

Vending Machine Simulation in Python

Documentation:

The `__init__` method is a constructor that initializes the following instance variables when an object of the `VendingMachine` class is created:

`balance`: The current balance of the machine, initially set to 0.

`transactions`: A list to store the transactions history, initially set to an empty list.

`sugar_count`: The current sugar count in the machine, initially set to 10.

`products`: A dictionary that contains the names of the products as keys and a tuple of the price and quantity as values, which is passed as a parameter to the constructor.

The `restart` method is used to clear the transactions history by resetting the transactions list to an empty list.

The `insert_coin` method allows the user to insert a coin into the machine. The method accepts only certain amounts of money (10, 20, 50, 100, 200 cents) and prompts the user to enter an amount until a valid amount is entered. The user can also choose to insert multiple coins.

The `dispense_product` method is used to dispense a product from the machine. The name of the product is passed as a parameter to this method. If the name of the product is "Coffee", the method asks the user whether they want sugar in their coffee. If sugar is available, it is added to the coffee. Then, the method checks if the product is available in the machine. If it is, the method prompts the user to either dispense the product or refund the coins. If the product is not available, the method informs the user that the product is unavailable.

The `display_products` method displays the available products in the machine, along with their quantities and prices and the `check_balance` method displays the current balance of the machine.

The `purchase_product` method is used to purchase a product from the machine. The method displays the available products and prompts the user to enter the product number. If the entered number is valid, it displays the cost of the product and prompts the user to either continue with the purchase, change the product, or cancel the purchase. If the user chooses to continue with

the purchase, the method checks if the balance is sufficient to purchase the product. If it is, the product is dispensed, and the transaction is added to the transactions list. The method also writes the name of the product to a text file named "Product_File.txt".

Test Cases:

Name	U-001
Actor(s)	Users
Goal	New transactions can be started. Users select restart to reset previous transactions and conditions to clear transaction history.

```
=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====

Enter your choice: 1

Transaction history has been cleared.
```

Name	U-002
Actor(s)	Users
Goal	List of products must be displayed. Users select a product from the list of products on the display screen.

```

=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====

```

Enter your choice: 2

```

      Product      Quantity  Price
1. Coffee         10        4.0$
2. Tea            5         6.0$
3. Juice          8         3.0$
4. Water          3         1.0$

```

Please enter the product number:

Name	U-003
Actor(s)	
Goal	Cost of the selected item must be displayed. Users read and confirm by selecting the continue option.

```

      Product      Quantity  Price
1. Coffee         10        4.0$
2. Tea            5         6.0$
3. Juice          8         3.0$
4. Water          3         1.0$

```

Please enter the product number: 4

The cost of Water is 1.0\$

Name	U-004
Actor(s)	Users
Goal	Coin must be inserted to get the product. A user can insert coins into the machine based on the indicated price.

The cost of Water is 1.0\$

Please select one of the options for purchase:

1. Continue
 2. Change item
 3. Cancel
- 1

Please enter the amount in cents: 100

Do you want to insert another coin(y/n)? n

Name	S-002
Actor(s)	Users
Goal	Only available items must be displayed as an item list, otherwise, appropriate information is provided to the user.

```
=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====
```

Enter your choice: 2

	Product	Quantity	Price
1.	Coffee	10	4.0\$
2.	Tea is unavailable.		
3.	Juice	8	3.0\$
4.	Water	3	1.0\$

Please enter the product number: 2

Sorry, Tea is unavailable.

Name	S-007
Actor(s)	Users
Goal	The system must dispense the selected item only if the amount of coin is inserted. The system will be able to go back to the previous transaction (U-001) by a warning and ask the user to pay the correct amount or reset.

```

=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====

```

Enter your choice: 2

	Product	Quantity	Price
1.	Coffee	10	4.0\$
2.	Tea	5	6.0\$
3.	Juice	8	3.0\$
4.	Water	3	1.0\$

Please enter the product number: 3

The cost of Juice is 3.0\$

Please select one of the options for purchase:

```

1. Continue
2. Change item
3. Cancel
1

```

Please enter the amount in cents: 200

Do you want to insert another coin(y/n)? y

Please enter the amount in cents: 50

Do you want to insert another coin(y/n)? n

Warning! The entered amount is less than the product price.
Please enter correct amount or reset.

Please select one of the options for purchase:

```

1. Continue
2. Change item
3. Cancel

```

Name	S-010
Actor(s)	Users and customers
Goal	The system must accept coins of different amounts. E.g., 10 cents, 20 cents, 50 cents, 1 dollar, 2 dollars.

Please enter the amount in cents: 20

Do you want to insert another coin(y/n)? y

Please enter the amount in cents: 50

Do you want to insert another coin(y/n)? y

Please enter the amount in cents: 10

Do you want to insert another coin(y/n)? y

Please enter the amount in cents: 100

Do you want to insert another coin(y/n)? y

Please enter the amount in cents: 200

Do you want to insert another coin(y/n)? n

Name	S-011
Actor(s)	
Goal	The system must compare item cost with entered coin.

The cost of Juice is 3.0\$

Please select one of the options for purchase:

1. Continue
 2. Change item
 3. Cancel
- 1

Please enter the amount in cents: 200

Do you want to insert another coin(y/n)? n

Warning! The entered amount is less than the product price.
Please enter correct amount or reset.

Name	S-012
Actor(s)	

Goal	The system must check the validity of the coin. If the system accepts only 20 cents and the user enters 10 cents, then the system should give a warning.
-------------	--

Please select one of the options for purchase:

1. Continue
 2. Change item
 3. Cancel
- 1

Please enter the amount in cents: 22

Wrong amount! The system only accepts one of these amounts:
[10, 20, 50, 100, 200]
Please try again.

Name	D-005
Actor(s)	
Goal	The system must store the coins and record all transactions.

```
=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====
```

Enter your choice: 6

Your current balance is: 100

```
Water: 1.0$
Juice: 3.0$
Water: 1.0$
```

Name	U-005
Actor(s)	Users

Goal	The transaction can be cancelled as required. A user can select cancel anytime during the transaction.
-------------	--

Please enter the amount in cents: 100

Do you want to insert another coin(y/n)? n

Welcome

Please select one of the options for transaction:

1. Confirm

2. Cancel

2

Transaction cancelled.

Name	U-007
Actor(s)	Users
Goal	The order can be changed as required.

	Product	Quantity	Price
1.	Coffee	10	4.0\$
2.	Tea	5	6.0\$
3.	Juice	8	3.0\$
4.	Water	3	1.0\$

Please enter the product number: 1

The cost of Coffee is 4.0\$

Please select one of the options for purchase:

1. Continue

2. Change item

3. Cancel

2

	Product	Quantity	Price
1.	Coffee	10	4.0\$
2.	Tea	5	6.0\$
3.	Juice	8	3.0\$
4.	Water	3	1.0\$

Please enter the product number: 2

The cost of Tea is 6.0\$

Name	S-001
-------------	-------

Actor(s)	Users and customers
Goal	The status of the machine is displayed.

```

=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====

```

Enter your choice: 3

Machine is working.

Name	S-003
Actor(s)	Customers
Goal	Alert message is printed automatically by the machine if any of the ingredients are unavailable.

Please select one of the options for transaction:

1. Confirm
 2. Cancel
- 1

Would you like sugar in your Coffee (y/n)? y

Sugar is unavailable.

Name	S-004
-------------	-------

Actor(s)	Users
Goal	The system can refund the coin if in need by the user before the item gets ready for dispense.

Please select one of the options for transaction:

1. Confirm
 2. Cancel
- 1

Please wait 2 minutes while we make your Water.

Please select one of the options:

1. Dispense product
 2. Refund coins
- 2

Coins refunded.

Name	S-009
Actor(s)	Users
Goal	The system shall allow a user to select products coffee, tea, Coke, and juice.

=====

Please select one of the options below.

1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit

=====

Enter your choice: 2

Product	Quantity	Price
1. Coffee	10	4.0\$
2. Tea	5	6.0\$
3. Juice	8	3.0\$
4. Water	3	1.0\$

Please enter the product number:

Name	D-006
Actor(s)	
Goal	The system needs to provide statistical data based on the transactions.

```

=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====

```

Enter your choice: 4

```

Here is the statistical data based on transactions.
Water: 1.0$
Juice: 3.0$
Water: 1.0$

```

Name	U-006
Actor(s)	Users
Goal	The transaction shall be continued as required without restarting the whole steps. A user can select the continue to buy option.

```

Please select one of the options:
1. Dispense product
2. Refund coins
1

```

Here is your Juice. Enjoy!

Goodbye!

```

Please select one of the options:
1. Continue to buy
2. Exit

```

Name	S-005
Actor(s)	Users and customers
Goal	The system shall display welcome and goodbye messages at the beginning and end of the transaction respectively.

Welcome

Please select one of the options for transaction:

1. Confirm

2. Cancel

1

Please wait 2 minutes while we make your Juice.

Please select one of the options:

1. Dispense product

2. Refund coins

1

Here is your Juice. Enjoy!

Goodbye!

Name	S-006
Actor(s)	Users
Goal	The system must display the waiting time as a message to the user in preparing the items.

Please select one of the options for transaction:

1. Confirm

2. Cancel

1

Would you like sugar in your Coffee (y/n)? y

Please wait 10 seconds for adding sugar.

Sugar has been added to your Coffee.

Please wait 2 minutes while we make your Coffee.

Please select one of the options:

1. Dispense product

2. Refund coins

1

Here is your Coffee. Enjoy!

Name	S-008
Actor(s)	Customers
Goal	The system shall allow resetting operation for the vending machine supplier.

```

=====
Please select one of the options below.
1. Restart transactions
2. Buy a product
3. Machine status
4. Transactions history
5. Reset Machine
6. Check balance
7. Quit
=====

Enter your choice: 5

The machine has been reset.

```

Name	D-003
Actor(s)	
Goal	The system shall store coffee and allow the user to mix sugar manually or automatically by the machine.

```

Please select one of the options for transaction:
1. Confirm
2. Cancel
1

Would you like sugar in your Coffee (y/n)? y

Please wait 10 seconds for adding sugar.

Sugar has been added to your Coffee.


Please select one of the options for transaction:
1. Confirm
2. Cancel
1

Would you like sugar in your Coffee (y/n)? n

Sugar has been provided seperately.

```

Notes:

I have added extra code which will display balance in dollar, for example 100 will be displayed as 1.00 instead and there will be a welcome message and the start and also goodbye at the end