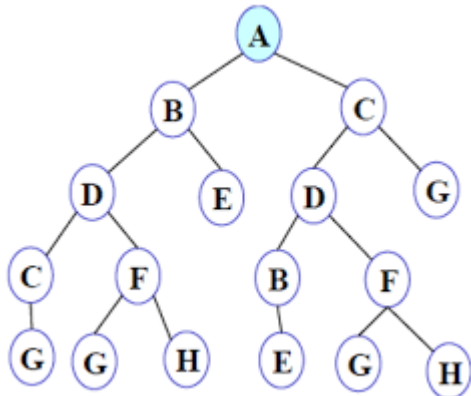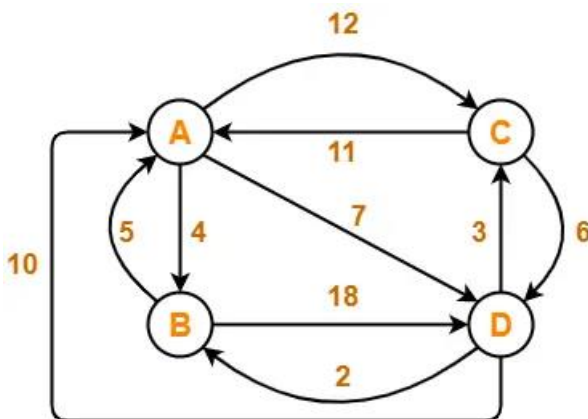## PRINCIPLES OF ARTIFICIAL INTELLIGENCE(AIML-207)
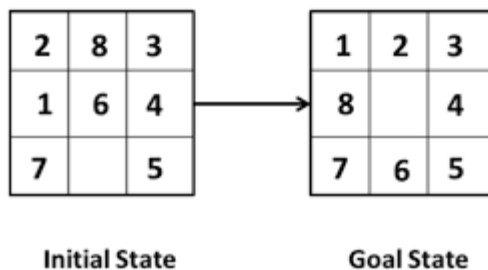
Assignment 1:

1. Describe the problem formulation steps in AI with examples.
2. What are the branches of AI? Explain in brief.
3. Find a path between nodes A and G using BFS for the given tree.

4. Solve the Travelling Salesman Problem using the Branch and Bound Algorithm in the following graph-

5. Solve the given 8-puzzle problem.

6. What do you mean by Blind search? Explain different types of Blind search with an example.
7. Discuss various steps in problem-solving techniques.

# PRINCIPLES OF ARTIFICIAL INTELLIGENCE(AIML-207)

Assignment 2:

1. What do you mean by heuristic and heuristic search techniques?
2. What is the need for the evaluation function?
3. What do you mean by problem reduction? Explain with the help of an AND-OR graph.
4. Find the path from P to S from the following graph by using the best-first search algorithm.
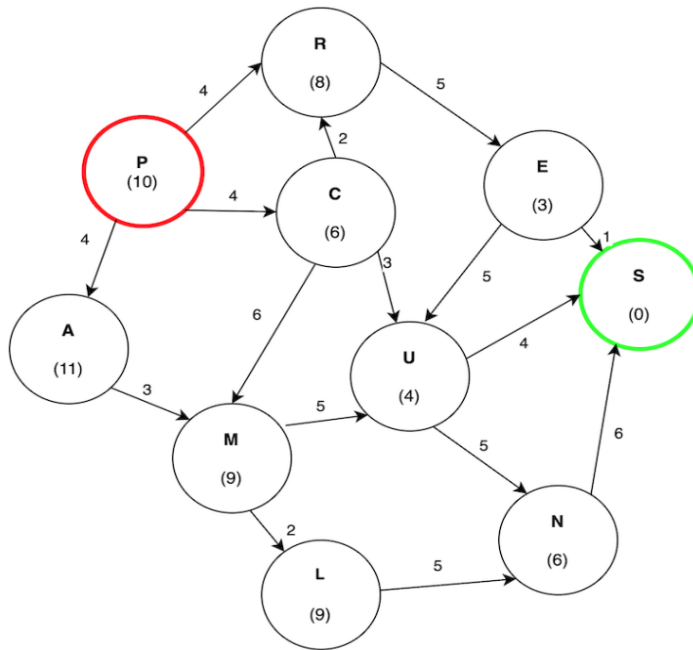
5. What is a state-space diagram for the Hill-climbing algorithm? Explain all the regions in the state-space diagram of the Hill-climbing algorithm.

6. Consider the following graph. The numbers written on nodes represent the heuristic value.

   Find the most cost-effective path to reach from start state A to final state J using A* algorithm.
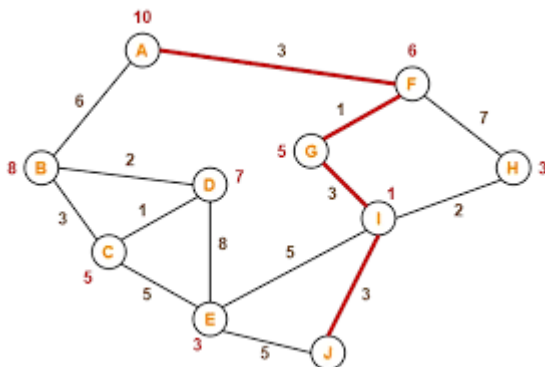
7. Find the path to reach goal node G from A by using the Breadth First Search algorithm on the following graph.
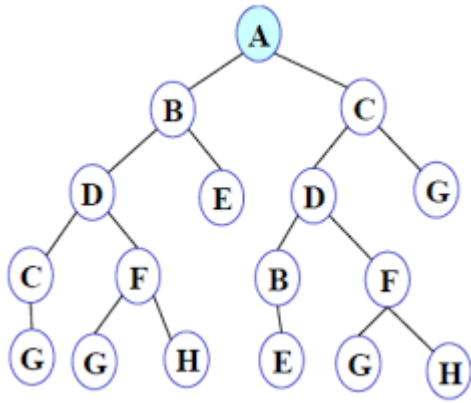
8. Find the final solution path by using the Best First Search on following graph.
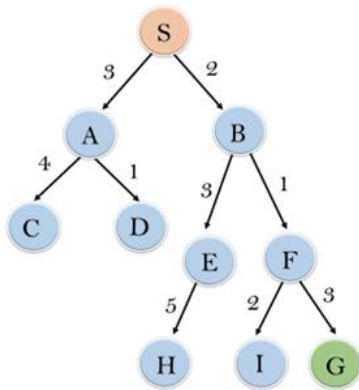
node	H (n)
A	12
B	4
C	7
D	3
E	8
F	2
H	4
I	9
S	13
G	0
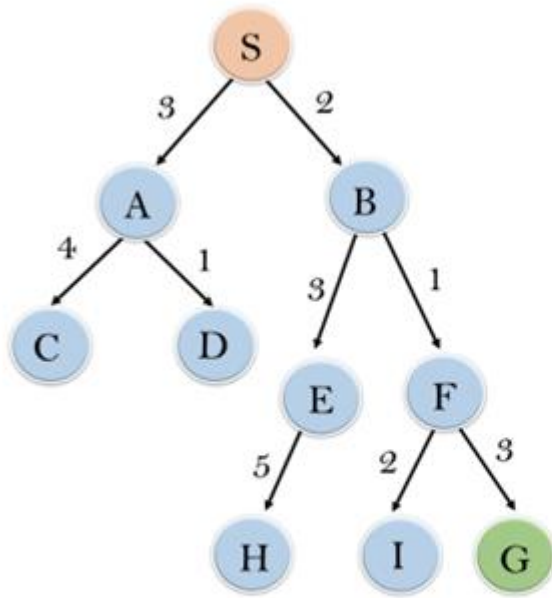
node	H (n)
A	12
B	4
C	7
D	3
E	8
F	2
H	4
I	9
S	13
G	0

PRINCIPLES OF ARTIFICIAL INTELLIGENCE(AIML-207)

Assignment 3:

1. Explain a knowledge-based system. Discuss the properties of Knowledge Representation Systems.
2. Explain semantic nets. What are the interfaces of it.
3. Prove the following using either resolution or traditional logic, using these propositions:

    S : I study;

    G: I get good grades;

    E: I enjoy.

    i). If I study I make good grades.

    ii). If I do not study I enjoy.

    ∴ either I make good grades or I enjoy.
4. Express the following in FOL and construct a proof using resolution refutation:

    i). Everyone has a parent

    ii). For any persons x, y, and z, if z is y's parent and y is x's parent, then z is the grandparent of x.

    iii). Therefore, everyone has a grandparent.

5. Explain inference rules with examples.

6. Consider the argument ," All dogs bark. Some animals are dogs. Therefore, some animals bark". Determine whether the conclusion is a valid consequence of the premises.

7. Explain resolution in propositional logic and predicate logic.

8. Determine whether the following argument is valid ." if I work the whole night on this problem,then I can solve it. If I solve the problem, then I will understand the topic. therefore, I will work the whole night on this problem, then I will understand the topic."

7

Assignment 4:

1. Describe Bayesian networks. How are the Bayesian networks powerful representations for uncertainty knowledge?

2. Solve the Mony Hall Problem. Three doors are present—red, green, and blue; from which to choose only one, one of which has a prize hidden behind it. Suppose we choose the red door. The host of the contest, who knows the location of the prize and will not open the door, opens the blue door and reveals that there is no prize behind it. He then asks if we wish to change from our initial choice of red. Will changing to green now improve our chances of winning the prize?

3. Let's consider a simple example involving a bag of coloured balls.
   i). Condition:
     - You have a bag of balls, and there are three colours: red, green, and blue.
     - The bag contains 30% red balls, 60% green balls, and 10% blue balls.
   ii). Probabilities:
     P(Red) = 0.3 (30% chance of drawing a red ball).
     P(Green) = 0.6 (60% chance of drawing a green ball).
     P(Blue) = 0.1 (10% chance of drawing a blue ball). Problem Statement:
      Now, you close your eyes, and someone randomly selects a ball from the bag. You don't see the colour but are told the probability of the chosen ball being red is 30%. What's the probability that the ball is green?

4. Explain Dempster-Shafer Theory.
5. Explain various member functions used in fuzzy logic. Explain fuzzy controllers.
6. What is ANN? Explain the model of ANN.
7. Explain min-max theory and alpha-beta pruning in AI.