

AI LAB ASSIGNMENT 4

by

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Task 1A :

Simple Reflex Agent

Write a program to develop a simple reflex agent. The program defines an agent that will tell the action of an object based on its mood.

The agent can perceive four inputs (e.g., moods) and perform actions accordingly based on the input.

(Moods= "happy", "sad", "angry", "hungry")

(Action= "smile", "console", "calm down", "feed") On the basis of inputs, the agent will take the action.

```
rules = {  
    "happy": "smile",  
    "sad": "console",  
    "angry": "calm down",  
    "hungry": "feed"  
}  
  
mood = input("Enter the mood (happy, sad, angry, hungry): ")  
  
mood = mood.strip().lower()  
  
action = rules.get(mood, "Unknown mood! No action found.")  
  
print(f"Mood: {mood}")  
print(f"Action: {action}")
```

```
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Enter the mood (happy, sad, angry, hungry): hungry
Mood: hungry
Action: feed
```

Task 1B:

Write a program to develop a simple reflex agent. The program defines an agent that will suggest an action based on the weather condition.

The agent can perceive three types of weather conditions.

Weather = "sunny", "rainy", "cold"

Action = "Go outside", "Take umbrella", "Wear jacket" On the basis of the weather condition, the agent will take the action.

```
rules = {
    "sunny": "Go outside",
    "rainy": "Take umbrella",
    "cold": "Wear jacket"
}

weather = input("Enter the weather (sunny, rainy, cold): ")

weather = weather.strip().lower()

action = rules.get(weather, "Unknown weather! No action found.")

print(f"Weather: {weather}")
```

```
print(f"Action: {action}")
```

```
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RSE/6TH SEMESTER/AI LAB/LECTURES/AILAB/lab04/task1B.py"
Enter the weather (sunny, rainy, cold): rainy
Weather: rainy
Action: Take umbrella
```

Task 2A

Write a program to develop a model-based reflex agent that cleans rooms.

The environment consists of multiple rooms ("Room1", "Room2", "Room3").

If a room is "dirty" → the agent performs action "clean".

If a room is "clean" → the agent performs action "move to next room".

The agent should maintain an internal state (memory) to remember the status of each room after cleaning.

```
class Cleaner:
```

```
    def __init__(self, rooms):
```

```
        self.rooms = rooms
```

```
        self.memory = {room: status for room, status in rooms.items()}
```

```
        self.current = list(rooms.keys())[0]
```

```
    def decide_action(self, status):
```

```
        if status == "dirty":
```

```
            action = "clean"
```

```
            self.memory[self.current] = "clean"
```

```
        else:
```

```

    action = "move"

    keys = list(self.rooms.keys())

    index = keys.index(self.current)

    if index + 1 < len(keys):

        self.current = keys[index + 1]

    return action

```

```

rooms = {"Room1": "dirty", "Room2": "clean", "Room3": "dirty"}

agent = Cleaner(rooms)

```

```

for _ in range(len(rooms) * 2):

    status = agent.memory[agent.current]

    action = agent.decide_action(status)

    print(f"Room: {agent.current}, Perception: {status}, Action: {action}")

```

```

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Room: Room1, Perception: dirty, Action: clean
Room: Room2, Perception: clean, Action: move
Room: Room3, Perception: clean, Action: move
Room: Room3, Perception: dirty, Action: clean
Room: Room3, Perception: clean, Action: move
Room: Room3, Perception: clean, Action: move

```

Task 2B

Write a program to develop a model-based reflex agent that controls a traffic light.

If cars are waiting → action = "Turn Green".

If no cars are waiting → action = "Turn Red".

The agent should remember the last state of the traffic light so that it does not switch signals too frequently.

```
class TrafficLightAgent:
    def __init__(self):
        self.last_state = "Red"

    def decide_action(self, cars_waiting):
        if cars_waiting and self.last_state != "Green":
            action = "Turn Green"
            self.last_state = "Green"
        elif not cars_waiting and self.last_state != "Red":
            action = "Turn Red"
            self.last_state = "Red"
        else:
            action = "Keep " + self.last_state
        return action

agent = TrafficLightAgent()

scenarios = [True, True, False, False, True, False]

for step, cars in enumerate(scenarios, start=1):
    action = agent.decide_action(cars)
    print(f"Step {step}: Cars waiting = {cars}, Action = {action}")
```

```
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```

```
Step 1: Cars waiting = True, Action = Turn Green
```

```
Step 2: Cars waiting = True, Action = Keep Green
```

```
Step 3: Cars waiting = False, Action = Turn Red
```

```
Step 4: Cars waiting = False, Action = Keep Red
```

```
Step 5: Cars waiting = True, Action = Turn Green
```

```
Step 6: Cars waiting = False, Action = Turn Red
```