**Please be reminded this is an individual test and must be completed on your own. No discussions with any other people are allowed.**

**Case Study**

*Office Necessities Ltd* is a small company that supplies office necessities including desks, office chairs, print papers, etc. Its customers are individuals, small businesses, schools and universities. The company has a few physical stores across the province. You are hired to help them to build a web-based system to support their business.

You have written the following scenario to capture one of the requirements.

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case Name | Move products to physical stores | | |
| Triggering Event | Inventory needs to be moved to physical stores from central warehouse. | | |
| Brief Description | Central warehouse manager creates a moving ticket to move products to physical stores from central warehouse. | | |
| Actors | Central warehouse manager | | |
| Related Use Cases |  | | |
| Preconditions | Central warehouse manager has logged in. | | |
| Post Conditions | A moving ticket has been created and saved into database. | | |
| Flow of activities | Actor | | System |
|  | 1. | Requests to create an inventory moving ticket. | Displays a list of physical stores with their store id, store name and address. Asks to which store you would like to move products. |
|  | 2. | Selects one store. | Asks for which product to move and what is the quantity, also lists all the products by displaying each product’s id and name. There are food products and non-food products. For food products, system also displays the expiration dates of the food products. |
|  | 3. | Selects one product and inputs the quantity to move. | Verifies if the quantity is under the warehouse inventory quantity. If yes, confirm the product being moved is successfully added into the ticket.  Prompts for more products to move to this store? |
|  |  | Repeat step3 until all products have been added into the moving ticket. |  |
|  | 4. | Finish adding products to the current store. | Asks if move products to other physical stores? |
|  |  | Repeat step2 to step4 until no more physical store to move products. |  |
|  | 5. | Confirms finishing adding products to be moved. | Generates a QR code as the confirmation code to be added as the unique identifier of the moving ticket. Save the moving ticket to database. |
| Exception Conditions | * If the quantity entered is greater than the inventory quantity in step3, the actor will be asked to provide another quantity. | | |

**Question 1 (15 marks)**

Create a **domain class diagram** based on the information given in the use case above (only the use case); and create an **Object-level sequence diagram** for the above scenario. Be sure to demonstrate your understanding of composition. Solutions without utilizing composition will receive a grade of zero.

**Question 2 (5 marks)**

*Office Necessities Ltd*’s customers are individuals, small businesses, schools and universities. For all types of customers, the company would like to know their names, phones and addresses. For small businesses, the company would like to record their preferred brands. For schools, the company would like to record the total number of students and the total number of teachers. For universities, the company would like to record the total number of students, the total number of professors and the total number of staffs. Also, for small businesses, schools and universities, the company would like to have one or two specified contacts to communicate for any order issues.

Create a domain class diagram based on the information given. Be sure to demonstrate your understanding of generalization. Solutions without generalization will receive a grade of zero.

**Short Answer Questions**

**Question 3** (2 marks) – An afterschool swimming program would like to set up an information system for their business. They provide group lessons, semi-private lessons, and single private lessons. Each lesson will have an assigned class time and coach. Please help them to analyze and create a complete class diagram to model this part of the system. You need to decide if a generalization structure should be use here or not. Give a brief reasoning beside your class diagram about your decision. Make sure you include reasonable attributes to your classes.

**Question 4** (2 marks) - Would you use composition between these two classes? Why or Why not? Please create a complete model based on your reasoning.



**Question 5** (1 marks) - Chapter 1 – review question

How do a use case diagram and a domain class diagram drive the system development process?

**Question 6** (1 marks) - Chapter 2 – review question

List and briefly describe the six information-gathering techniques.

**Question 7** (1 marks) - Chapter 3 – review question

What are system controls, and why are they not considered part of the users’ functional requirements?

**Question 8** (1 marks) – Chapter 4 – review question

What is an object state?

**Submission**

Export your diagrams as picture files and insert them into proper position of this file. Submit this file to blackboard.