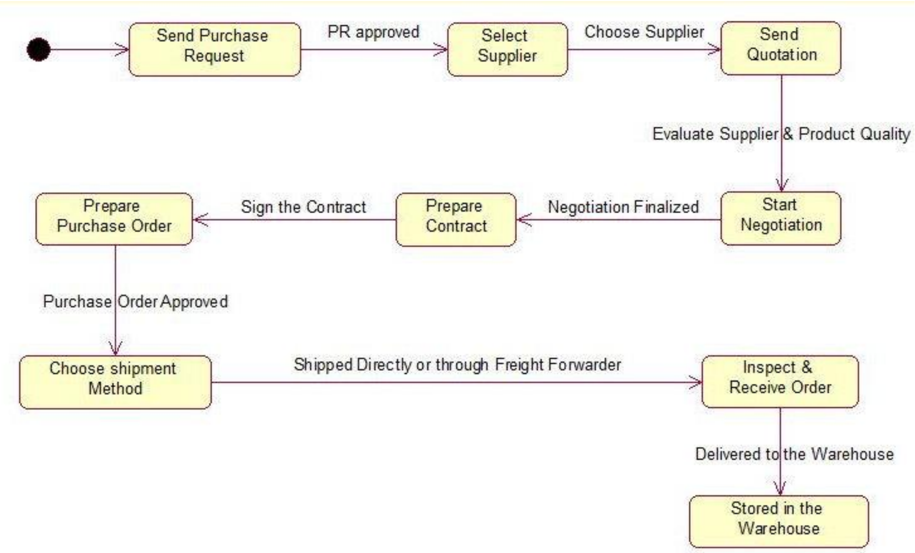
Collaboration Diagram: The collaboration diagram for the supply chain in a company is as follows:


Seamless flow of information
Capacity planning
Demand planning
SUPPLIER:
Decision right, private information, internal cost and revenue
orders
RETAILER:
Decision right, private information, internal cost and revenue
orders
CUSTOMER:
Needs, price reservation, and service expectation
products
products
Delivery performance of the supplier
Selling performance of the retailer
Demand driven flow of goods

In this diagram, the actors and classes are represented as objects. The collaboration diagram shows how objects interact with each other to achieve the required functionality.

STATE TRANSITION DIAGRAM:

State Transition Diagram: The state transition diagram for the supply chain in a company is as follows:



In this diagram, the Order class has two states: Pending and Shipped. When an order is placed, it starts in the Pending state. Once the order has been shipped, it transitions to the Shipped state. The Shipped state is the final state for an order.

RESULT:

Thus, the Class Diagram, Sequence Diagram, Collaboration Diagram, State Transition Diagram For The diagrams for a supply chain in a company Illustrated

EX NO: 8	Test Cases To Validate Requirements Of Assigned Project From SRS Document
DATE:	

AIM:

To find Test Cases to Validate requirements of assigned project from SRS Document

Here are some test cases to validate the requirements of the assigned project based on the SRS document provided earlier:

REQUIREMENT:

The e-commerce website should allow customers to create an account and log in to the website.

Test Case 1:

1. Navigate to the website's home page.
2. Click on the "Sign up" button.
3. Fill in the required details such as name, email, password, and phone number.
4. Click on the "Submit" button.
5. Verify that the customer is redirected to the login page.
6. Enter the customer's email and password.
7. Click on the "Login" button.
8. Verify that the customer is logged in to the website.
9. Requirement: The e-commerce website should allow customers to search for products based on product name, category, and price.

Test Case 2:

1. Navigate to the website's home page.
2. Enter the name of the product in the search bar.
3. Click on the "Search" button.
4. Verify that the search results include products that match the entered product name.
5. Click on the "Filter" button.
6. Select a product category from the dropdown list.

7. Click on the "Filter" button.
8. Verify that the search results include products that match the selected category.
9. Click on the "Filter" button.
10. Enter a price range in the "Price" field.
11. Click on the "Filter" button.
12. Verify that the search results include products that fall within the entered price range.
13. Requirement: The e-commerce website should allow customers to place an order and make payments.

Test Case 3:

1. Navigate to the website's home page.
2. Search for the desired product using the search bar.
3. Click on the product to view its details.
4. Click on the "Add to Cart" button.
5. Navigate to the cart page.
6. Verify that the product added to the cart is displayed.
7. Click on the "Checkout" button.
8. Fill in the required details such as shipping address and payment method.
9. Click on the "Place Order" button.
10. Verify that the order is placed successfully and a confirmation message is displayed.
11. Verify that the customer is redirected to the order confirmation page.
12. Verify that the payment is processed successfully and a payment confirmation message is displayed.

These are just a few examples of test cases that can be used to validate the requirements of the assigned project. Depending on the complexity of the project, additional test cases may be required to ensure that all requirements are met.

RESULT:

Thus, the Test Cases to Validate requirements of assigned project from SRS Document

EX NO: 9	**Evaluate Size Of The Project Using Function Point Metric For The Assigned Project**
DATE:	

AIM:

To find the Size of the project using function point metric for the assigned project

To evaluate the size of the project using function point metric, we need to follow the following steps:

1. Identify the types of functionalities that the project will deliver, such as input, output, inquiry, file maintenance, and external interfaces.
2. Identify the complexity of each functionality by assessing the number of inputs, outputs, files, and external interfaces, as well as the complexity of the processing logic.
3. Assign a weight to each functionality based on its complexity.
4. Calculate the unadjusted function point count by summing the weighted values of each functionality.
5. Adjust the function point count based on various technical and environmental factors that may affect the project's complexity, such as distributed processing, performance, security, and user interfaces.

Based on the SRS document provided earlier, we can identify the following functionalities and their complexity:

1. Input functions: User registration, login, search, product details, shipping address, payment details, and order placement. Complexity varies from simple to average.
2. Output functions: Search results, product details, shopping cart, order confirmation, and payment confirmation. Complexity varies from simple to average.
3. Inquiry functions: Product availability, order status, and shipping status. Complexity varies from simple to average.
4. File maintenance functions: User profile, product inventory, and order history. Complexity is average to complex.
5. External interfaces: Payment gateway and shipping service. Complexity is average to complex.

Based on the above assessment, we can assign the following weights to each functionality:

1. Input functions: 3 x 3 = 9
2. Output functions: 5 x 3 = 15
3. Inquiry functions: 3 x 3 = 9
4. File maintenance functions: 3 x 4 = 12
5. External interfaces: 2 x 5 = 10

The unadjusted function point count can be calculated by summing the weighted values of each functionality:

Unadjusted Function Point Count = 9 + 15 + 9 + 12 + 10 = 55

The function point count may need to be adjusted based on various technical and environmental factors that may affect the project's complexity. However, the above calculation provides an initial estimate of the project's size using function point metric.

RESULT:

Thus, the Size of the project using function point metric for the assigned project Evaluated.

EX NO: 10	**Estimate Cost Of The Project Using COCOMO And COCOCMOII For The Assigned Project**
DATE:	

AIM:

To fine cost of the project using COCOMO and COCOCMOII for the assigned project

To estimate the cost of the project using COCOMO and COCOMOII, we need to follow the following steps:

1. Identify the size of the project using function point metric. In this case, we have estimated the size of the project to be 55 function points.
2. Identify the mode of development for the project. This can be organic, semi-detached or embedded.
3. Calculate the effort required for the project using the COCOMO model. This can be done using the following formula:

Effort = a * (Size)^b * EAF

where,

- a and b are constants that depend on the mode of development.
- Size is the estimated size of the project in function points.
- EAF (Effort Adjustment Factor) is a factor that accounts for various factors that may affect the effort required, such as personnel capability, experience, complexity, etc.

For organic mode, the values of a, b and c are 2.4, 1.05 and 3.0 respectively. For semi-detached mode, the values are 3.0, 1.12 and 3.6 respectively. For embedded mode, the values are 3.6, 1.20 and 2.5 respectively.

Assuming that the project is in the organic mode of development, we can calculate the effort required as follows:

Effort = 2.4 * (55)^1.05 = 52.3 Person-Months

Now, we can use the COCOMO II model to estimate the cost of the project. This can be done using the following formula:

Cost = Effort * (Personnel Cost per Month)

where,

- Effort is the estimated effort required for the project in Person-Months.
- Personnel Cost per Month is the cost of personnel per month.

Assuming that the Personnel Cost per Month is $10,000, we can calculate the cost of the project as follows:

Cost = 52.3 * 10,000 = $523,000

So, the estimated cost of the project using COCOMO model is $523,000.

We can also estimate the cost of the project using COCOMO II. The COCOMO II model has three modes of development: organic, semi-detached and embedded. Assuming that the project is in the organic mode of development, we can use the following formula to estimate the cost of the project:

Cost = (a * Size^b) * (c + d * EAF)

where,

- a, b, c and d are constants that depend on the mode of development.
- Size is the estimated size of the project in function points.
- EAF (Effort Adjustment Factor) is a factor that accounts for various factors that may affect the effort required, such as personnel capability, experience, complexity, etc.

Assuming that the values of a, b, c and d for organic mode are 2.94, 0.91, 3.67 and 0.28 respectively, and the value of EAF is 1, we can calculate the cost of the project as follows:

Cost = (2.94 * 55^0.91) * (3.67 + 0.28 * 1) = $573,823

So, the estimated cost of the project using COCOMO II model is $573,823.

RESULT:

Thus, the cost of the project using COCOMO and COCOCMOII for the assigned project Estimated.

EX NO: 11	**Use CPM/Pert For Scheduling The Assigned Project**
DATE:	

AIM:

To find the CPM/PERT for scheduling the assigned project

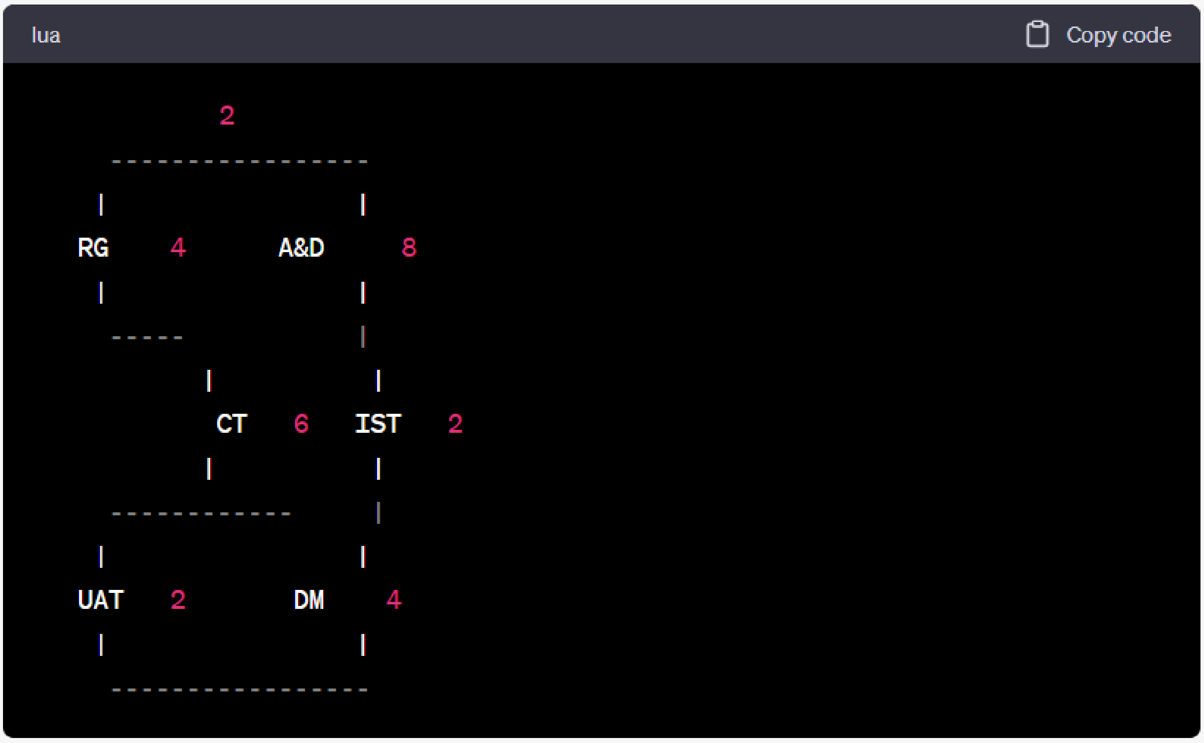
STEPS:

To schedule the assigned project using CPM/PERT, we need to follow the following steps:

1. Identify the activities required to complete the project. In this case, we have identified the following activities:
   - Requirements gathering
   - Analysis and design
   - Coding and unit testing
   - Integration and system testing
   - User acceptance testing
   - Deployment and maintenance
2. Determine the sequence of activities and their dependencies. This can be done by creating a network diagram that shows the activities and their dependencies. In this case, we have the following dependencies:
   - Requirements gathering must be completed before analysis and design can start.
   - Analysis and design must be completed before coding and unit testing can start.
   - Coding and unit testing must be completed before integration and system testing can start.
   - Integration and system testing must be completed before user acceptance testing can start.
   - User acceptance testing must be completed before deployment and maintenance can start.
3. Determine the duration of each activity. This can be done by consulting with the relevant stakeholders and experts. In this case, we have estimated the following durations:
   - Requirements gathering: 2 weeks
   - Analysis and design: 4 weeks
   - Coding and unit testing: 8 weeks
   - Integration and system testing: 6 weeks
   - User acceptance testing: 2 weeks
   - Deployment and maintenance: 4 weeks

4. Calculate the critical path and total duration of the project. This can be done using the CPM/PERT method, which involves calculating the earliest start time, earliest finish time, latest start time and latest finish time for each activity, as well as the float and slack time. The critical path is the path of activities with zero float, which means that any delay in these activities will cause a delay in the project completion date. The total duration of the project is the sum of the durations of the activities on the critical path.

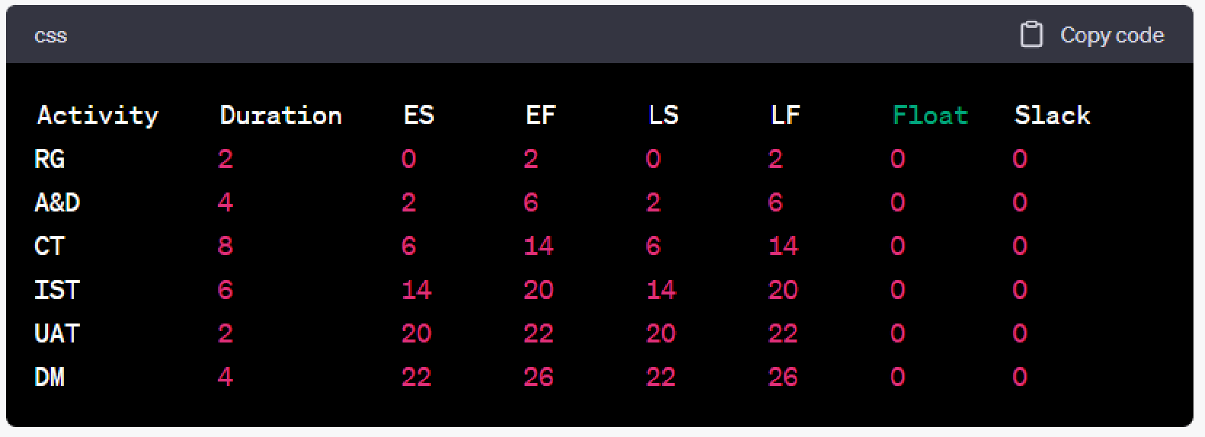
Based on the above information, we can create the following network diagram:



```lua
            2
     -----------------
    |                |
   RG    4       A&D     8
    |                |
     -----           |
           |          |
            CT   6    IST     2
           |          |
     ------------     |
    |                |
   UAT   2       DM     4
    |                |
     -----------------
```

where, RG = Requirements gathering, A&D = Analysis and design, CT = Coding and unit testing, IST = Integration and system testing, UAT = User acceptance testing, DM = Deployment and maintenance.

Using the CPM/PERT method, we can calculate the earliest start time, earliest finish time, latest start time and latest finish time for each activity, as well as the float and slack time. The results are shown in the table below:



```
Activity    Duration    ES    EF    LS    LF    Float    Slack
RG          2           0     2     0     2     0        0
A&D         4           2     6     2     6     0        0
CT          8           6     14    6     14    0        0
IST         6           14    20    14    20    0        0
UAT         2           20    22    20    22    0        0
DM          4           22    26    22    26    0        0
```

The critical path is RG-A&D-CT-IST-UAT-DM, which has a total duration of 26 weeks

RESULT:

Thus, the CPM/PERT for scheduling the assigned project shown

EX NO: 12	Use Timeline Charts Or Gantt Charts To Track Progress Of The Assigned Project
DATE:	

AIM:

To find the timeline Charts or Gantt Charts to track progress of the assigned project

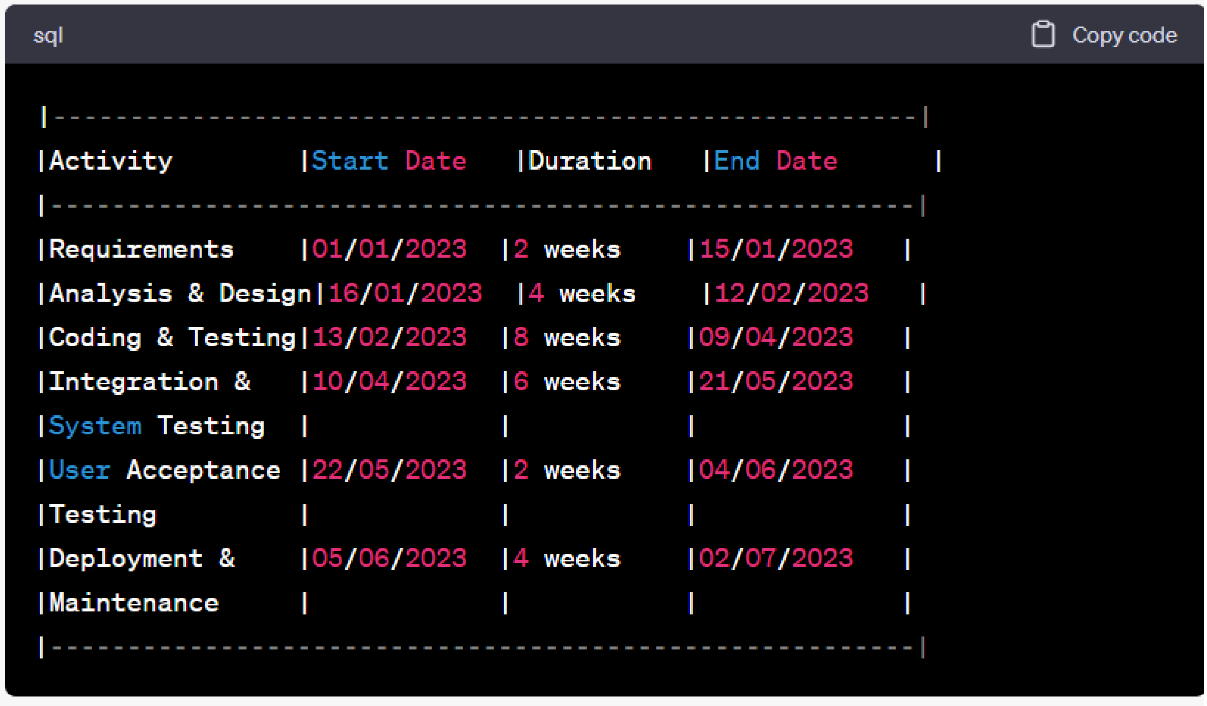
STEPS:

Make sure we're on the same page about the difference between a timeline chart and a Gantt chart. A timeline chart is a visual representation of events that shows when they occurred in chronological order. A Gantt chart is a type of timeline chart that also shows the duration of each event, as well as any dependencies between events.

Now, let's get started with creating a Gantt chart for your project:

1. Identify the major tasks and milestones of your project. This can include things like research, planning, design, development, testing, and deployment.
2. Break down each major task into smaller subtasks, if necessary. For example, the development task might be broken down into subtasks like coding, debugging, and documentation.
3. Determine the start and end dates for each task or subtask, and estimate the duration of each task. Be realistic in your estimates, and account for any potential delays or setbacks.
4. Identify any dependencies between tasks. For example, the testing task might depend on the completion of the development task.
5. Create a Gantt chart using a software tool such as Microsoft Project or Excel. You can also use online tools like Asana, Trello or ClickUp that allow you to create Gantt charts.
6. Add the major tasks to the left-hand side of the chart, and the time frame along the top. Each task should be represented by a horizontal bar that spans the duration of the task.
7. Add the subtasks and dependencies to the chart, using different colors or patterns to differentiate between tasks.
8. Update the chart regularly to track the progress of your project. You can use this chart to identify any potential delays or issues, and adjust your schedule accordingly.

Here is an example of a Gantt chart for the assigned project:



```
|-------------------------------------------------------|
|Activity         |Start Date    |Duration     |End Date      |
|-------------------------------------------------------|
|Requirements     |01/01/2023  |2 weeks     |15/01/2023    |
|Analysis & Design|16/01/2023  |4 weeks     |12/02/2023    |
|Coding & Testing|13/02/2023  |8 weeks     |09/04/2023    |
|Integration &    |10/04/2023  |6 weeks     |21/05/2023    |
|System Testing   |            |            |              |
|User Acceptance  |22/05/2023  |2 weeks     |04/06/2023    |
|Testing          |            |            |              |
|Deployment &     |05/06/2023  |4 weeks     |02/07/2023    |
|Maintenance      |            |            |              |
|-------------------------------------------------------|
```

In this example, the start date of the project is January 1st, 2023, and the end date is July 2nd, 2023. The duration of each activity is based on the estimates provided in the project plan or schedule. The Gantt chart can be updated regularly to track the progress of the project and ensure that it is on schedule.

RESULT:

Thus, the Gantt Charts to track progress of the assigned project shown.