RIPHAH INTERNATIONAL UNIVERSITY, ISLAMABAD

Lab#8

Bachelors of Computer Science – 6th Semester

Course: Artificial Intelligence

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Question 01:

Write a program for a simple reflex agent. The agent will act as a vacuum cleaner. In the first activity, wewill 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.

AI_Lab#8_Task#1.py > ...

```python
import random

environment = {
    'A': random.randint(0, 1),
    'B': random.randint(0, 1),
    'C': random.randint(0, 1),
    'D': random.randint(0, 1)
}

def simple_reflex_agent(environment):
    for area, state in environment.items():
        if state == 1:
            print(f"Agent is cleaning {area}.")
            environment[area] = 0

print("Initial Environment State:")
print(environment)

print("\nAgent Action:")
simple_reflex_agent(environment)

print("\nUpdated Environment State:")
print(environment)
```

```
[Running] python -u "d:\BSCS_6th_Semes
Initial Environment State:
{'A': 0, 'B': 0, 'C': 0, 'D': 1}

Agent Action:
Agent is cleaning D.

Updated Environment State:
{'A': 0, 'B': 0, 'C': 0, 'D': 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

AI_Lab#8_Task#2.py > ...

```python
def traffic_light_agent(color):
    if color == "Red":
        return "Stop"
    elif color == "Yellow":
        return "Slow down"
    elif color == "Green":
        return "Move"
    else:
        return "Unknown action: Not recognized"

current_light = "Green"
print(f"Current light color: {current_light}")
print(f"Action: {traffic_light_agent(current_light)}")

```

```
[Running] python -u "d:\BSCS_6th
Current light color: Green
Action: Move

[Done] exited with code=0 in 0.1
```

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.

AI_Lab#8_Task#3.py > ...

```python
class AutomaticDoor:
    def __init__(self):
        self.person_detected = False
        self.is_night = False

    def detect_person(self):
        self.person_detected = True

    def open_door(self):
        if self.person_detected or not self.is_night:
            print("Door is opening.")
        else:
            print("Door remains closed.")

    def close_door(self):
        print("Door is closing.")

door = AutomaticDoor()

door.detect_person()
door.open_door()

door.person_detected = False
door.is_night = True
door.open_door()

door.person_detected = True
door.open_door()
```

```
[Running] python -u "d:\BS
Door is opening.
Door remains closed.
Door is opening.

[Done] exited with code=0
```