City University

Faculty of Science & Engineering

Department of Computer Science and Engineering

Program: B.Sc. in CSE

Midterm Examination Semester: Fall 2017

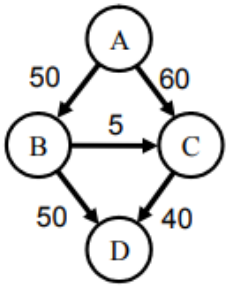
Course Code: CSE 417 Course Title: Artificial Intelligence

Total Marks: 30 Duration: 1 hour 30 Minutes

Answer any 3(three) questions ***3 X 10 =30***

1(a) Briefly explain agent and agent function with proper example. ***2***

(b) The state space description for a problem is shown below, with A being the start state and D being the goal state. Shown on the graph are path costs between states. The table lists the estimated distance from a state to the goal. Assume these estimates are admissible. Perform an A* search for this problem. Recall that f (n)= g (n)+h (n). ***4***



Node	Estimated distance to goal
A	90
B	45
C	40
D	0

(c) For Taxi Driver agent,

i. Develop a PEAS description of the task environment. ***3***

ii. Is this agent a Deterministic or Stochastic? ***1***

2(a) Represent the following in Prolog: ***4***

i. Anyone likes shopping if she is a girl.

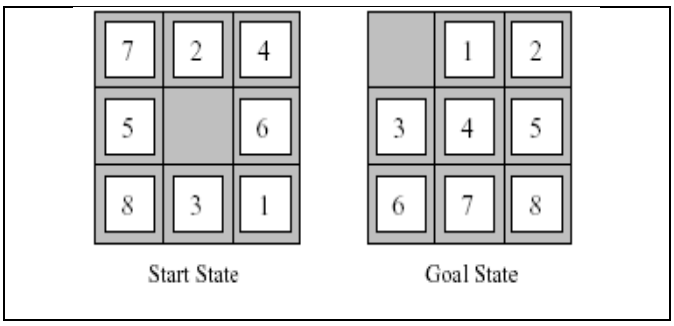
ii. Mia and Marcellus are married.

iii. Anyone can travel if he is a traveler.

iv. An animal is a bird if it has feathers.

(b) Mention some application of Artificial Intelligence. ***2***

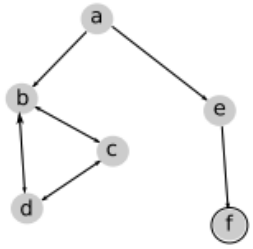
(c) A problem, 8-puzzle consists of a 3x3 board with eight numbered tiles and a blank space. A tile adjacent to the blank space can slide into the space. The object is to reach the goal state, as shown in the following figure. Is this problem well defined? If yes, then explain the four basic components of well-defined problem according to the following 8-puzzle problem. ***4***



3(a) Mention some drawbacks of Best-first-search. ***2***

(b) Differentiate blind search & heuristic search. Under which condition a heuristic function is called admissible? ***4***

(c) Consider the search problem represented in following figure, where a is the start node and f is the goal node. Would you prefer DFS or BFS for this problem? Why? ***4***



4(a) Mention the syntax for fact declaration in prolog. ***2***

(b) What answers do you get for below queries for given program. ***4***

Program :

```
vegetarian(jose).
vegetarian(james).
vegetable(carrot).
vegetable(egg_plant).
likes(jose, X) :- vegetable(X).
loves(Who, egg_plant) :- vegetarian(Who).
```

Queries :

```
?- vegetable(X).
?- vegetable(potato).
?- likes(jose, What).
?- loves(Who, egg_plant).
```

(c) Identify the causes why iterative deepening is considered better than either breadth-first or depth-first search. ***4***