

Tutorial 6:

Search and probabilistic reasoning

Name	Student no.

For this tutorial, you can discuss the questions in small groups (up to 4 students). Individually submit the answers to each of the 5 Questions.

Question 1

a) List 3 activities that require human intelligence

- 1.
- 2.
- 3.

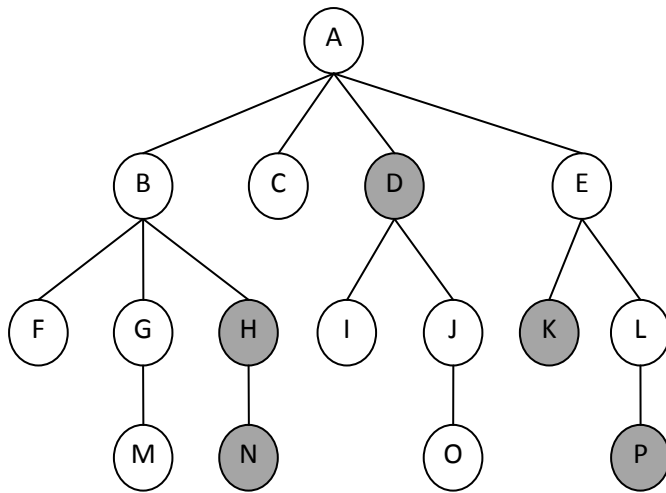
b) List 3 activities that require rationality

- 1.
- 2.
- 3.

c) Provide a definition for natural intelligence

d) Provide a definition for artificial intelligence

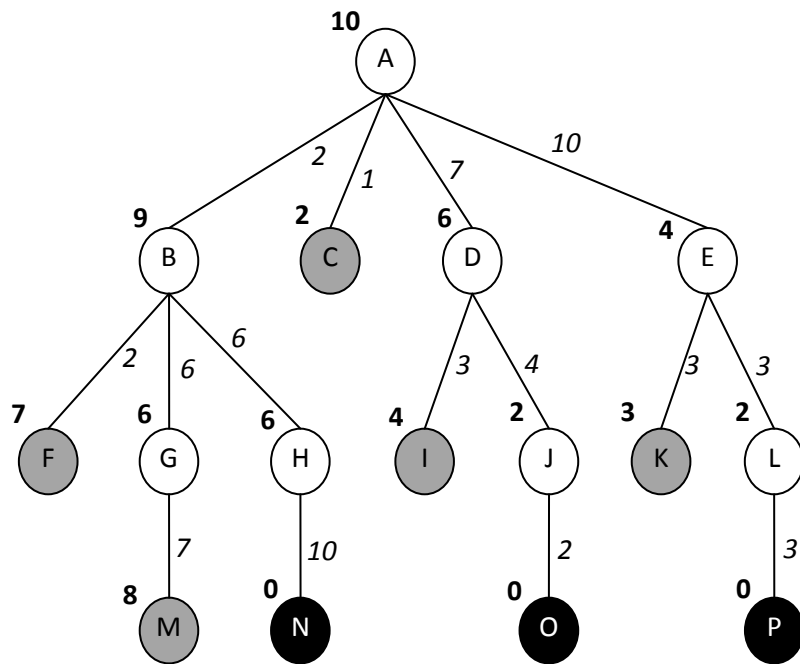
Question 2



For the tree above, determine the order in which the shaded nodes will be expanded for:

- Breadth first search
- Depth first search
- Depth limited search to a depth of 2
- Iterative deepening search

Question 3

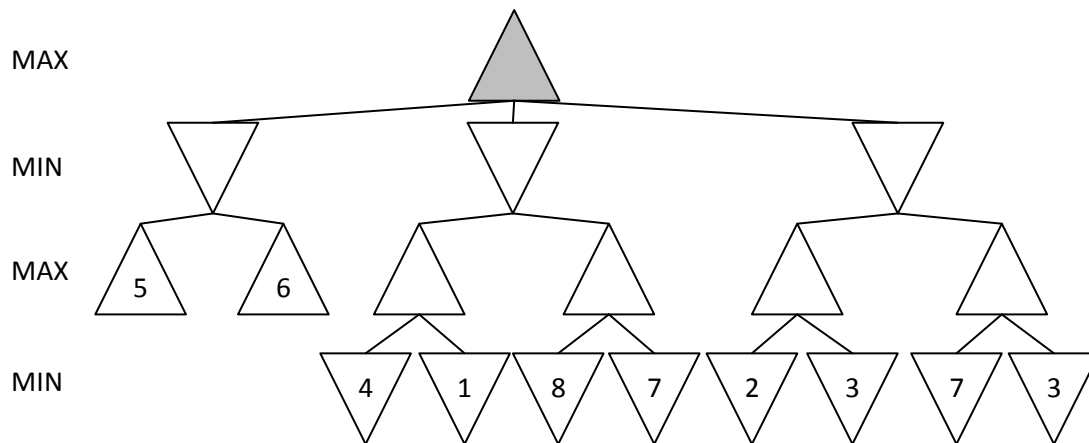


In the above tree, heuristic values are in bold, step costs are in italics, A is the initial node, grey nodes are dead ends, and black nodes are goal states.

a) Trace the workings of a Greedy search algorithm, state the chosen path and path cost

b) Trace the workings of an A* search algorithm, state the chosen path and path cost

Question 4



- Use MINIMAX algorithm to determine the values for each of the blank nodes in the search tree. Fill in the MINIMAX values inside each of the blank nodes in the diagram
- Using alpha-beta pruning, reduce the search by marking where branches of the search tree can be pruned.

Question 5

A game manufacturer has collected data about quality of their product. The probability of producing a faulty game is 0.08. There is a test, T1, that can be used to classify the game as sound or faulty. T1 misclassifies 16% of sound games and 6% of faulty games.

Bayes' rule is
$$p(A | B) = \frac{p(B | A)p(A)}{p(B)}$$

and
$$p(A) = p(A | B)p(B) + p(A | \neg B)p(\neg B)$$

What is the probability of a game with a "sound" result for T1 actually being faulty? Show all working.