K.G.C.E.
Karjat - Raigad

Tutorial No :- 2

Page No. :
Date :

KGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCE

Name :- Darshan Sanjay Jadhav

Roll No :- 23

Batch :- I-1

Sem :- VII / I.T

Subject :- IS LAB

Class :- B.E / I.T

DOP	DOC	Sign	Marks

Tutorial 2 :- To understand State space problem formulation

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

Theory :- First understand the problem Solving agent, Algorithm shown in figure 3 shows agent program for problem solving agent. Agent first formulates goal & and problem then determines or rather searches an action sequence after which it returns the next action to be executed in a sequential manner.

Defining the problem is referred to as problem formulation. it involes defining following five things

Initial State it is the startings state that the problem is in.

Actions it defines all possible action available to the agent, given it is in some state is currently it is a function Action (S) that returns list of all possible action.

Transition model also known as successor, function

```
Function SIMPLE-PROBLEM-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
```

Problem Solving Agent Architecture.

which define which step/s the system tend to move to when a particular action is executed by the agent Successive application of transition model gives rise to what is know as state space.

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 a accumulated cost of performing certain action sequence under consider action is optimal.

Thus a problem can formally specified by identifying initial state, actions transition model (successor function), goal test and path cost. In term of problem solving agent solution is the path from intial state to a goal state. optimal solution is lowest path cost of all solution process of finding a solution is called search

Working : Based on understanding of problem formulation students need to formulate following problem. They will clearly show state space up to depth level 3 or till goal node which ever is shallowell.

1. Navigate to KGCE workshop from HOD IT cabin with minimum number of moves, can be climbing or alighting stair case, turning let, right, walking through corrider.
2. 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 two people, under the constraint that for both banks, if there are missionaris present on the bank 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 chess board when no two queens attacks.

when no two queens attacks
~~when no two queens attacks~~
each other
5. Two room vacuum cleaner world
6. water Jug problem.