TASGAONKAR GROUP

SARASWATI EDUCATION SOCIETY

Tutorial 1

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Subject :- AI

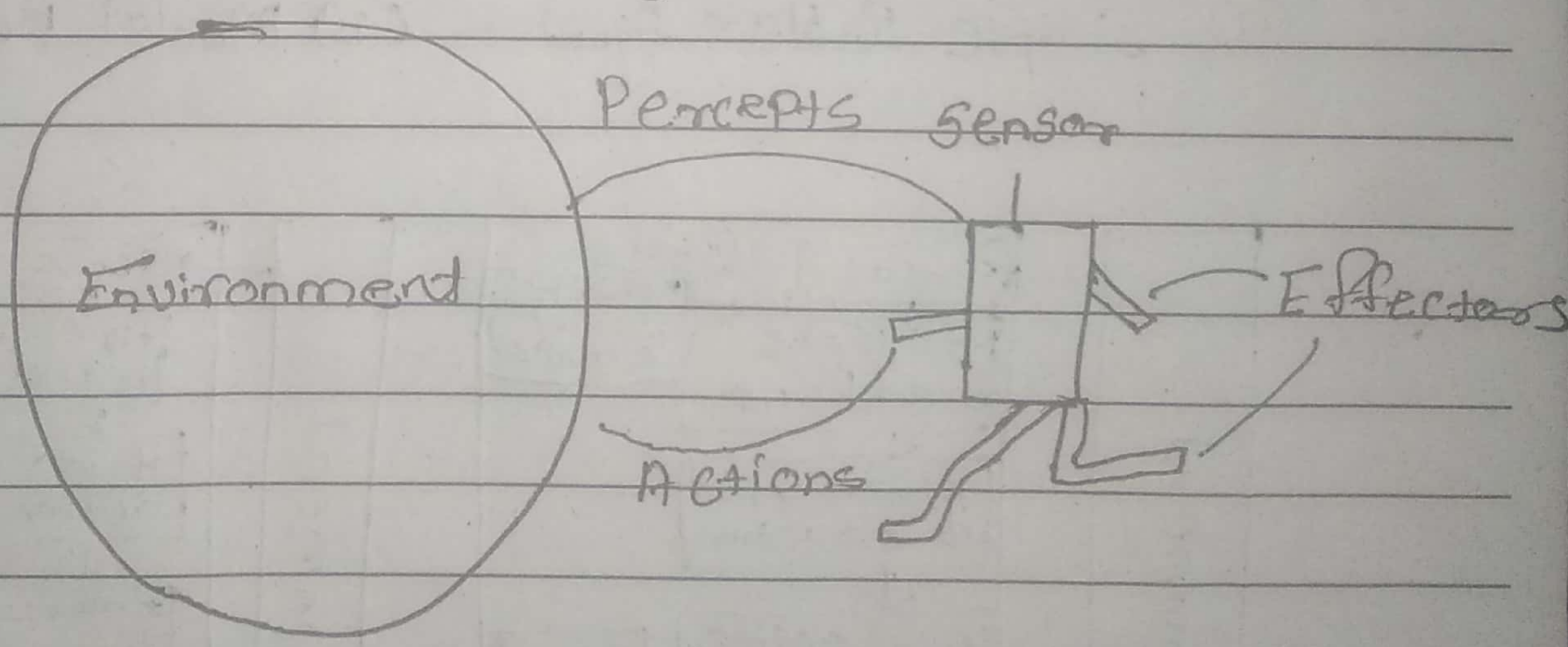
D.O.P	D.O.S	Marks	Sign

Date :

Tutorial 1 :- Design of Intelligent Agent.

Aim :- To understand the Concept of Agent Abstraction by Studing definedion of Rational Agent, Agent environment, Task environment, Descriptors environment type.

Theory :- An Artificial Intelligent (AI) System is Composed of an agent and its environment. The agents act in their environment. An agent is anything that can perceive its environment through sensor & upon that environment through effectors.



Human agents :- has Sensory organs Such as eyes, ears, nose, tongue & skin parallel to the Sensors, & other or organs Such as hands, legs mouth, for effectors

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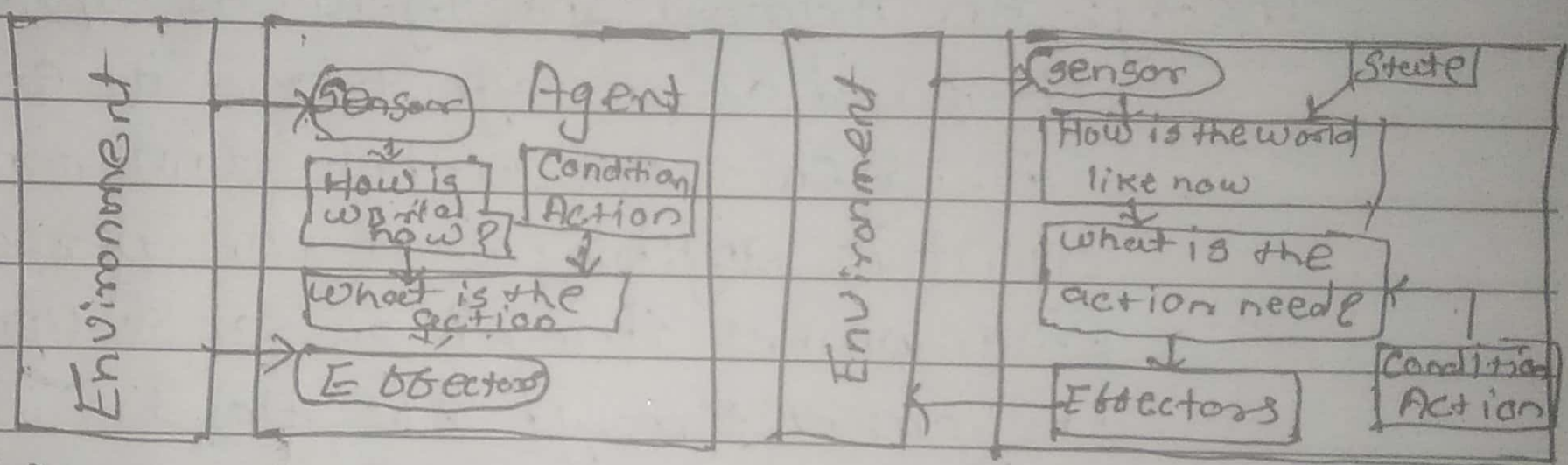
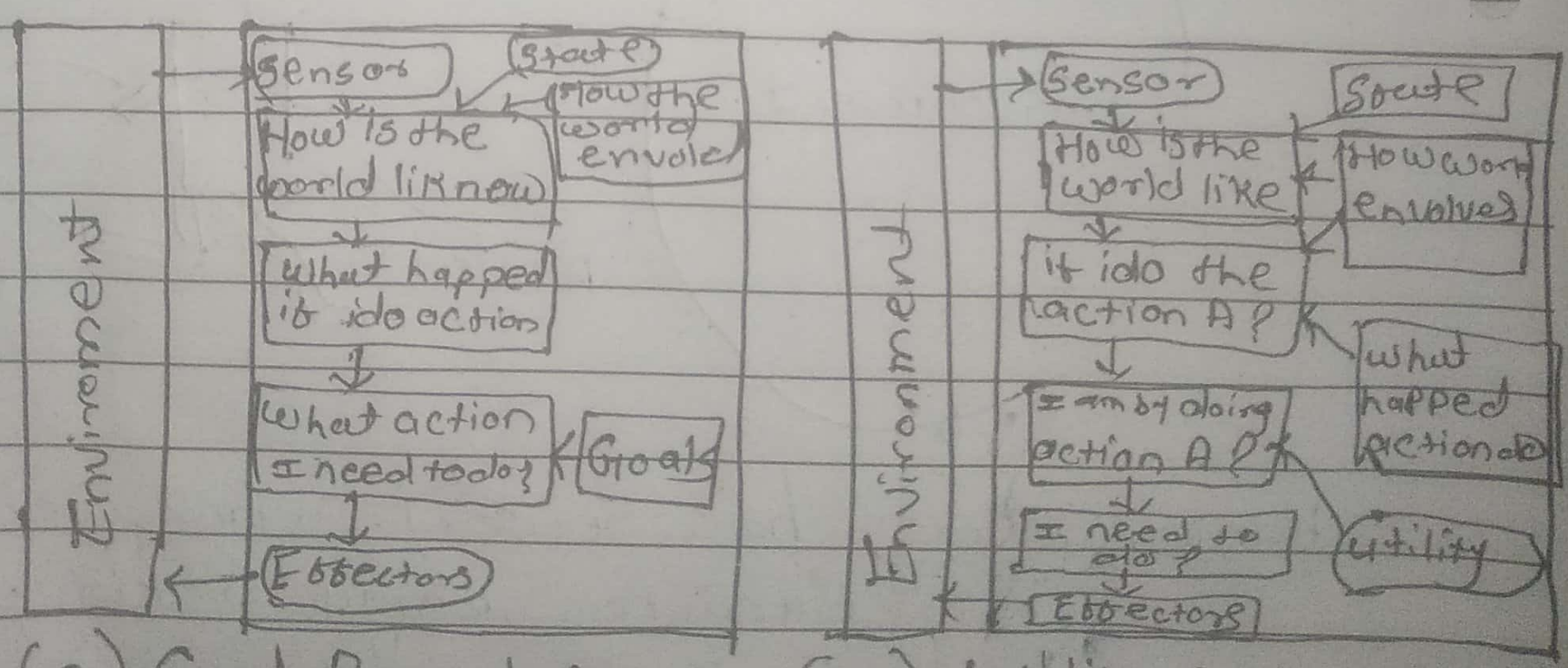
Robotic agent :- Replace cameras and infrared range finders for the sensors & various motors & actuators for effectors.

Software agent :- has encoded bit String of its program & actions.



(a) Simple Reflex Agent (b) Model Based Reflex



(c) Goal Based Agent (d) Utility Based Agent

Agent architecture Type

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Reblex agents Choose actions only based on the Current percept only. They are rational only if a Correct decision is made only on the basis of Current percept. Agent environment for such agent is fully observable. Mobile Based Reflex Agent as shown ternal State of persistent information. Here the model means knowledge about how the things happen in the world that is representation of unobserved aspects of Current State depending on percept history. Agent take into account how its actions effect the world. Goal based agent Choose their actions in order to achieve goals. Goal based approch is more flexible than reflex agent since the knowledge supporting a description of desirable situations. Finally the utility Based Agents 2d choose actions need based on preferance (utility) for each State. Goals are a inadequate when there are conflicting goals, out of which only few can be achieved. goals have some uncertainty of being achieved & you need to weight likehood of success against the important of a goal.

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Another important piece of information is task environment properties while analyzing task enviroment the agent architect needs to consider following property :-

1.) Discrete or Continuous :- If there are a limited number of distinct clearly defined state of the environment, the environment is discreate ; otherwise it is Continuous

2.) observable or partialy observable :- If it is possible to determine the complete state of the environment at each time point from the precept it is observable.

3.) Static or Dynamic : If the environment does not change while an agent is acting, then it is static otherwise it is dynamic

4.) Deterministic or Non-deterministic :- If the next state of the environment is completely determined by the current state & the actions of the agent, then the environment is deterministic ; otherwise it is non-deterministic.

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6) Single agent or multiple agents :- The environment may contain single agent or other agent which may be of the same or different kind as that of the agent

7) Accessible or Inaccessible :- If the agent sensory apparatus can have access to the complete state of the Environment, then the environment is accessible to that agent.

Working :-

Search internet for AI based application in following scenario & identify who is agent for that application. Futther list out PEAS descriptions for agent Environment in each of the case. Finally try to classify task environment properties like a list of attributes from above list of 7 task Environment properties.

1) Autonomous Lunar Rover
2) Deep Blue Chess playing Computer program
3) Eliza the natural language processing Computer program created from 1964 to 1966.

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1) Deep Blue Chess playing Computer program

Performance Measure :- Win/lose/draw, Safety of chess prices, Safety of King piece, no of moves, times for each moves

Environment :- Chess board, Chess pieces

Atuators :- Desktop Sqve, CPU

Sensor :- Chess board

Task environments properties :- Discreate, fully, Static Deterministic, Sequential Single agent, Avessible

2) ELIZA the NLP Computer program Created from 1964 to 1966 at the MIT Artificial intelligence Locarately by Jureph weizenbaum.

Performance Measure :- Understanding uses, Conversation Environment User

Environment :- User, program Keyboard, User text input Eliza texts, output Windows

Actuators :- User, Program, Keyboard, User text input Eliza texts, output window, Texts

Semals :- User texts inputs

Task environment properties :- continuous, fully observable, Static, Deterministic,

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3) Sophia is a Social humanoid robot developed by Hong Kong based company Hanson Robotics.

Performance measure:- Understanding user, maintaining Conversation, facial expression, response time
Environment:- Humans, objects...
Actuators:- Arms, mouth, legs, Speaker
Sensors:- Eyes, ears, mic, audio sensor

Task environment property:- Continuous, fully Observable, Dynamic, Deterministic, Sequential, Accesible

4) Apple's virtual assistant siri

Performance Measure:- understanding user text and speech, producing best result, summarize, response speed
Environment:- User, speech, text
Actuators:- Mobile, screen, Speaker
Sensors:- Mobile, screen, mic, button
Task Environment properties:- Continuous, fully observable, static, Deterministic, Single agent Accesible

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5) Automated Crossword Solver :-

Performance Measure :- Understanding hints, analyzing & visible letters, time to solve

Environment :- Hints, Visible, letters, Crossword

Actuators :- Desktop screen, Pretgun

Sensors :- Crossword board

Task Environment properties :- Discrete, fully observable, Static, Deterministic single agent, Accessible.