**COURSE CODE: DJS22ITL601**   **DATE:**

**COURSE NAME: Software Engineering Laboratory**  **CLASS: T.Y.BTech**

**EXPERIMENT NO. 6**

**CO/LO** Analyze real world problem using software engineering principles.

**AIM / OBJECTIVE**: Perform Project Management Activity

**DESCRIPTION OF EXPERIMENT:** Project Management activities:

1. Perform Project Scheduling using WBS Gantt Chart
2. Perform Project cost estimation using appropriate FP based / COCOMO Techniques.
3. Perform Risk Analysis and Design RMMM plan for the system under development.

**OUTPUT:**

1. Gannt Chart
2. Cost Estimation using FP/COCOMO Technique
3. At Least Five RMMM plan

**QUESTION:**

1. How does complexity of weights affect FP Calculation?
2. What is risk exposure and how it is calculated?

**REFERENCE**

www.geeksforgeeks.com

**1. Project Scheduling using WBS and Gantt Chart**

**Work Breakdown Structure (WBS)**

The WBS for the Codeforces Visualizer project is as follows:

| **Task ID** | **Task Description** | **Subtasks** |
| --- | --- | --- |
| 1 | Requirement Analysis | Collect requirements, define features |
| 2 | Design | UI Design, System Architecture |
| 3 | Frontend Development | Search UI, Chart display, Responsive design |
| 4 | Backend/API Integration | Codeforces API, Caching, Error handling |
| 5 | Visualization Module | Rating graph, Tag analysis, Heatmap |
| 6 | Testing & Debugging | Unit tests, UI tests, API tests |
| 7 | Deployment | Hosting, Documentation, Feedback integration |

**Gantt Chart**

A Gantt chart maps each task with estimated durations (in weeks):

| **Task** | **Week 1** | **Week 2** | **Week 3** | **Week 4** | **Week 5** |
| --- | --- | --- | --- | --- | --- |
| Requirement Analysis | X |  |  |  |  |
| Design | X | X |  |  |  |
| Frontend Development |  | X | X |  |  |
| Backend/API Integration |  | X | X | X |  |
| Visualization Module |  |  | X | X |  |
| Testing & Debugging |  |  |  | X | X |
| Deployment |  |  |  |  | X |

**2. Project Cost Estimation**

**a. Function Point (FP) Based Estimation**

**Count of Components:**

| **Component** | **Count** | **Weight (Avg)** | **Total FP** |
| --- | --- | --- | --- |
| External Inputs (EI) | 5 | 4 | 20 |
| External Outputs (EO) | 4 | 5 | 20 |
| External Inquiries (EQ) | 3 | 4 | 12 |
| Internal Logical Files | 2 | 7 | 14 |
| External Interface Files | 2 | 5 | 10 |
| **Total FP** |  |  | **76** |

Assuming Productivity Rate = 10 FP/Person-Month  
**Estimated Effort = 76 / 10 = 7.6 Person-Months**

**b. COCOMO (Basic Model) Estimation**

**Assuming Organic Mode:**

* Estimated KLOC = 2.5
* Effort = a × (KLOC)^b = 2.4 × (2.5)^1.05 ≈ **6.3 Person-Months**

**Development Time (TDEV) = c × (Effort)^d = 2.5 × (6.3)^0.38 ≈ 4.3 Months**

**3. Risk Analysis and RMMM Plan**

**a. Risk Identification:**

| **Risk ID** | **Risk Description** | **Probability** | **Impact** |
| --- | --- | --- | --- |
| R1 | Codeforces API changes or downtime | High | High |
| R2 | Data visualization bugs | Medium | Medium |
| R3 | Integration issues between frontend/backend | Medium | High |
| R4 | Incomplete requirements | Low | High |

**b. Risk Mitigation, Monitoring, and Management (RMMM) Plan**

| **Risk ID** | **Mitigation Strategy** |
| --- | --- |
| R1 | Use versioned API endpoints and maintain fallback error pages |
| R2 | Perform unit testing for all charts and validate sample data |
| R3 | Use Swagger/OpenAPI for contract clarity between frontend/backend |
| R4 | Conduct regular stakeholder meetings for clarity and scope lock |