Advance class diagram and sequence diagram: Composition, Generalization, and Service Controllers

Objectives:

- Create a class diagram and sequence diagrams with generalized and specialized objects, and objects in a composition relationship.
- Use Service controllers to show interfaces with subsystems.

This is an individual lab. Complete a Visual Paradigm model as per the following requirements. Copy your diagrams to a MS-Word compatible file and include both the Word and source .VPP files in your submission.

Case Study:

Meal Solution Inc. is a company in Toronto which provides food kit delivery service. Food items provided by the company include packed uncooked meals (customer will cook the meals from the packed ingredients), snacks, and beverages. Customers order food week by week. Customers' orders for the coming week need to be placed and paid by the end of current Wednesday. Every week they provide around 20 meal recipes for the customers to choose from and then they pack all the ingredients for each meal and deliver the uncooked ingredients to the customers. Customers can also buy some snacks and beverages from the company.

The company needs an e-commerce system to help to run their business. In this lab, we only model a small portion of the system.

Scenarios:

Scenario 1: Order food for a specific week

Use Case Name	Order food for a specific week		
Triggering Event	Customer would like to order food for a specific week using the system.		
Brief Description	Customer logs in their account and choose a week to order food. After customer finishes choosing all the meals, snacks or beverages for that week, he/she proceeds to pay for the chosen food.		
Actors	Customer		
Related Use Cases	Register an account		
Preconditions	Customer is logged in the system.		
Post Conditions	Food has been ordered and paid.		
Flow of activities	Actor (customer)		System
	1.	Chooses a week and requests to view all the available food (meals, snacks, and beverages) for that week.	If it has passed the midnight of the Wednesday ahead of the chosen week, the system will not show any food; otherwise, the system will show all the available meals, snacks, and beverages for the chosen week.
	2.	Selects one meal/snack/beverage to see the details of the item.	Displays information about the chosen item, including name, the number of calories. If it is a meal chosen, system

			also displays the preparation time, the difficulty level of cooking (easy or difficult), a list of ingredients for the meal with amount for each, and the instructions of steps.
	3.	Adds the item being viewed and specify the quantity to buy.	Adds the item and the quantity into the order for the week.
	4.	Repeat step2-step3 above until all the food items have been added.	
	5.	Requests to pay.	Asks if use the credit card stored in the system to pay.
	6.	Answers yes.	Sends the payment information (total amount and credit card information) to the Payment subsystem Service Controller. The Payment subsystem Service Controller will process the payment and send back payment confirmation. Once the payment confirmation is received, an order confirmation code will be shown.
Exception Conditions	Actor chooses to cancel request.		

Scenario 2: Add a new ingredient

Use Case Name	Add a new ingredient		
Triggering Event	Meal designer would like to add a new ingredient into the system.		
Brief Description	Meal designer adds a new ingredient which is not yet in the available ingredient list so that the ingredient can be used for cooking meals.		
Actors	Meal designer		
Related Use Cases	Create a meal recipe		
Preconditions	Meal designer is logged in the system.		
Post Conditions	A new ingredient has been added into the available ingredient list.		
Flow of activities	Actor (meal designer)		System
	1.	Requests to add a new ingredient.	Asks the actor to select one of the categories of the ingredient (e.g., meat, vegetables, fruit, spice), ingredient name, number of calories per 100g, and description.
	2.	Chooses one category, fills in the ingredient name, number of calories per 100g, and description. Then submit.	Checks if the ingredient name is already in the available ingredient list. If no, creates an ingredient ID for the ingredient being added. And asks for confirmation of adding.
	3.	Confirms.	saves the ingredient information.
Exception Conditions	Actor chooses to cancel request.		

Scenario 3: Create a meal recipe

You may refer to this example of meal recipe for a better understanding. Our use case is not covering all the information from the example though.

Use Case Name	Create a meal recipe		
Triggering Event	Meal designer has designed a new meal and would like to add it into the system so that customers will be able to view and choose it from the system.		
Brief Description	Meal designer adds a new meal recipe into the system, including the ingredient list, meal attributes and instructions of cooking.		
Actors	Meal designer		
Related Use Cases	Add a new ingredient (if the ingredient needed is not in the system yet)		
Preconditions	Meal designer is logged in the system.		
Post Conditions	A new meal recipe is saved in the system.		
Flow of activities	Actor (Meal designer)		System
	1.	Requests to add a new meal recipe.	Asks for meal name, serving amount (for 4 people or 2 people), total number of calories of the meal, difficulty level of cooking.
	2.	Provides the requested information. Continues to next step.	Asks the actor to select all the needed ingredients and fill in the amount for each ingredient. (Note: this step will trigger the use case “add a new ingredient” if the needed ingredient is not in the available ingredient list, but you don’t need to model this, simple assume all needed ingredients are in the list.)
	3.	Select an ingredient and fills in the quantity and unit for the ingredient; and then submit.	Saves the ingredient information. Ask if any more ingredients to add.
	4.	Repeat step3 until all the ingredients have been added.	
	5.	Confirm no more ingredients to add.	Asks for instructions of cooking steps.
	6.	Fills in all the steps of cooking.	Saves the cooking instruction. Asks for confirmation of adding the new meal.
	7.	Confirms.	
Exception Conditions	Actor chooses to cancel request.		

Part 1: Class Diagram

Create a Class Diagram based on the case study background and use case scenarios above. Demonstrate that you understand Composition and Generalization, where applicable.

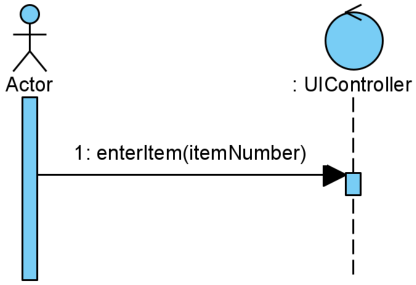
Part 2: Sequence Diagrams

Create an object-level Sequence Diagram for each of the scenarios given above. Demonstrate that you understand Composition, generalization, and the appropriate use of Service Controllers, where applicable.

Part 3: Operations

Each message in the sequence diagram is an operation assigned to your classes (including controllers). **Update each class with its operations.** Remember, returns are not operations.

For example:



The UIController has the operation: *enterItem*.

enterItem ends at the UIController lifeline and therefore belongs to the UIController.

The Customer calls the *enterItem* operation, which is therefore an operation of the UIController.

To add operations to classes in Visual Paradigm, right click on the class in the class diagram and select *Add*, then *Operation.*