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| Sister Nivedita University |
| *DG 1/2 New Town, Kolkata – 700156*  *www.snuniv.ac.in* |

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SOFTWARE ENGINEERING Lab ASSIGNMENTS

School of Engineering

**Department of Computer Science**

**Bachelor of Technology (B. Tech)**

**[ 5th Semester]**

**ASSIGNMENT-1**

1. **Activity Network & Gantt Chart**

Consider the following project activities and their durations:

* a) Requirements Gathering (20 days)
* b) System Design (50 days)
* c) Database Design (35 days)
* d) User Interface Design (40 days)
* e) Implementation (90 days)
* f) Testing (60 days)
* g) Documentation (30 days)
* h) Deployment (20 days)

The precedence relations are as follows:

* a < {b, c, d}
* {b, c} < e
* d < f
* e < {g, f}
* f < h

1. Draw the Activity Network Diagram.
2. Calculate and provide the following time parameters for each activity: ES (Early Start), LS (Late Start), EF (Early Finish), LF (Late Finish), ST (Slack Time), and MT (Minimum Time).
3. Draw the Gantt Chart for the project.

**(B) Event Planning**

An annual conference is scheduled for 15th October 2024. Consider the following tasks:

* a) Venue Booking
* b) Speaker Scheduling
* c) AV Equipment Setup
* d) Catering
* e) Invitation Sending
* f) Printing Conference Material

Detail the tasks under catering:

* d.1) Budget Preparation
* d.2) Menu Selection
* d.3) Caterer Selection
* d.4) Confirm Menu

1. Draw the Gantt Chart for the conference preparation tasks.
2. Determine the finish date for the conference preparation tasks.

**(C) Work Breakdown Structure**

Construct a Work Breakdown Structure (WBS) for organizing a company picnic.

**(D) Consider the following tasks:**

|  |  |  |
| --- | --- | --- |
| **Task name** | **Duration** | **Dependency** |
| T1 | 5 | Independent |
| T2 | 7 | Independent |
| T3 | 3 | T1(FS) |
| T4 | 7 | T3(SS) |
| T5 | 10 | T2(FS) |
| T6 | 4 | Independent |
| T7 | 4 | T6(FF) |

a) Create 3 subtasks of T2.

b) Create 4 subtasks of T4.

c) Create 2 subtasks of T5.

d) Insert one weekly recurring task with 4 occurrences before T3 on Wednesday.

e) Show the critical path and determine the finish date.

**(E) Enter the following tasks**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tasks** | **Start Date** | **Durations (Days)** | **Resources** | **Dependency** |
| T1  T2  T3  T4  T5  T6  T7  T8 | <Today>  <Today>  <Today> + 5 <Today> + 7 <Today> + 10 <Today> + 10 <Today> + 10 <Today> + 14 | 1  2  3  4  10  10  2  5 | R1,R2  R2,R4  R6,R7  R9,R10  R1,R5  R6, R8  R3  R8,R9 | Ind.  Ind.  T1(FS)  Ind.  Ind.  T4(SS)  T4(FF)  Ind. |

Do the following:

i) Enter a Task (NEW1) before the first task (T1).

ii) Enter a Task (NEW2) just before the last Task (T8).

iii) Create 2 sequential subtasks for task T2.

iv) Move the 2nd Independent task (T2) just before the last task.

v) Create 4 sequential subtasks under the 4th Independent Task (T5).

vi) Move the 5th Independent Task at the Top.

vii) Increase the Resource (one) for 3rd Independent Task and observe its change in duration.

viii) Decrease the Resources (one) of 1st Independent Tasks and observe the change in the duration of the tasks accordingly.

(F) Consider the following tasks and resource information:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tasks** | **Durations (Days)** | **Resources** | **Standard**  **Rate** | **Dependency** |
| T1  T2  T3  T4  T5  T6  T7  T8 | 3  5  3  4  10  12  4  5 | R1,R2  R3,R4  R2,R5  R4,R6  R1,R3  R2  R4  R5,R6 | R1:$10/Hr  R2:$12/Hr  R3:$10/Hr  R4:$15/Hr  R5:$15/Hr  R6:$20/Hr | Ind.  Ind.  T1(FS)  T2(FS), T3(SS)  T4(FS)  T3(FS)  T5(FF)  T6FS), T7(FS) |

Calculate the usage of the resources (in hours) with assigned tasks and determine manufacturing cost of the project and market price to achieve 25% profit.

**ASSIGNMENT-2 (Project Scheduling- PERT Chart)**

**(A)**

1. Enter 6 tasks with durations: 100 days, 85 days, 70 days, 95 days, 60 days, 50 days.
2. Add a Recurring Task named "Weekly Team Meeting" that occurs every Monday, from the start date until 60 days after the start date.
3. Modify Task 3 to start 20 days after Task 2 finishes.
4. Set a Deadline for Task 5 as 90 days after the project starts.
5. Adjust the Gantt Chart to reflect these changes.

**(B)**

For a conference with the following durations and dependencies:

* a) Planning
  + a.1) Identify Speakers (2, 4, 6 days)
  + a.2) Finalize Agenda (3, 5, 7 days)
* b) Logistics
  + b.1) Arrange Catering (4, 6, 8 days)
  + b.2) Book AV Equipment (2, 3, 5 days)

Precedence relations: a < b; a.1 < a.2; b.1 < b.2

1. Determine the duration of the summary tasks.
2. Draw the optimistic, expected, and pessimistic Gantt Charts for the project.

**ASSIGNMENT-3 (Use case Diagram)**

**(A) Online Banking System**

Draw a Use Case Diagram for an online banking system where customers can:

* View account balance
* Transfer funds
* Pay bills
* View transaction history

The system allows users to login and manage accounts.

**(B) Library Management System**

Draw a Use Case Diagram for a Library Management System. Include actors such as:

* Library Member
* Librarian
* Admin

Functionalities include:

* Borrow Books
* Return Books
* Manage Book Inventory
* Update Member Records

**ASSIGNMENT-4 (Class Diagram)**

**(A) Railway Reservation System**

Draw a Class Diagram for a railway reservation system. Include:

* Train Information
* Reservation Details
* Passenger Information
* Booking and Cancellation Features

**(B) Student Marks Analysis System**

Draw a Class Diagram for a student marks analysis system that includes:

* Student Records
* Subject Marks
* Grade Calculation
* Ranking and Report Generation

The Final report should display rank, percentage, Class, Pass/Fail status for each student.

**ASSIGNMENT-5 (Sequence Diagram)**

**(A) ATM Transaction System**

Draw a Sequence Diagram for an ATM transaction system where a customer can:

* Insert Card
* Enter PIN
* Choose Account Type
* Withdraw Cash

**(B) Credit Card Payment Processing**

Draw a Sequence Diagram for a credit card payment processing system, showing interactions between:

* Customer
* Merchant
* Payment Gateway
* Bank

**ASSIGNMENT-6 (Activity Diagram)**

**(A) College Admission Process**

Draw an Activity Diagram for the college admission process including:

* Fee Payment
* Hostel Registration
* Academic Registration
* Library Registration
* Issuance of ID and Library Cards

**(B) Email Login Process**

Draw an Activity Diagram that outlines the steps for logging into an email system.

**ASSIGNMENT-7 (System Modeling- ER Diagram)**

**(A) Library Management System**

Draw an ER Diagram for a library management system with entities such as:

* Member
* Book
* Publisher
* Author

**(B) Hospital Management System**

Draw an ER Diagram for a hospital management system including entities like:

* Patient
* Doctor
* Room
* Appointment
* Billing

**ASSIGNMENT-8 (System Modeling- DFD)**

**(A) Basic Algorithm**

Construct a DFD for the following algorithm:

main() {

int a[100];

for (int i = 0; i < 100; i++) {

process(a[i], a[i+1]);

}

}

process(int a, int b) {

if (a > b) {

action1();

} else {

action2();

}

}

action1() {

// Some processing

}

action2() {

// Some processing

}

**ASSIGNMENT-9 (Preparation of SRS Document)**

Prepare an SRS document for the following projects:

1. An Online Shopping System
2. A Task Management Application

**ASSIGNMENT-10 (Test Plan)**

**(A) GCD Calculation Program**

Design a Test Plan for a program to calculate the GCD of two integers using both Black Box Testing and White Box Testing methods.

**(B) Odd/Even Number Checker**

Design a Test Plan for a program to determine if a number is odd or even, using both Black Box Testing and White Box Testing methods.

**Signature of the teacher**

**[Teacher’s Name]**