Report on Model-Based Reflex Agent in Python

# Introduction

This report explains the implementation of a Model-Based Reflex Agent using Python. The goal of the agent is to maintain a comfortable room temperature (22°C) in a smart home system. The agent decides whether to turn the heater ON or OFF depending on the current room temperature. It also remembers its previous action to avoid unnecessary switching.

# Code Explanation

## 1. Class Definition

The class `ModelBasedReflexAgent` is defined to represent the agent. It contains attributes and methods to sense the environment, make decisions, and take actions.

## 2. \_\_init\_\_ Method

This method initializes the agent with a fixed temperature (comfort level). It also sets `last\_action` to None to store the memory of the last action performed.

## 3. sensor Method

The `sensor(temp)` method takes the current room temperature as input and updates the agent's perception of the environment.

## 4. performance Method

The `performance()` method makes the decision:  
- If the current temperature is below the fixed temperature, it decides to turn ON the heater.  
- Otherwise, it decides to turn OFF the heater.  
Additionally, it compares the new decision with the last action. If both are the same, it outputs 'No Change' to avoid redundant actions.

## 5. actuator Method

The `actuator()` method executes the action returned by the performance function and prints the result in the format: 'Current Temp => Action'.

# Example Usage

A dictionary `rooms` is defined with different room names and their current temperatures. The agent iterates over each room, senses the temperature, and decides whether to turn the heater ON or OFF.

# Sample Output

=== Model Reflex Agent ===  
Living Room : 20 °C => Action: Turn ON Heater  
Drawing Room : 22 °C => Action: Turn OFF Heater  
Kitchen : 34 °C => Action: Turn OFF Heater  
Bedroom : 21 °C => Action: Turn ON Heater  
Bathroom : 23 °C => Action: Turn OFF Heater  
  
--- Repeated Sensor Reading ---  
22 °C => Action: Turn OFF Heater  
22 °C => Action: No Change

# Conclusion

The Model-Based Reflex Agent improves the efficiency of a smart home system by considering both the current state (temperature) and its previous actions. This avoids unnecessary switching of the heater, reducing energy consumption and increasing the lifespan of the heating system.