K.G.C.E.
Karjat - Raigad

Tutorial No :- 2

Page No. :
Date :

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Tutorial 2 :- To understand state space problem formaulation.

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

Theory :- First we understand the problem solving agent. Algorithm shows in figure 3 shows agent program for porblem solving agent. Agent first formalites goal and problem, then determinies or rather searches an action sequence.

```
function Simple - Problem - Solving - Agent retrn
  action
  static: seq an action sequence. initially empty
     state some description of 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 reffered to as problem Formulation. It involves defining following five things:-

Initial State: It is the starting state that the problem is in.

Action it defines all possible actions available to the agent given it is in some state a currently. It is function Action(s) that returns list of all possible actions.

Transition Model also known as succesor function which define which state/s the system tent to move to when a particular action is executed by the agent.

Goal Test This act as a stopping condition when the state passed to this function is goal state it will return true.

path cost its is accumulated cost of performing certain sequence of actions. This can help in determining wether the action sequenie under consideration is optimal.

Working :- Based on understanding of problem formulation students need to Formulate following problems.

① Navigate to KGCE workshop from HOD IT cabin with minimum number for moves, move can be climbing or alighting staircase

② 8 Puzzle problem

③ The missionaries and cannibals problem. There are 3 missionaries and three cannibals who must cross a river using boat which can carry at most two people Under the constraint that for both banks. The boat cannot cross the river by itself with no people on board

④ N Queen's problem. Arrange N queen on a N cross N chess board so where two queens attack each other.

⑤ 2 room vacuum cleaner world

⑥ Water Jug problem.