Object Oriented Analysis and Design
In-Class Test

Attempt ALL questions, merge them all into a single document, name the document with your group number and submit to the corresponding link on Blackboard.

Question 01:

Read the following description about an **Automated Ticket Issuing System**.

An automated Ticket Issuing System sells rail tickets. A passenger can buy a rail ticket without waiting in lengthy queues at the ticket counter.

Before buying the ticket, passenger has to press the start button, a menu displaying potential destinations is activated along with a message to the user to select a destination.
Once a destination has been selected, the system calculates the total amount and display it on the screen. Users are requested to input the amount using coins. The system would issue the ticket and balance once a valid amount is entered.

Regular passengers can pay the total amount to the cashier at the ticket counter, who would issue them a card. They would swipe the card in the machine and the system debits the amount and issue the ticket. If there aren't enough credits in the card, system debits all points while allowing the passenger to insert remaining balance via coins.

If the passengers are new to the system they can click help button, the system would display all instructions. Also, they can view the map and ticket prices.

The system will have a key-operated switch that will allow an operator to start and stop serving the customer. The machine can only be turned off when it's not serving a customer. Operator would be able to insert blank tickets, withdraw certain amount of coins from the machine.

a) Draw a Use Case Diagram for the Automated Ticket Issuing System. (25 marks)

Note: If you need to make additional assumptions about the system requirements, make sure you list down them below the diagram.

b) Write the Use Case Scenario for the use case "Buy Ticket". (10 marks)

Note: You may use the template given below;

Use Case Name		
Actors		
Pre-Conditions (if any)		
Post-Conditions (if any)		
Main Flow Events	User	System
Alternative Flow Events		

Question 02:

"**Auto Master**" is a reputed repair station for automobile vehicles such as cars, vans, jeeps, etc. They undertake all types of vehicle repairs at their repair station at Colombo 04.
Any customer can bring his/her vehicle for repairs to repair station.
Once a new repair arrives to the repair station, an Automobile Specialist will be allocated for the job. He will then create a new job order for the corresponding vehicle and will record relevant details such as, the issue and parts, where the problem exists (E.g. engine, gearbox, power steering pump, etc.), the condition of the vehicle and the date of hand over requested by the customer.
Then the original copy of the job order will be given to the customer and the vehicle will be sent to the Repair Station Coordinator with a copy of the job order. The Repair Station Coordinator inspects the vehicle to decide whether the requested repair can be done using available spare parts in repair station. If it cannot be done using available spare parts in the repair station, the customer will be notified regarding the situation, and the status of the vehicle will be mentioned as "ON-HOLD" until repair station receives the required spare parts from the manufacturer/spare parts dealer.
If the repair can be done using available spare parts, the Repair Station Coordinator will create a “Work Allocation Chart” and the work will be assigned to a suitable Forman.
During the process of fixing the problem of the vehicle, if the Forman discovers new problem in the vehicle he will inform it to the Repair Station Coordinator.
Then the Repair Station Coordinator will create a new Work Allocation Chart for the newly identified problem and will assign the Forman to carry out the work on it.
When the repairs are completed, the Forman has to submit a Detailed Report mentioning the work he did, new spare parts used (if any), the new condition of the vehicle, time spent, etc. This Detailed report will be used by the Automobile Specialist to create the Invoice.

a) Assuming that you are going to develop a system for Auto Master, identify suitable Classes for your system. (10 marks)

b) Draw the Class Diagram by identifying the relationships, multiplicity and role names where necessary. Your answer should include relevant attributes and methods according to the scenario. (30 marks)

Question 03:

Model a State Machine diagram for the "CybertTec" virus guard, reading the scenario given below. (25 marks)

"CybertTec" is a new virus guard which detects and manages of viruses. It is initially in the Checking State where it will do a self-scan and make sure that the virus definition files are up-to-date. If there is an error in the self-scan, virus guard changes its state to the Critical State. While in the critical stage, CybertTec will automatically repair the software. When the repairs are completed successfully, CyberTec moves back to Checking Sate. When the virus definition files are up to-date, CybertTec changes its state to General State, where it runs its normal operations.
Once the virus definition files are expired (over 1 year since the last registered date), only the services specified in the Evaluation Copy will be functioning. There can be several states and transitions within the Evaluation State.
In the evaluation state, if the virus definition files are less than 14 days old, it will go to Diminished State, from the General State. In this case the updates are downloaded automatically from the Virus Guard website. At this stage an automatic self-check will be running regularly. It checks if the virus definition files are over 14 days (from the expiration date) and if they are, the CybertT, changes the state to Augmented State. In this state, any installations from the web is restricted but network access is allowed. At this stage if user settles the payment, within the 14 days of time, CybertTec will continue its normal operation.