AISC

Class: B.E COMP

Experiment 1b: Specify PEAS description for an AI agent.

Learning Objective:

Basic Experiments

Specify PEAS description for an AI agent.

Tools: Python

Theory:

There are certain types of AI agents. But apart from these types, there are many agents which are being designed and created today and they differ from each other in some aspects and have some aspects in common too. So, to group similar types of agents together, a system was developed which is known as **PEAS system**.

PEAS stands for Performance, Environment, Actuators, and Sensors. Based on these properties of an agent, they can be grouped together or can be differentiated from each other. Each agent has these following properties defines for it.

Performance:
The output which we get from the agent. All the necessary results that an agent gives after processing comes under its performance.

Environment:
All the surrounding things and conditions of an agent fall in this section. It basically consists of all the things under which the agents work.

Actuators:
The devices, hardware or software through which the agent performs any actions or processes any information to produce a result are the actuators of the agent.

Sensors:
The devices through which the agent observes and perceives its environment are the sensors of the agent.

EXAMPLE:

Let us take an example of a self-driven car. As the name suggests, it is a car which drives on its own, by taking all the necessary decisions while driving without any help from the user

(customer). In other words, we can say that this car drives on its own and requires no driver. The **PEAS** description for this agent will be as follows:

Performance: The performance factors for a self-driven car will be the Speed, Safety while driving (both of the car and the user), Time is taken to drive to a particular location, the comfort of the user, etc.

Environment: The road on which the Car is being driven, other cars present on the road, pedestrians, crossings, road signs, traffic signals, etc. , all act as its environment.

Actuators: All those devices through which the control of the car is handled, are the actuators of the car. For example, the Steering, Accelerator, Breaks, Horn, Music system, etc.

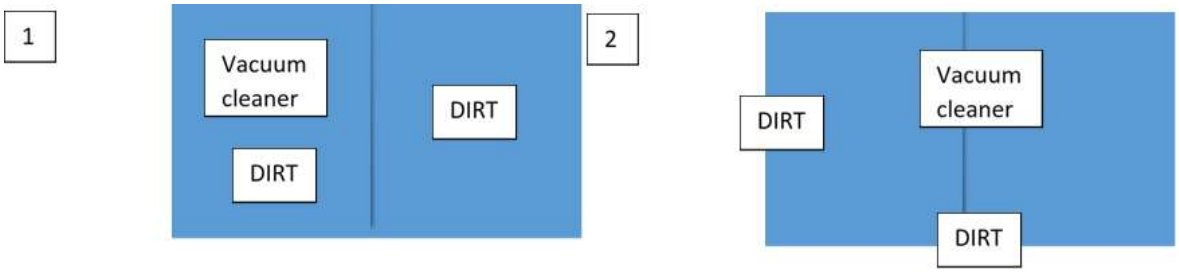
Sensors: All those devices through which the car gets an estimate about its surroundings and it can draw certain perceptions out of it are its sensors. For example, Camera, Speedometer, GPS, Odometer, Sonar, etc.

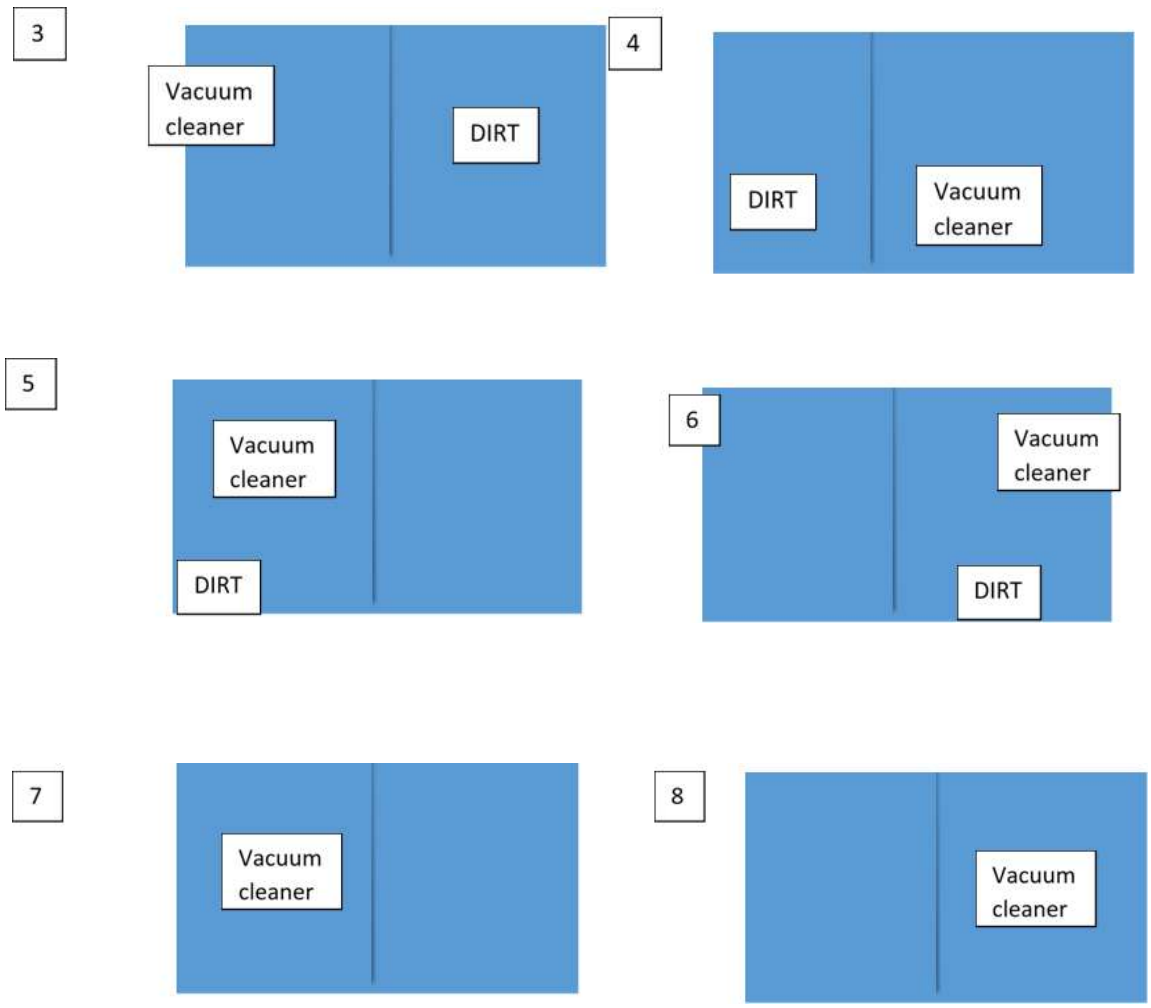
Vacuum Cleaner Problem in Artificial Intelligence

we are going to study about the **vacuum cleaner problem in AI**. What it is, what type of agent acts in this problem, what goals the agent in this problem has and how all the working takes p lace in solving this problem?

Vacuum cleaner problem is a well-known search problem for an agent which works on Artificial Intelligence. In this problem, our vacuum cleaner is our agent. It is a goal based agent, and the goal of this agent, which is the vacuum cleaner, is to clean up the whole area. So, in the classical vacuum cleaner problem, we have two rooms and one vacuum cleaner. There is dirt in both the rooms and it is to be cleaned. The vacuum cleaner is present in any one of these rooms. So, we have to reach a state in which both the rooms are clean and are dust free.

So, there are eight possible states possible in our **vacuum cleaner problem**. These can be well illustrated with the help of the following diagrams:





Here, states 1 and 2 are our initial states and state 7 and state 8 are our final states (goal states). This means that, initially, both the rooms are full of dirt and the **vacuum cleaner** can reside in any room. And to reach the final goal state, both the rooms should be clean and the **vacuum cleaner** again can reside in any of the two rooms.

The **vacuum cleaner** can perform the following functions: move left, move right, move forward, move backward and to suck dust. But as there are only two rooms in our problem, the vacuum cleaner performs only the following functions here: move left, move right and suck.

Here the performance of our agent (vacuum cleaner) depends upon many factors such as time taken in cleaning, the path followed in cleaning, the number of moves the agent takes in total, etc. But we consider two main factors for estimating the performance of the agent. They are:

1. **Search Cost:** How long the agent takes to come up with the solution.
2. **Path cost:** How expensive each action in the solution are.

By considering the above factors, the agent can also be classifies as a utility based agent.

Implimentation:

Agent = Part-picking robot
• Performance measure: Percentage of parts in correct bins, efficiency, speed, power consumption.
• Environment: Conveyor belt with parts, bins.
• Actuators: Jointed arm and hand
• Sensors: Camera, joint angle sensors, metal detector, infrared sensors.

Learning Outcomes: Students should have the ability to

LO1: Understand the problem formulation Example Vacuum Cleaner.

Course Outcomes: Upon completion of the course students will be able to understand problem formulation in ALSC.

Conclusion: Thus, the aim to study and implement **PEAS description for an AI agent vacuum cleaner.**

Viva Questions:

Ques.1 What do you understand by AI Agent?

Ques. 2. Explain the basic steps in PEAS?

Ques. 3. Write types of problem discussed in detail.

For Faculty Use

Correction Parameters	Formative Assessment [40%]	Timely completion of Practical [40%]	Attendance / Learning Attitude [20%]	
Marks Obtained				