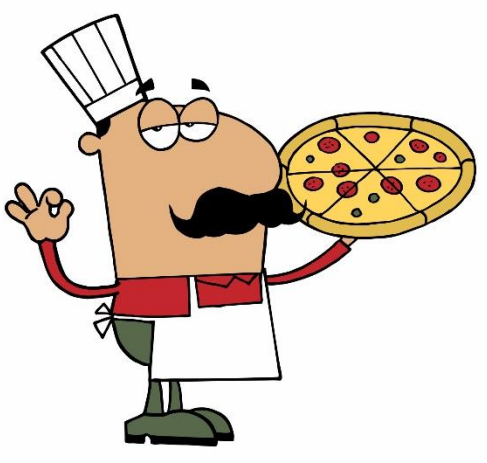
Scenario



Firehouse Pizza is a new fast-food outlet employing a novel business concept - customisable pizzas! You are requested to develop software to support the operations of this new shop.

Menus will lead the customer to choose the pizza size, sauce, crust, crust filling (if applicable), and toppings.

- Pizza size could be small, medium, and large.
- Pizza sauce can be tomato or cream.
- Pizza crust can be regular or stuffed. In case of stuffed crust, the customer would need to choose a crust filling, which can be mozzarella or spiced cheese.
- Each pizza shall have five different toppings. Hot and spicy toppings have an associated grade which can be mild, moderate, and ferocious.

The price of each pizza is determined by summing up the prices for the pizza size and its toppings. An extra cost for the crust filling is added where applicable.

Once all the pizza details are chosen, a summary screen should show an itemised receipt with the total price as shown below. A warning of how hot and spicy the pizza is should also show up when necessary. This value is not cumulative, and is determined by the most hot and spicy topping chosen.

A sample receipt is provided below.

```
RECEIPT

Size       Medium                    7.00
Sauce      Tomato                    0.00
Crust      Mozzarella                2.00
Topping 1  Mozzarella                0.40
Topping 2  Ham                       0.60
Topping 3  Eggs                      0.70
Topping 4  Chicken                   0.95
Topping 5  Cayenne Chili Peppers     0.32
Total:                              11.97

WARNING: This pizza's hot and spicy level is Moderate

Press any key to quit...
```

The data can be hard-coded in the program as follows:

Category	Element	Hot & Spicy Level	Price (€)
Pizza Size	Small		5
	Medium		7
	Large		10
Pizza Crust	Mozzarella		2
	Spiced Cheese		4
Toppings	Mozzarella		0.40
	Ham		0.60
	Eggs		0.70
	Salmon		0.98
	Tuna		0.80
	Garlic		0.20
	Beef		0.90
	Chicken		0.95
	Sweet chili peppers	Mild	0.31
	Cayenne chili peppers	Moderate	0.32
	Habanero chili peppers	Ferocious	0.33

Task 1 Design

a) Draw a class diagram for the scenario
b) Create a use-case for the scenario. The use case shall mimic the creation of a stuffed pizza and shall include a user mistake.
c) Draw a sequence diagram for the scenario

Task 2 Implementation

a) Write the main program for the pizza ordering application.
b) Create pizza classes using inheritance where applicable.
c) Apply OOP techniques in the implementation of the classes.
d) Implement the topping as an additional class.

Task 3 Testing

a) You are to test your program using a combination of white-box and black-box testing. Make a list of the five most important elements of the program that are to be tested. In a second column explain how you are going to test each of these elements. You could test an element through unit tests, visually, and through other methods.
b) Draw an IPO chart for these five tests indicating the expected and actual output.
c) Create unit tests to ensure that correct calculations are being made for the following scenarios. For each scenario test the GetPrice() method and the HotSpicyLevel get property:
    i. Medium pizza with tomato sauce, mozzarella-filled crust, and mozzarella, ham, eggs, chicken, and cayenne chilli peppers as toppings.
    ii. Large pizza with cream sauce, regular crust, and mozzarella, beef, and all types of chilli peppers as toppings.
d) Record all test results in the IPO chart and in unit tests.
e) Ensure that your program does not have bugs
f) Document at least three bugs you discovered during testing. For each bug write the cause in detail and the corrective action you've taken.