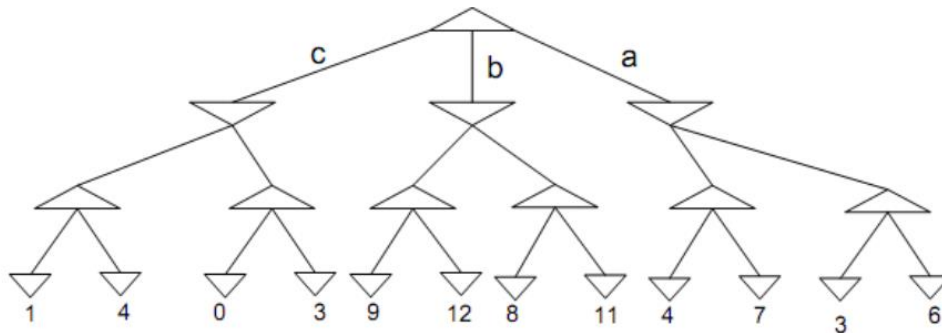# 22AIE 201 Fundamentals of AI

Theory Assignment 1

1. Devise a PEAS for an interactive language tutor.

2. Solve for the score of the min-max game tree given below.

3. There are 3 devils and 3 Priests. They all must cross a river in a boat. A boat can only carry two people at a time. If there are equal number of devils and priests, then devils will not eat Priest. If the number of devils are greater than the number of priests on the same side of the river then devils will eat the priests. So how can we make all the 6 peoples to arrive to the other side safely?
Draw the state space representation of the problem.

4. How many solutions are there for the map-coloring problem in Figure? How many solutions if four colors are allowed? Two colors?

5. Consider you are designing an intelligent agent for an automated plant irrigation agent, which checks the water content of soil and irrigate plants accordingly. Explain how your agent will be designed using:
a. Simple reflex agents   b. Model-based reflex agents

c. Goal-based agents   d. Utility-based agents

6. Solve the Cryptarithmetic problem: SEND+ MORE=MONEY

7. You are provided with two jugs: one having the capacity to hold 3 gallons of water and the other has the capacity to hold 4 gallons of water. There is no other measuring equipment available, and the jugs also do not have any kind of marking on them. So, the agent's task here is to fill the 4-gallon jug with 2 gallons of water by using only these two jugs and no other material. Initially, both our jugs are empty. Formulate a state representation towards the goal formulation for this problem.

8. For the following questions, use the graph below and assume that we break ties by visiting lexicographically earlier nodes first.
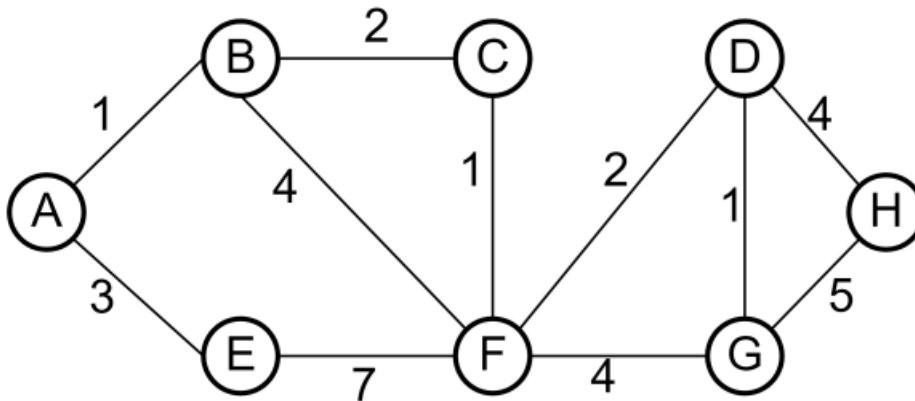
(i)   Give the depth first search traversal starting from vertex A (ignore edge weights).
(ii)   Give the breadth first search traversal starting from vertex A (ignore edge weights)
(iii)   Give the path A* search would return, starting from A and with G as a goal. Let h(u, v) be the valued returned by the heuristic for nodes u and v.

u	v	$h(u,v)$
A	G	9
B	G	7
C	G	4
D	G	1
E	G	10
F	G	3
H	G	5