Exercise 1 - Nospresso

Nospresso

***

To facilitate peer testing and grading by the teaching team, it is essential to follow the instructions provided precisely:

- only program what is explicitly requested,

- do not add anything beyond what is asked,

- do not implement features differently from the specified instructions.

***

The goal is to develop a program that simulates the operation of a beverage vending machine (coffee machine). The program should allow the users to select a drink, customize their order, manage ingredient stocks, process payments, and update stocks after each transaction. It should also allow an admin mode protected by a PIN code to restock ingredients.

When the program starts, it should display:

```
        Nospresso Cafe
Please select your mode:
1) Client
2) Admin
3) Exit
>
```

The character $>$ represents the user's keyboard input. For all user inputs in the program, you must manage input validation. The program should only proceed if the user's keyboard entry is a permitted value. Otherwise, the program should re-prompt until a valid entry is provided.

Main Features

1. **Mode Selection:**

   - Client Mode: Allows the user to order a drink.
   - Admin Mode: Allows the admin to restock the machine's ingredients.
     - This mode is protected by a 6-digit PIN code (default: 434343).
     - Once the PIN code is validated, stock levels are displayed.
   - Exit: Allows the program to close.

   After using any mode, the mode selection menu is displayed again, whether after restocking or preparing a beverage.

2. **Product Selection (Client Mode):**

   - The user can choose from several types of drinks: Espresso, Cappuccino, Latte.

3. **Drink Customization:**

   - The user can customize their drink by adding sugar with different levels: No Sugar, Light (5g), Medium (10g), Heavy (15g).
   - The user can also add extra milk for cappuccinos and lattes (up to 3 doses per drink, with each dose containing 50ml of milk).

4. **Stock Management:**

   - The program should check that the required amounts of ingredients are available before preparing the selected drink.
   - Initial stocks are defined as follows:
     - Coffee powder: 50g
     - Sugar: 30g
     - Milk: 0.5 liters
   - Ingredient usage by type of drink:
     - Espresso: 8g of coffee powder
     - Cappuccino: 6g of coffee powder, 100ml of milk
     - Latte:
       * Small: 6g of coffee powder, 120ml of milk
       * Medium: 8g of coffee powder, 150ml of milk
       * Large: 12g of coffee powder, 200ml of milk
   - Sugar quantities by level:
     - Light: 5g
     - Medium: 10g
     - Heavy: 15g

5. **Payment:**

   - The user must pay via Twint. The program generates a Twint code that the user can use to complete the payment.
   - This code is randomly generated and consists of 5 alphanumeric characters. It is displayed at payment time, and the program then waits 3 seconds before automatically validating the payment.

6. **Stock Update:**

   - In Client Mode, after each successful transaction, the quantities of ingredients used (coffee powder, sugar, milk) are automatically deducted from stocks.
   - In Admin Mode, after entering the correct PIN code, the admin can manually add specific quantities of coffee powder, sugar, and milk to stocks.

Error Handling

If any ingredient (coffee powder, sugar, milk) is insufficient, the drink cannot be prepared, and an error message is displayed (see scenario examples).

Price Table

Coffee Type	Size	Base Price (CHF)	Sugar Level	Sugar Price	Final Price (CHF)
Espresso	Standard	2.00	No Sugar	0.00	2.00
			Light (5g)	0.10	2.10
			Medium (10g)	0.20	2.20
			Heavy (15g)	0.30	2.30
Cappuccino	Standard	2.50	No Sugar	0.00	2.50
			Light (5g)	0.10	2.60
			Medium (10g)	0.20	2.70
			Heavy (15g)	0.30	2.80
Latte	Small	2.70	No Sugar	0.00	2.70
			Light (5g)	0.10	2.80
			Medium (10g)	0.20	2.90
			Heavy (15g)	0.30	3.00
	Medium	3.20	No Sugar	0.00	3.20
			Light (5g)	0.10	3.30
			Medium (10g)	0.20	3.40
			Heavy (15g)	0.30	3.50
	Large	3.70	No Sugar	0.00	3.70
			Light (5g)	0.10	3.60
			Medium (10g)	0.20	3.90
			Heavy (15g)	0.30	4.00

The cost of an extra milk dose is 0.05 CHF.

Client Mode: Beverage Selection

If the user selects **Client Mode**, the following prompts are displayed based on their choices:

```
Please select your beverage:
1) Espresso - CHF 2.00
2) Cappuccino - CHF 2.50
3) Latte - CHF 2.70 (Small), CHF 3.20 (Medium), CHF 3.70 (Large)
>

Would you like to add sugar?
1) No sugar
2) Light (5g) - CHF 0.10
```

```
3) Medium (10g) - CHF 0.20
4) Heavy (15g) - CHF 0.30
>


Would you like to add extra milk?
(Available only for Cappuccino and Latte)
1) Yes
2) No
>


How many doses?
>
```

Use numbers instead of text for keyboard entries.

Payment Interface

After customizing the drink, the user moves to the payment screen and can pay via Twint.

```
Please pay using Twint.
Your payment code is: AB12X
(Waiting for payment validation...)

Thank you! Your payment has been accepted.
```

Beverage Preparation

Once the payment is validated, the machine displays:

```
Preparing your beverage...
[...]
Your Cappuccino is ready! Enjoy!
```

Scala Code

Pause code execution for 5 seconds.

```
Thread.sleep(5000)  // Waits for 5000 milliseconds (5 seconds)
```

Scenarios Based on Stocks and User Choices

Scenario 1: Successful Beverage Order

- **Selected Beverage**: Cappuccino

- **Customization**: Medium sugar, with milk

- **Stock**: Sufficient

```
Selected beverage: Cappuccino
Sugar level: Medium (10g)
Extra milk: No
Total price: CHF 2.50 + CHF 0.20 = CHF 2.70

Please pay using Twint.
Your payment code is: JK9ZL
(Waiting for payment...)

Payment confirmed.
Preparing your beverage...
Your Cappuccino is ready! Enjoy!
```

Scenario 2: Insufficient Milk Stock for a Latte

- **Selected Beverage**: Latte (Large)

- **Customization**: No sugar, with milk

- **Stock**: Insufficient milk for selected size

```
Selected beverage: Latte (Large)
Sugar level: No sugar
Extra milk: No

Error: Insufficient milk to prepare the selected beverage.
Please choose a smaller size or try another beverage.
```

Scenario 3: Low Coffee Stock for an Espresso

- **Selected Beverage**: Espresso

- **Customization**: Heavy sugar

- **Stock**: Insufficient coffee powder

```
Selected beverage: Espresso
Sugar level: Heavy (15g)

Error: Insufficient coffee powder to prepare the selected beverage.
Please choose another beverage or check stocks in Admin mode.
```

Scenario 4: Stock Replenishment in Admin Mode

- **Mode**: Admin

- **Action**: Replenishing coffee powder and milk

```
Admin Mode
Enter PIN: ******
Access granted.

Stocks:
```

```
    Coffee powder: 10g
    Milk          : 0.5L
    Sugar         : 30g


Replenishing stocks...
Addition:
    Coffee powder: 50
    Milk          : 0.5
    Sugar         : 0
Stock levels updated.
Returning to the main menu...
```

Scenario 5: Small Latte with Light Sugar

- **Selected Beverage**: Latte (Small)

- **Customization**: Light sugar

- **Stock**: Sufficient

```
Selected beverage: Latte (Small)
Sugar level: Light (5g)
Extra milk: No
Total price: CHF 2.70 + CHF 0.10 = CHF 2.80

Please pay using Twint.
Your payment code is: PQ3VM
(Waiting for payment...)

Payment confirmed.
Preparing your beverage...
Your Latte is ready! Enjoy!
```