

Catalog

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Course: CS3642

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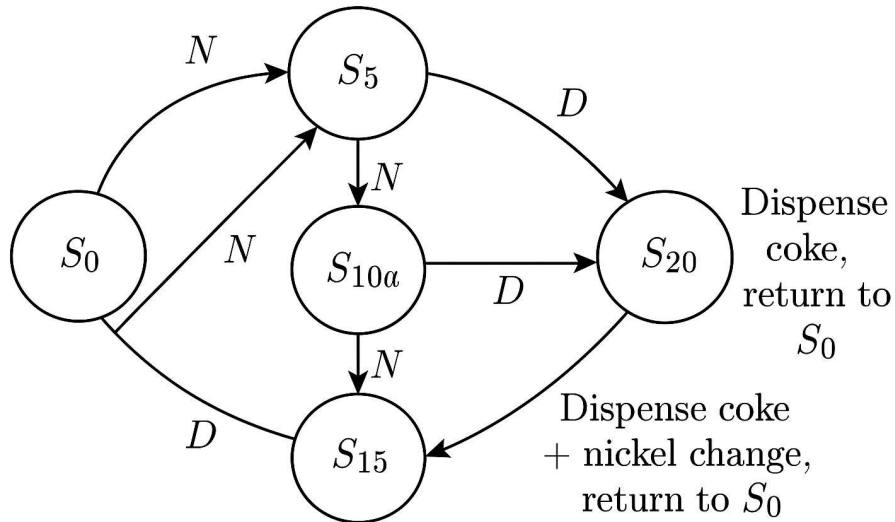
Assignment: Assignment 1

Due Date:

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State diagram for the Coke Machine



Algorithm for the AI agent without GUI for explanation purposes.

```
File Edit Selection View Go Run ... 1
state-machine.py state-machine-terminal.py X
state-machine-terminal.py > ...
7 This is a CLEAN terminal version to understand how the AI agent "remembers"
8 state and makes decisions. No GUI!
9
10
11 from enum import Enum
12 from dataclasses import dataclass
13 from typing import List
14 import time
15
16 class MachineState(Enum):
17     """The 5 different 'moods' our robot can be in"""
18     IDLE = 0 # "I'm waiting for coins!"
19     NICKEL_5 = 5 # "Got 5 cents, need 10 more!"
20     CENTS_10 = 10 # "Got 10 cents, need 5 more!"
21     CENTS_15 = 15 # "Got 15 cents - COKE TIME!"
22     CENTS_20 = 20 # "Got 20 cents - Coke + change!"
23
24 @dataclass
25 class Transaction:
26     """Records what happened in each transaction"""
27     coins_used: List[str]
28     total_paid: int
29     change_given: int
30     timestamp: str
31
32 class SimpleCokeMachine:
33     """
34     This is our AI AGENT - the 'brain' of the machine.
35
36     HOW IT REMEMBERS:
37     - self.current_state = what mood the robot is in RIGHT NOW
38     - self.current_amount = how much money is inside RIGHT NOW
39     - self.coins_inserted = list of coins put in for THIS transaction
40     - self.transaction_history = memory of ALL past transactions
41 """
```

```
File Edit Selection View Go Run ...  
state-machine.py state-machine-terminal.py x  
state-machine-terminal.py > ...  
class SimpleCokeMachine:  
    def __init__(self):  
        print("🤖 INITIALIZING COKE MACHINE AI AGENT...")  
        print("Setting up robot's memory...\n")  
        # THE ROBOT'S MEMORY VARIABLES:  
        self.current_state = MachineState.IDLE # Robot's current mood  
        self.current_amount = 0 # Money in machine RIGHT NOW  
        self.coins_inserted = [] # Coins for THIS transaction  
        self.transaction_history = [] # Memory of ALL transactions  
        self.total_sales = 0 # Total money made  
        self.cokes_dispensed = 0 # How many cokes sold  
        print("✅ Robot brain initialized!")  
        print(f"📌 Starting state: {self.current_state.name}")  
        print(f"💰 Starting amount: {self.current_amount}$")  
        print(f"🏦 Memory banks: Empty")  
        print("-" * 50)  
    def show_robot_memory(self):  
        """Shows what the robot is thinking RIGHT NOW"""  
        print("\n🤖 === ROBOT'S CURRENT MEMORY ===")  
        print(f"📌 Current Mood (State): {self.current_state.name}")  
        print(f"💰 Money Inside: {self.current_amount}$")  
        print(f"📋 Coins This Round: {self.coins_inserted}")  
        print(f"💵 Total Sales: ${self.total_sales/100:.2f}")  
        print(f"📄 Cokes Sold: {self.cokes_dispensed}")  
        print(f"📜 Transactions Remembered: {len(self.transaction_history)}")  
        # Show what robot is thinking  
        thoughts = {  
            MachineState.IDLE: "🕒 'Waiting for someone to insert coins...'",  
            MachineState.NICKEL_5: "🔪 'Got 5¢! Need 10¢ more for a coke!'",  
        }  
    def insert_coin(self, coin_type):  
        """  
        This is where the MAGIC happens!  
        The robot processes a coin and changes its memory.  
        """  
        print(f"\n📌 INSERTING {coin_type.upper()}...")  
        # STEP 1: Figure out coin value  
        if coin_type.lower() == 'nickel':  
            coin_value = 5  
        elif coin_type.lower() == 'dime':  
            coin_value = 10  
        else:  
            print("❌ ERROR: Robot doesn't recognize that coin!")  
            return False  
        # STEP 2: Update robot's memory  
        print(f"📌 Robot remembering: Adding {coin_value}$ to memory...")  
        old_amount = self.current_amount  
        old_state = self.current_state
```

```
File Edit Selection View Go Run ... state-machine.py state-machine-terminal.py x
> .venv
state-machine-termin...
state-machine.py

32 class SimpleCokeMachine:
33     def insert_coin(self, coin_type):
34         # STEP 2: Update robot's memory
35         print(f"🤖 Robot remembering: Adding {coin_value}¢ to memory...")
36         old_amount = self.current_amount
37         old_state = self.current_state
38
39         # UPDATE MEMORY:
40         self.current_amount += coin_value # Add money
41         self.coins_inserted.append(coin_type.lower()) # Remember this coin
42
43         # STEP 3: Robot decides its new mood (state)
44         print(f"🤖 Robot thinking: {old_amount}¢ + {coin_value}¢ = {self.current_amount}¢")
45
46         if self.current_amount == 5:
47             self.current_state = MachineState.NICKEL_5
48         elif self.current_amount == 10:
49             self.current_state = MachineState.CENTS_10
50         elif self.current_amount == 15:
51             self.current_state = MachineState.CENTS_15
52         elif self.current_amount == 20:
53             self.current_state = MachineState.CENTS_20
54         elif self.current_amount > 20:
55             print("❌ ERROR: Too much money! This shouldn't happen!")
56             return False
57
58         # STEP 4: Show how robot's memory changed
59         print(f"📄 State Change: {old_state.name} → {self.current_state.name}")
60
61         # STEP 5: Check if it's time to dispense
62         if self.current_amount >= 15:
63             print("🔥 Robot decides: TIME TO DISPENSE!")
64             return self.dispense_coke()
65         else:
66             # Robot decides: Need for more money
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```
File Edit Selection View Go Run ... state-machine.py state-machine-terminal.py x
state-machine-terminal.py > ...
> .venv
state-machine-terminal...
state-machine.py

class SimpleCokeMachine:
    def coin_return(self):
        """Return all coins and reset (like hitting coin return button)"""
        if self.current_amount > 0:
            print(f"\n COIN RETURN: Returning {self.current_amount}¢")
            print(f"Returning coins: {self.coins_inserted}")

            # Reset robot's memory
            self.current_state = MachineState.IDLE
            self.current_amount = 0
            self.coins_inserted = []
            print(" Robot memory reset to starting state")
        else:
            print("\n Robot thinks: 'No coins to return!'")

    def show_transaction_history(self):
        """Show robot's memory of all past transactions"""
        print("\n == ROBOT'S TRANSACTION MEMORY ==")
        if not self.transaction_history:
            print(" Robot memory: No transactions yet!")
            return

        for i, transaction in enumerate(self.transaction_history, 1):
            print(f"Transaction #{i} at {transaction.timestamp}")
            print(f"  Coins used: {transaction.coins_used}")
            print(f"  Total paid: {transaction.total_paid}¢")
            print(f"  Change given: {transaction.change_given}¢")

        print(f"\n SUMMARY: {len(self.transaction_history)} transactions in memory")

    def main():
        """Main program - shows how the robot remembers and thinks"""
        print(" COKE MACHINE AI AGENT - TERMINAL VERSION")
        print("-" * 50)
```

```
File Edit Selection View Go Run ... state-machine.py state-machine-terminal.py x
state-machine-terminal.py > ...
> .venv
state-machine-terminal...
state-machine.py

def main():
    elif choice == '2':
        print("\n" + "-" * 50)
        machine.insert_coin('dime')
        machine.show_robot_memory()

    elif choice == '3':
        machine.show_robot_memory()

    elif choice == '4':
        machine.coin_return()
        machine.show_robot_memory()

    elif choice == '5':
        machine.show_transaction_history()

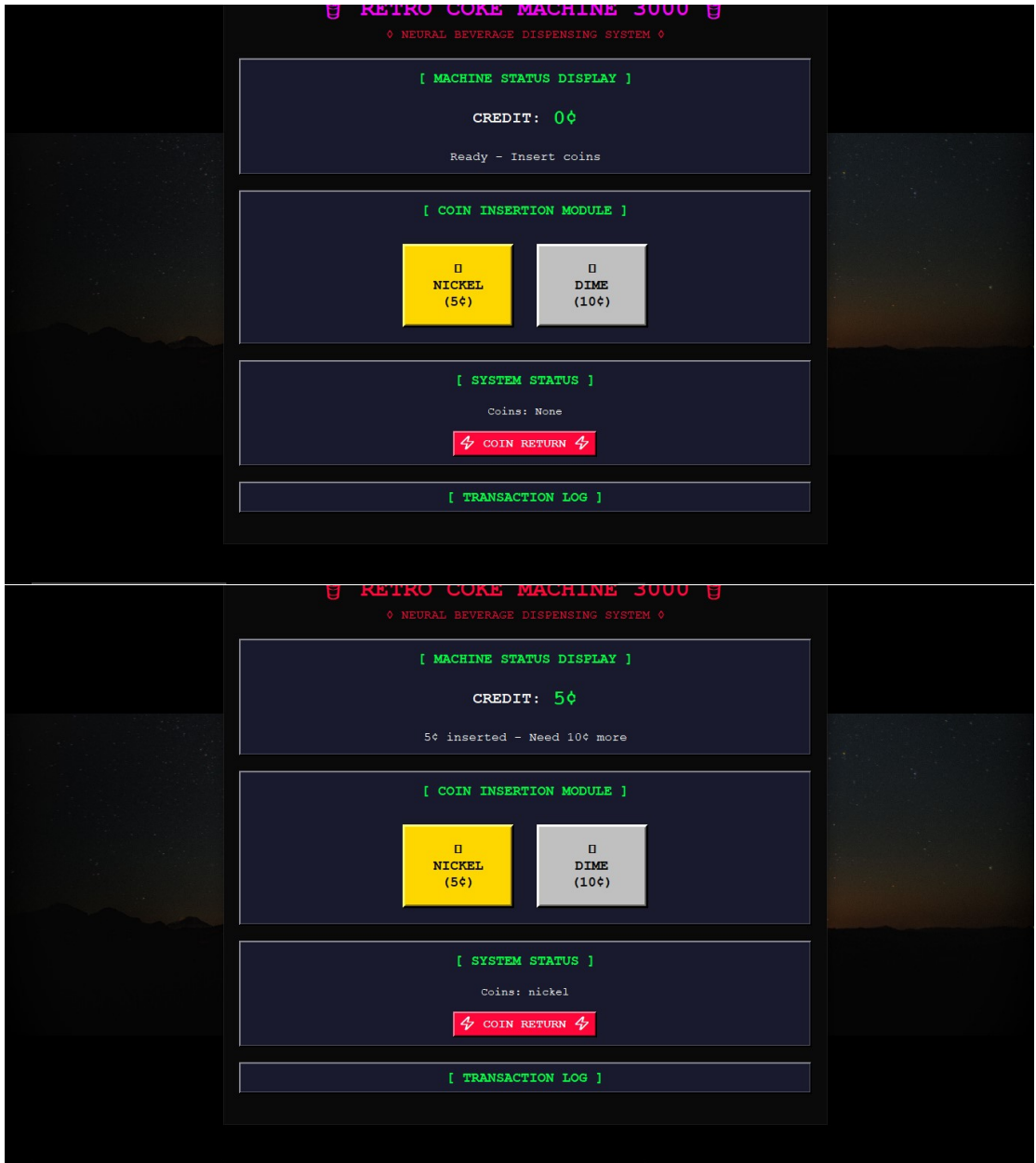
    elif choice == '6':
        print("\n Robot shutting down...")
        print("Thanks for learning about AI agents!")
        break

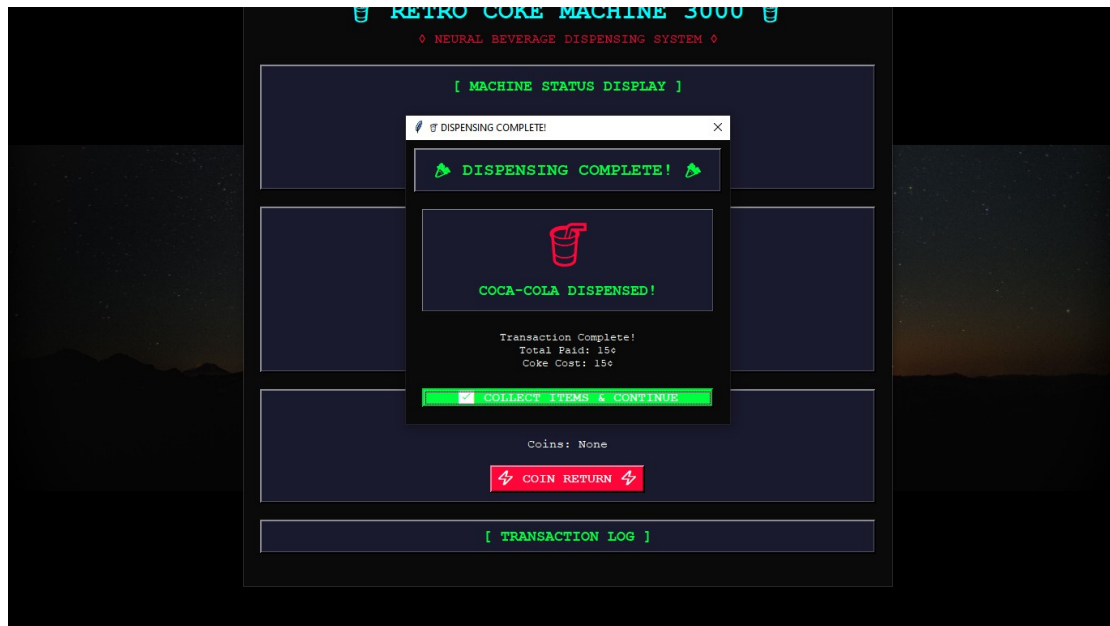
    else:
        print(" Invalid choice! Pick 1-6.")

    # Pause so you can read what happened
    input("\n Press ENTER to continue...")

if __name__ == "__main__":
    main()
```

AI Agent application's GUI





AI Agent application's Terminal Output

```
File Edit Selection View Go Run ...  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
Python + -  
INITIALIZING COKE MACHINE AI AGENT...  
Setting up robot's memory...  
Robot brain initialized!  
Starting state: IDLE  
Starting amount: 0¢  
Memory banks: Empty  
===== COKE MACHINE CONTROLS =====  
1. Insert Nickel (5¢)  
2. Insert Dime (10¢)  
3. Show Robot Memory  
4. Coin Return  
5. Show Transaction History  
6. Quit  
Choose action (1-6):
```