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Class :- B.E. IT

Subject :- AI

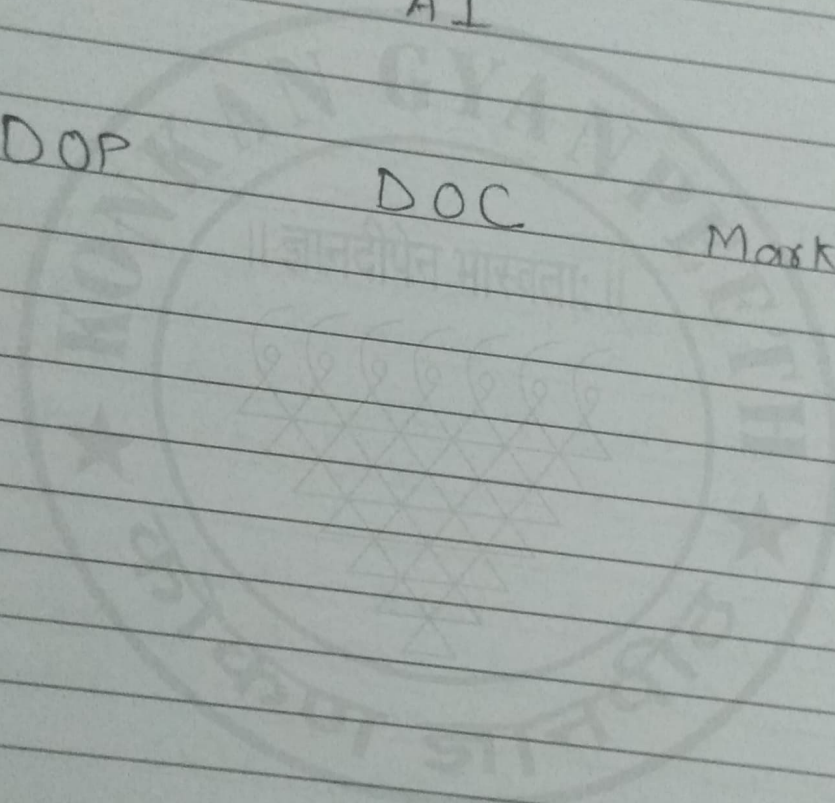| DOP	DOC	Marks	Sign

Tutorial 2 :- To understand state space problem
formulation.

Aim :- To understant state space based problem
formulation of AI problems so that
problem solving Agent can be applied

Theory :- first we understant the problem solving
agent. Algorithm shown in figure 3 shows agent
program for problem solving agent, Agent first
formulated goal and problem, then determines
or rather searches an action sequence
after which it return the next action
to be executed in a sequential maner

```
function SIMPLE-Broblem-SOlVING-AGENT
(Percept) returns an action.
   Static : Seq, an action sequence, initially empty
           State, some description of the current
       world state goal, a goal, initially null
   problem, a problem formulation.
State ← UPDATE-STATE (State, percept)
   if seq is empty then do
       goal ← FORMULATE-GOAL (state)
   problem ← formulate - Problem (State, goal)
     seq ← SEARCH (Problem
     action ← FIRST (seq)
       seq ← § REST (seq)        return action
```

Defining the problem is referred to as problem formulation. It involves defining following five things:

- Initial state It is the starting state that the problem is in.
- Actions It defines all possible actions available to the agent, given it is in some state currently. It is a function Action that return list of all possible actions.
- Transition Model also known as successor function which define which state is the system tend to move to when a particular action is executed by the agent. successive appliation of transition model give rise to what is is known as state spare.
- Goal Test This act as a stopping condition when the state passed to this function is goal state it will return true and searching would stop.
- Path cost It is accumulated cost of performing certain sequence of actions. This can help in determining weather the action sequence under consider-action is optimal.

Working: Based on understanding of problem formulation students need to formulate following problems They will clearly show state space us to depth level 3 which ever is shallowest.

at - Raigad

Date :

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1) Navigate to KGCE workshop from HOD IT cabin with minimum number of moves, moves can be climbing or alighting staircase, turning left, right, walking through a corridor.

2) 8 puzzle problem.

3) The missionaries and cannibals problem
There are three missionaries and three cannibals who must cross a river using a boat which can carry at most 2 people, under the constraint, that, for both banks, if there are missionaries present on the banks, they cannot be outnumbered by cannibals if they were, the cannibals would eat the missionaries. The boat cannot cross the river by itself with no people on board.

4) N Queen's problem. Arrange N queens on a N cross N chees board where no two queens attack each other

5) Two room varcum cleaner world.

6) water Tug problem.