ourdiu.com | Shared by Md. Ferdous Foysal Hridoy

Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Final Examination, Summer 2025
Course Code: CSE333, Course Title: Software Engineering
Level: 3, Term: 3

Time: 2:00 Hrs. **Marks: 40**

Answer ALL Questions *[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

The Smart Fitness Tracker System (SFTS) is a mobile application and a wearable device designed to help users monitor and improve their health and fitness. The system's central component is a cloud-based server that processes data from the wearable device and syncs with the mobile app. The wearable device tracks real-time data such as heart rate, step count, calories burned, and sleep patterns. The mobile application serves as the user interface, where users can view their progress, set fitness goals, and receive personalized coaching tips. The system also includes a social feature that allows users to share their achievements and compete with friends.

The SFTS's key functionalities are driven by the continuous flow of data from the device to the server and then to the app. Users can manually log workouts, track their hydration, and receive reminders to stay active. The system's server analyzes the collected data and generates weekly progress reports and goal-based recommendations. A critical feature of the SFTS is its ability to send alerts. For example, if a user's heart rate exceeds a predefined safe zone during a workout, the system can automatically send a notification to the user's mobile app. This proactive alert system and integrated data analysis ensure a responsive and effective fitness tracking experience.

1.		Construct the Class Diagram for the Smart Fitness Tracker System (SFTS). The diagram should include classes for User, WearableDevice, MobileApp, Goal, and Alert. Clearly show the attributes for each class and the relationships between them	[10]	CO2
2.	*a)*	Construct a Business Process Model (BPM) for a User setting a new fitness goal. The BPM should depict the step-by-step flow from the user opening the app, navigating to the goals section, selecting a goal type (e.g., step count, weight loss), defining a target value, and saving the new goal. Use appropriate BPMN elements such as events, gateways, and tasks to illustrate the process clearly.	[05]	CO2
	b)	A company has a social media management tool that is facing multiple issues. First, users are reporting a bug where scheduled posts fail to publish at the correct time. Second, the company needs to integrate with a new social media platform that was not available when the tool was first developed (Adaptive). Third, the user interface feels outdated and cumbersome to use, prompting a desire for a redesign. Finally, the team wants to standardize the code to prevent future errors and make it easier for new developers to understand. Select a comprehensive maintenance plan that addresses all four of these issues. Prioritize the tasks and explain the rationale behind the prioritization.	[05]	

ourdiu.com

ourdiu.com | Shared by Md. Ferdous Foysal Hridoy

3.	a)	A cinema booking system has the following business rules for ticket prices: • A standard ticket costs $10. • A senior citizen (age 60 or above) gets a 25% discount. • A child (age 12 or below) gets a 50% discount. • Only one discount can be applied per ticket. Using Equivalence Partitioning (EP), identify the valid and invalid partitions for a customer's age when booking a ticket.	[05]	CO3
	b)	A core component of a data processing tool is a function process_data_array(data_list). The function iterates through data_list to perform an operation. The loop's logic is defined as: for (int i = 0; i < data_list.length; i++). Using loop testing strategies, determine the minimum set of test cases to thoroughly test the loop's boundary conditions and general functionality.	[05]	
4.	a)	a) A software company is developing an online tutoring platform. The project size is estimated to be 150 KLOC. The firm has two potential modes for the project: Semi-Detached or Organic. i) Calculate the Effort (in person-months) for both modes using the basic COCOMO model. ii) Compare why the estimated Effort differs between these two modes.	[05]	
	b)	Conduct a thorough quality assurance assessment of the **"add to cart" functionality** within an online food ordering application. This assessment should go beyond a simple pass/fail check and provide detailed feedback on the user journey. Focus on the following areas: Functionality, Usability, Security, Performance, and Compatibility.	[05]	CO3