

# **Faculty of Computing**



## **Artificial Intelligence Spring 2025**

### **Lab # 8**

#### **Instructor**

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#### **Submitted by:**

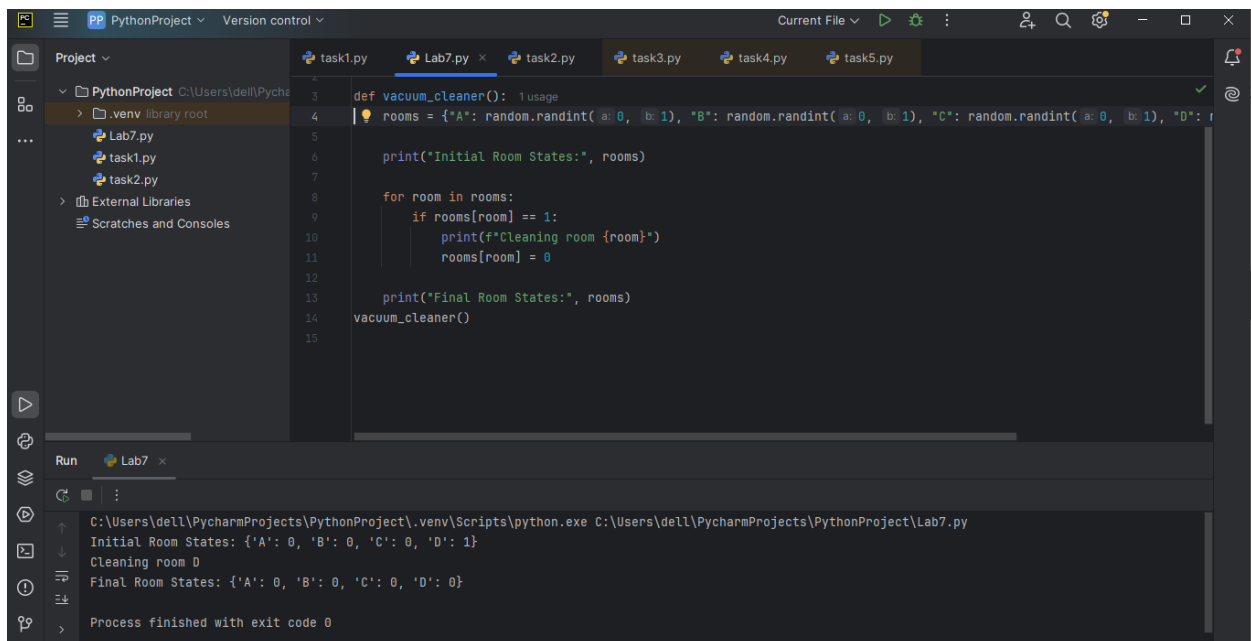
**Faareha Raza(47431)**

# Tasks

## Question 01:

Write a program for a simple reflex agent. The agent will act as a vacuum cleaner. In the first activity, we will create an environment for the agent.

- The environment is divided into 4 portions A,B,C and D.
- Then define two states for each portion.
- 0 indicates the cleaned state and 1 indicates the dirty state.
- We will initialize each portion with a random state that would be either 0 or 1.



The screenshot shows the PyCharm IDE with a Python project named 'PythonProject'. The file explorer on the left shows the project structure, including a '.venv' directory and several Python files. The main editor window displays the code for a vacuum cleaner agent. The code defines a function 'vacuum\_cleaner()' that initializes a dictionary 'rooms' with random states for rooms A, B, C, and D. It then iterates through the rooms, cleaning any that are dirty (state 1). The output of the program is shown in the Run console at the bottom.

```
def vacuum_cleaner():  
    rooms = {'A': random.randint(0, 1), 'B': random.randint(0, 1), 'C': random.randint(0, 1), 'D': random.randint(0, 1)}  
    print("Initial Room States:", rooms)  
    for room in rooms:  
        if rooms[room] == 1:  
            print(f"Cleaning room {room}")  
            rooms[room] = 0  
    print("Final Room States:", rooms)  
vacuum_cleaner()
```

Run Lab7 x

```
C:\Users\dell\PycharmProjects\PythonProject\.venv\Scripts\python.exe C:\Users\dell\PycharmProjects\PythonProject\Lab7.py  
Initial Room States: {'A': 0, 'B': 0, 'C': 0, 'D': 1}  
Cleaning room D  
Final Room States: {'A': 0, 'B': 0, 'C': 0, 'D': 0}  
Process finished with exit code 0
```

## Question 02:

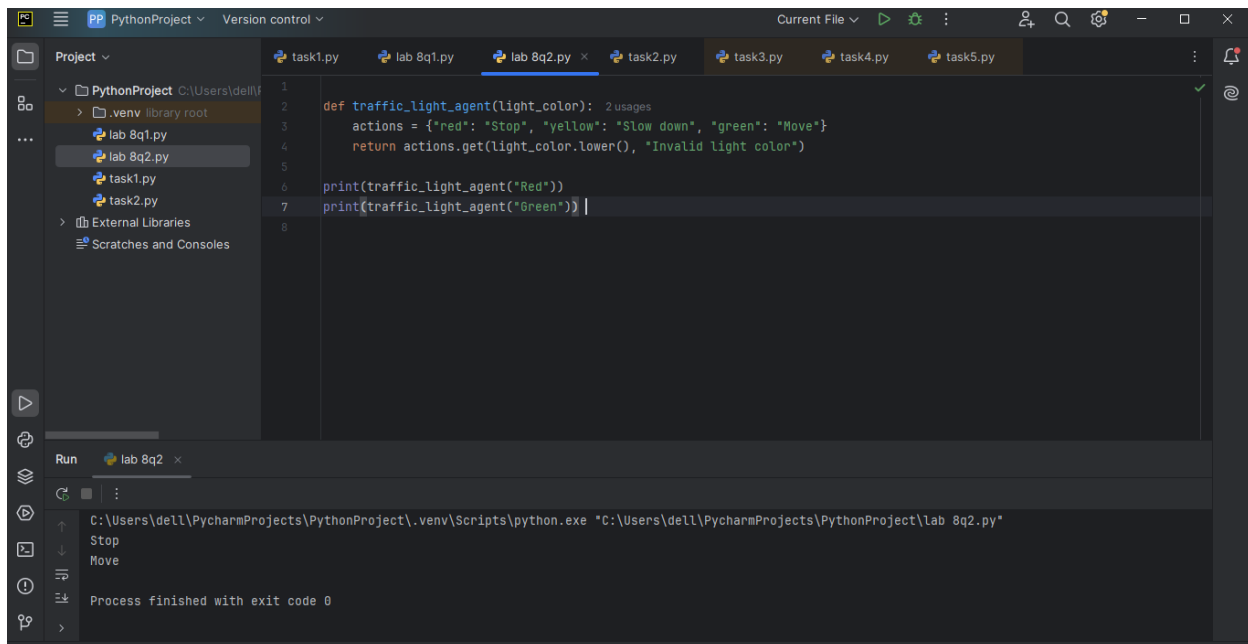
Create a Simple Reflex Agent that:

- Observes traffic light color (red, yellow, green).
- Takes an action based on the light:

Red → Stop

Yellow → Slow down

Green → Move



The screenshot shows the PyCharm IDE interface. The top toolbar includes icons for file operations, running, and debugging. The left sidebar shows the project structure with a folder named 'PythonProject' containing a '.venv' directory and several Python files. The main editor window displays the code for 'lab 8q2.py'. The code defines a function 'traffic\_light\_agent' that takes a 'light\_color' parameter and returns a list of actions based on the color. The actions are: 'Stop' for red, 'Slow down' for yellow, and 'Move' for green. The function also includes a fallback for invalid colors. Below the editor, the 'Run' tab shows the execution output, which includes the command used to run the script and the resulting actions: 'Stop' and 'Move'. The status bar at the bottom indicates that the process finished with exit code 0.

```
1 def traffic_light_agent(light_color): 2 usages
2     actions = {'red': 'Stop', 'yellow': 'Slow down', 'green': 'Move'}
3     return actions.get(light_color.lower(), "Invalid light color")
4
5
6 print(traffic_light_agent("Red"))
7 print(traffic_light_agent("Green"))
8
```

Run lab 8q2 x

C:\Users\dell\PycharmProjects\PythonProject\.venv\Scripts\python.exe "C:\Users\dell\PycharmProjects\PythonProject\lab 8q2.py"

Stop  
Move

Process finished with exit code 0

## Question 03:

Implement an automatic door agent that:

- Opens if it detects a person near the door.
- Closes if no person is detected.

Add a security feature where the door stays closed at night unless an authorized person is detected.

