



Institute of Engineering and Technology (IET)

**Implementing and testing a FSM
Project report**

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PROBLEM STATEMENT

- **FSM Description:**

A **finite-state machine (FSM)** or **finite-state automaton (FSA**, plural: *automata*), **finite automaton**, or simply a **state machine**, is a mathematical model of computation. It is an abstract machine that can be in exactly one of a finite number of states at any given time. The FSM can change from one state to another in response to some inputs; the change from one state to another is called a *transition*. An FSM is defined by a list of its states, its initial state, and the inputs that trigger each transition. Finite-state machines are of two types—**deterministic finite-state machine** and **non-deterministic finite-state machine**. A deterministic finite-state machine can be constructed equivalent to any non-deterministic one.

Introduction:

A **Vending machine** is an automatic machine that sells food or drink or other items. Vending machine foods include snacks such as potato chips, chocolate bars, and candy. Hot vending machine drinks include coffee, tea, and hot chocolate. Cold vending machine drinks include juice, bottled water, soft drinks. Other merchandise includes newspapers or cigarettes.

STATES in FSM:

I have 8 states in my vending machine.

- Initiate
- Product selection
- Quantity of product
- Total cost of the product
- Money to deposit
- Deposited amount confirmation
- Product with change
- Exit

- **STATES Description:**

STATE 1- Initiate STATE:

This state asks the user if he wanted to buy a soda can or not. If **yes**, the transition will move to the next state (STATE 2) and **no** takes it to the last state (STATE 8).

STATE 2- Product selection

This state allows the user to choose between 4 different types of cold drinks which are mentioned below:

["COCA-COLA","MOUNTAIN DEW","MIRINDA","PEPSI"]

After selecting a product it will move to the next state(STATE 3).

STATE 3- Quantity of product

Here the user is asked about the quantity of the product he wanted to buy by mentioning the selected product's brand name above.

STATE 4- Total cost of the product

This state calculates the total cost of the product, the user wanted to buy.

STATE 5- Money to deposit

This state mentions the amount to be paid by the user above and asks the user to pay the amount.

STATE 6- Deposited amount confirmation

Here the deposited amount is being confirmed that it is sufficient or not to buy the mentioned amount of product. After this the transition will be to the next state(STATE 7).

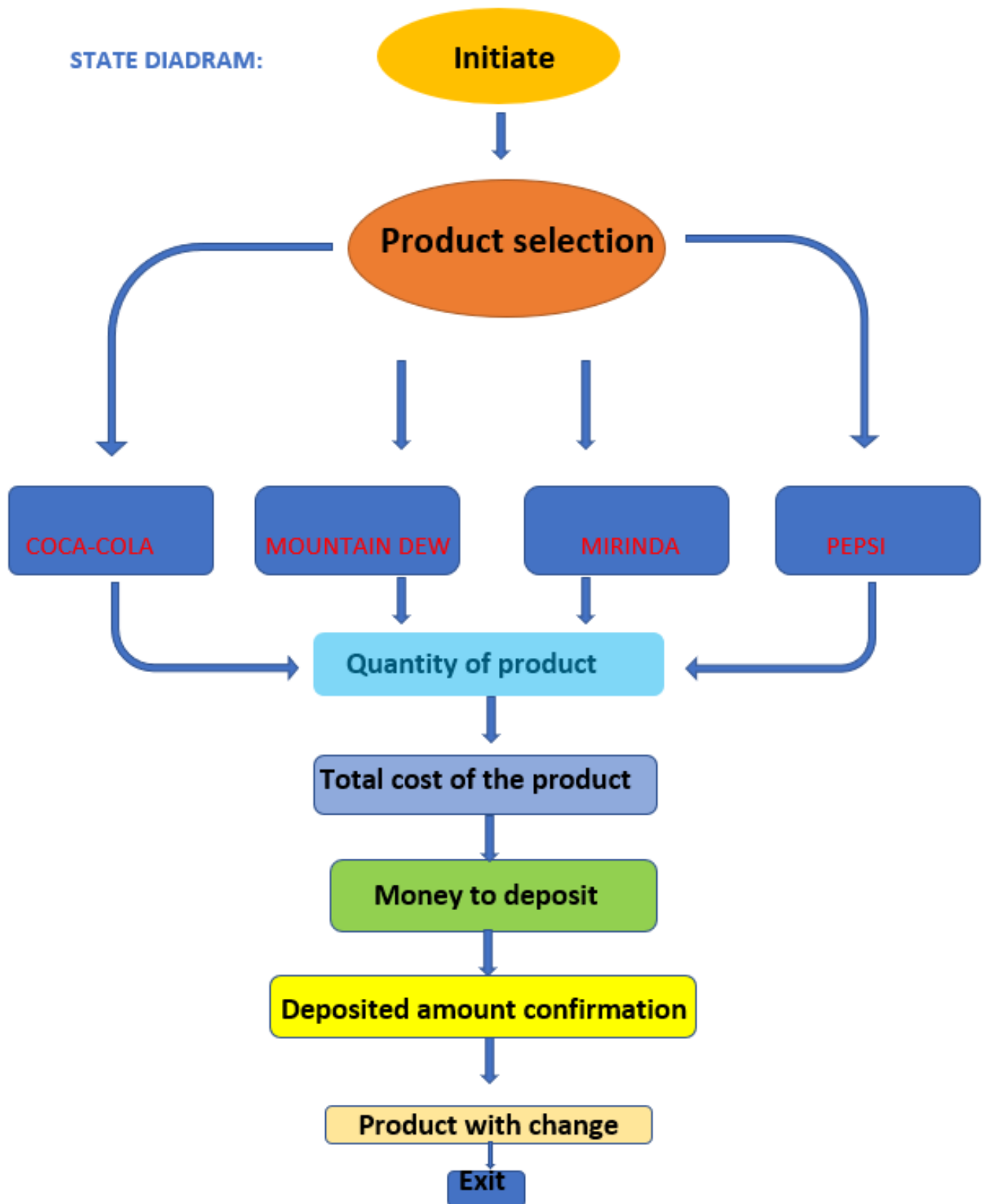
STATE 7- Product with change

In this state the change is delivered to the user (if any) with the product. After this transition will move to the final state(STATE 8).

STATE 8- Exit

- It is the last state of the transition which simply exits the vending machine.

STATE DIADRAM:



CODE

```
1. def soda(choice):
2.     #display a box for user to enter the number of soda the
    user wants to buy.
3.     text="Please enter the no. of soda cans you want of
        "+str(choice)
4.     title="SODA MACHINE"
5.     soda_number=easygui.integerbox(text,title,image=img1)
6.     print(soda_number)
7.     # total cost of all the soda purchased.
8.     total_amount=soda_cost * soda_number
9.     print(total_amount)
10.    # display a box for the user to deposit the money in
        the slot.
11.    text="Please deposit rs.15 per soda.And your total
        amount is "+str(total_amount)
12.    title="SODA MACHINE"
13.    img3="deposit money.jpg"
14.
    money_deposited=easygui.integerbox(text,title,image=img3)
15.    # calculating the change.
16.    change=float(money_deposited) - total_amount
17.    print(change)
18.    # To check the deposited money is enough or not.
19.    if change>=0:
20.        text="Thank you for your purchase for
            "+str(soda_number)+" cans of"+str(choice)+". your change is
            rs."+str(change)
21.        title="SODA MACHINE"
22.        img3="thank you.png"
23.        easygui.msgbox(text,title,image=img3)
24.    else:
25.        text="The deposited money is not enough,please
            begin again!"
26.        title="SODA MACHINE"
27.        img2="not enough money.jpg"
28.
    easygui.msgbox(text,title,image=img2,ok_button='OK')
```

```

1. import easygui
2. soda_cost=15
3. text="WELCOME, DO you wish to buy a soda can?"
4. title="SODA MACHINE"
5. img0="SODA MACHINE.jpg"
6. CHOICES=["Yes","No"]
7. output=easygui.ynbox(text,title,image=img0,choices=CHOICES)
8. # welcome message to the user.
9. if output==1:
10.     text="WELCOME"
11.     title="SODA MACHINE"
12.     img="SODA MACHINE.jpg"
13.     button_list=["COCA-COLA","MOUNTAIN DEW","MIRINDA","PEPSI"]
14.     choice=easygui.buttonbox(text,title,image=img,choices=button_list)
15.     if choice=="COCA-COLA":
16.         img1="Coca-Cola.png"
17.         soda(choice)
18.     elif choice=="MOUNTAIN DEW":
19.         img1="MOUNTAIN DEW.jpg"
20.         soda(choice)
21.     elif choice=="MIRINDA":
22.         img1="MIRINDA.jpg"
23.         soda(choice)
24.     elif choice=="PEPSI":
25.         img1="PEPSI.jpg"
26.         soda(choice)
27.     else:
28.         text="Have a good day."
29.         title="SODA MACHINE"
30.         easygui.msgbox(text,title)
31. else:
32.     text="Have a good day."
33.     title="SODA MACHINE"
34. easygui.msgbox(text,title)

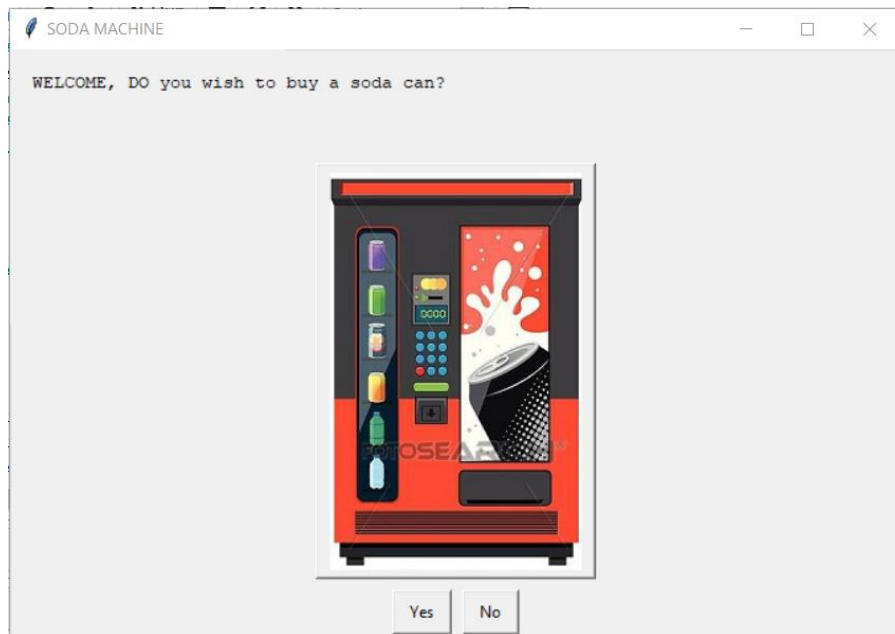
```

*The images used in the above code are available on onedrive.
The link is given below.

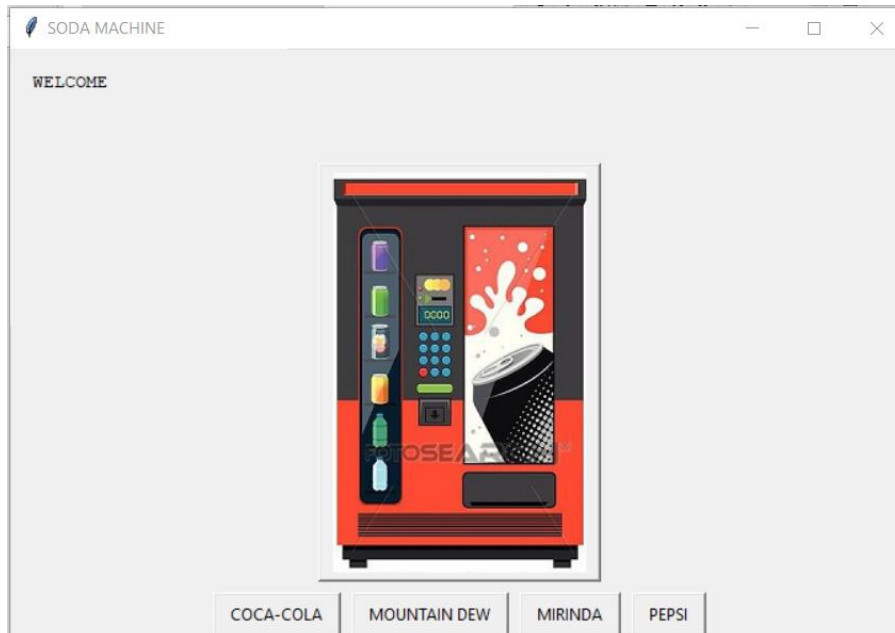
https://jklujaipur-my.sharepoint.com/:f:/g/personal/vikasjanu_jklu_edu_in/Emv2_-voOMxBgCMkOJo5KZQBp8Ip9VA_dadd8NrT50-hDw?e=HnF6uk

GUI:

STATE 1- Initiate STATE:



STATE 2- Product selection



STATE 3- Quantity of product

SODA MACHINE

Please enter the no. of soda cans you want of COCA-COLA



OK Cancel

STATE 4- Total cost of the product

STATE 5- Money to deposit

SODA MACHINE

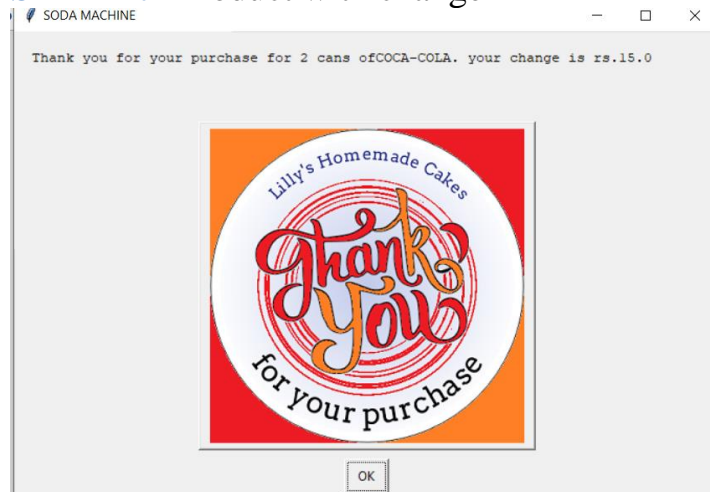
Please deposite rs.15 per soda.And your total amount is 30



OK Cancel

STATE 6- Deposited amount confirmation

STATE 7- Product with change



STATE 8- Exit

RESULTS AND DISCUSSION

With this project I got to know how a FSM and GUI are used in our daily life. It also helped me in better understanding of GUI and FSM.

As for the discussion, I am doing this project on my own without anybody's help. I only took help of the internet for the information I need to build a vending machine like the predefined functions which are used to make a GUI in pythan.

REFERENCES

www.geeksforgeeks.org

<https://www.geeksforgeeks.org/python-easygui-module-introduction/>