



BAHRIA UNIVERSITY (KARACHI CAMPUS)

Software Project Management (SEN-410)

ASSIGNMENT # 4 – Fall 2024

Problem Based Learning (PBL)

Based on: CLO-2

Class: BSE-7A/B

Submission Deadline: 31st Dec 24

Course Instructor: ENGR. MAJID KALEEM

Max Marks: 06

You have to complete this assignment in a group maximum of three (03) students. This assignment is based on the following PBL attributes:

1. The problem should involve **real-world scenarios**.
2. The problem should require students to make **reasoned decisions** and to defend them (investigation and critical analysis).
3. If used for a **group activity**, the problem should involve collaboration and group discussions.

Problem-based learning (PBL) is an educational approach that emphasizes active, student-centered learning through the exploration and resolution of *real-world* problems. In a PBL environment, students work collaboratively in small *groups* to analyze and solve complex problems, typically drawn from authentic situations or scenarios.

Scenario for Advanced COCOMO Assignment

Title: Estimation of Development Efforts for a Healthcare Management System

Scenario:

Your team has been approached by a healthcare organization to develop a **Healthcare Management System (HMS)** that will manage patient records, appointments, and billing, and provide basic analytics for hospital administrators. The organization has provided the following requirements for the system:

1. **Modules:**

- a. **Patient Management:** Manage patient records, medical history, and demographics.

- b. **Appointment Scheduling:** Schedule and track patient-doctor appointments.
 - c. **Billing System:** Generate invoices, process payments, and manage insurance claims.
 - d. **Analytics Dashboard:** Provide insights into patient data and hospital operations.
- 2. **Size of the Project:**
 - a. Based on the preliminary requirements, the estimated size of the system is **300 KLOC (thousand lines of code)**.
- 3. **Team Composition:**
 - a. Team size: 10 members (developers, testers, and analysts).
 - b. Average experience: Mid-level with 3-5 years of experience in software development.
- 4. **Development Environment:**
 - a. Programming Language: Python
 - b. Tools: Django Framework for the backend, React for the frontend, and PostgreSQL for the database.
 - c. The organization plans to use Agile methodology for development.
- 5. **Constraints:**
 - a. The project needs to be completed within **12 months**.
 - b. The organization requires a high level of reliability and accuracy for data processing.
- 6. **External Factors:**
 - a. Frequent changes in requirements are expected due to dynamic regulatory compliance for healthcare systems.
 - b. The team will need to collaborate with external consultants for legal and compliance advice.

Your Task:

Effort Estimation Using Advanced COCOMO:

1. Use the Advanced COCOMO model to estimate the development effort in person-months.
2. Identify relevant cost drivers from the given scenario and provide justifications for their ratings (e.g., RELY, CPLX, TIME, ACAP, PCAP, etc.).
3. Calculate the nominal effort using the **Effort Adjustment Factor (EAF)** and COCOMO equations.

Schedule Estimation:

1. Estimate the total time required to complete the project using Advanced COCOMO scheduling equations.

Analysis and Recommendations:

2. Analyze how different cost drivers impact the total effort and schedule.

3. Provide recommendations to optimize effort and ensure timely delivery.

Report:

1. Submit a detailed report with all calculations, assumptions, and justifications. Include a discussion of potential risks and how the estimated effort aligns with the project timeline.
2. Present your work to the class as a group and each member of the group must upload the presentation on LMS individually.

Good Luck!