United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Exam Name: Final Term Exam Trimester: Fall 2024

Course Code: PMG 4101, Course Title: Project Management

Total Marks: **40** Duration: 2 hours

Any examinee found engaging in unfair practices will be expelled from the trimester / program as per UIU disciplinary rules.

Answer all the questions.

Scenario 1: Your city wants to implement a traffic control system to optimize vehicle flow and reduce congestion. As an experience project manager, they have asked you to lead this critical initiative. The system will be a mix of hardware and software components designed to manage real-time traffic conditions across various intersections and roadways within the city. There is significant complexity when dealing with external data files, such as integrating video feeds from external vehicle registration databases and the city's broader traffic data repositories. Your team, consisting of experienced professionals and less experienced members, manages the development, including addressing real-time, safety-critical requirements. The system will handle simple complexity regarding inputs, outputs, and inquiries and average complexity for internal files. For example, it will collect traffic data from multiple inputs, such as sensors, cameras, and lights, to process and output real-time traffic signals. The platform processes road occupancy data and vehicle speed inputs, automatically adjusting traffic signals based on current conditions. Operators can manually intervene in emergencies, activating detours or altering signal timings to prioritize emergency vehicles. An auxiliary database is maintained for traffic patterns, real-time sensor data, and intersection configurations. When traffic signal timings are adjusted, the system generates a detailed schedule of signal changes, providing real-time feedback to the operators. After any adjustment, operators will receive a confirmation message and a summary of the changes made. The system will process all traffic data in a suspect directory, including the user's vehicle's number plate, average speed, and timing. Additionally, it will maintain records of any fines or fees collected for traffic violations, such as running red lights. The system will interface with a third-party platform to retrieve real-time updates and make data-driven adjustments to traffic management. There is no influence on the technical complexity factors between F1 and F3; all the factors from F4 to F6 are moderate, with F8 and F9 being average, while the remaining factors are significant. The project requires an average of 30 lines of code per function point, reflecting the system's overall complexity.

1. From the scenario 1, calculate the total Function Point value (use tables below, if needed). Determine the project complexity according to COCOMO Model. Find all the COCOMO parameters for the project mentioned in the scenario according to the project's complexity category.

[CO3] 5+5 = 10

2. Discuss the role of a tester in the Change Control Process. Imagine you are a project manager in a software development team. A senior manager requests a change in an ongoing project that could potentially increase costs. Outline the steps you would take within the Change Control Process to evaluate and address this request.

[CO4] 3+3 = 6

3. From the scenario 1, develop a Gantt chart for the above project scenario by identifying the tasks and tasks' dependency. Mention different assumptions or consideration need to be considered (e.g., weekly holidays and government holidays) for making a pragmatic estimation. [**CO5**] **6**

4. Suppose the quality assurance teams of your project employ both manual and automated test scripts, and it is usually necessary to ensure that the finished product covers the test plan. To verify that each script is correct and to ensure that more than one QA engineer has taken responsibility for the quality of the script - which review technique would be more appropriate? Provide the rationale for choosing the review technique. [**CO4] 6**

5. Discuss the core principles of *ISO 9000*. According to CMMI model, mention the characteristics of *Immature* and *Mature* Organization. [**CO3] 4+3 = 7**

6. Progress report submission and presentation on estimation through COCOMO model and Function point methods for a group project has been evaluated earlier (**Do not answer this question**, **already completed in classroom**). [**CO3**] **5**

Function Units	**Simple**	**Avg**	**Complex**
EI	3	4	6
EO	4	5	7
EQ	3	4	6
ILF	7	10	15
EIF	5	7	10

PROJECT TYPE	**a**	**b**	**c**	**d**
Organic	2.4	1.05	2.5	0.38
Semidetached	3	1.12	2.5	0.35
Embedded	3.6	1.2	2.5	0.3