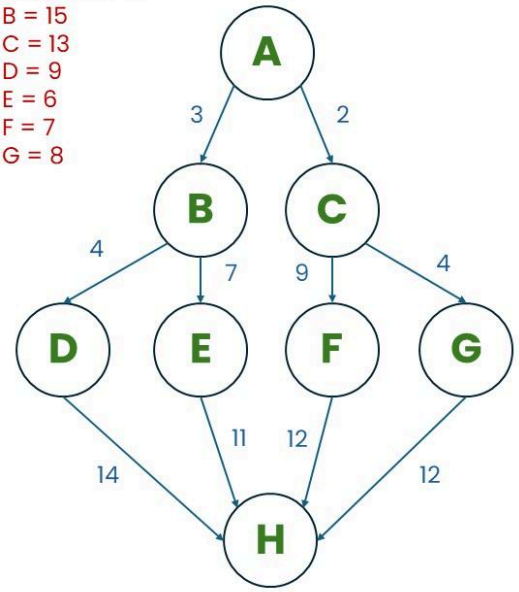
Informed Search Cost Path Solution (A* Search Algo)

Values for h:
B = 15
C = 13
D = 9
E = 6
F = 7
G = 8



The A* Search Algorithm operates by selecting nodes based on a value denoted as '**f**', which is computed as the sum of two other parameters, '**g**' and '**h**'.

$$f = g + h$$

where '**g**' is the cost from the starting point to a given node and '**h**', the heuristic, is the estimated cost from a given node to the destination node.

At every iteration, it chooses the node with the minimum 'f' value and expands it.

Find the shortest path in the given graph using A* Search algorithm

Starting Node: A
Destination Node: H

Uninformed Search Algorithm Activity

Choose the correct answer.

1. What term is used to describe algorithms in AI that explore the search space without any prior knowledge about the problem?
   a) Informed search algorithms
   b) Blind search algorithms
   c) Heuristic search algorithms
   d) Intelligent search algorithms

2. Which of the following is an example of a blind search strategy in uninformed search algorithms?
   a) A* search
   b) Greedy best-first search
   c) Breadth-first search
   d) Iterative deepening depth-first search

3. What is the main advantage of breadth-first search (BFS)?
   a) It always finds the optimal solution
   b) It requires less memory compared to other algorithms

c) It explores the search space level by level
d) It has a lower time complexity than depth-first search

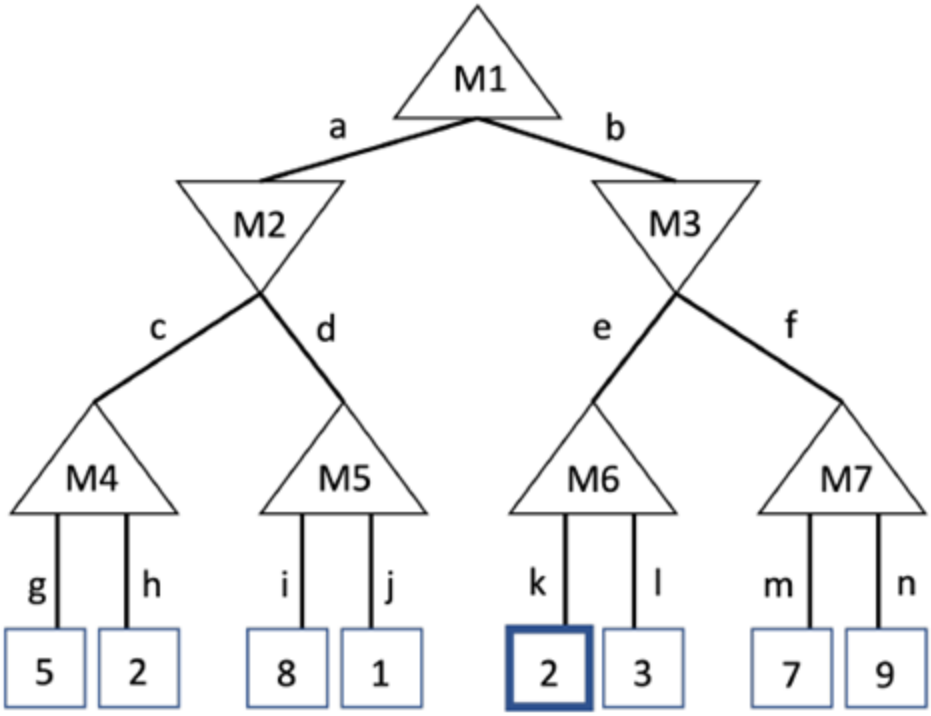
4. How does depth-first search (DFS) explore the search space?
   a) It explores the search space level by level
   b) It expands all nodes at a given depth before moving to the next level
   c) It recursively explores as far as possible along each branch before backtracking
   d) It uses dynamic programming to optimize the search process

5. What is one limitation of uninformed search algorithms?
   a) They always find the optimal solution
   b) They are memory efficient for large search spaces
   c) They may not be suitable for large or complex search spaces
   d) They guarantee finding the shallowest solution

6. When might uninformed search algorithms not be suitable for solving a problem effectively?
   a) When heuristic information is available
   b) When the search space is small
   c) When the problem is well-structured
   d) When computational resources are limited

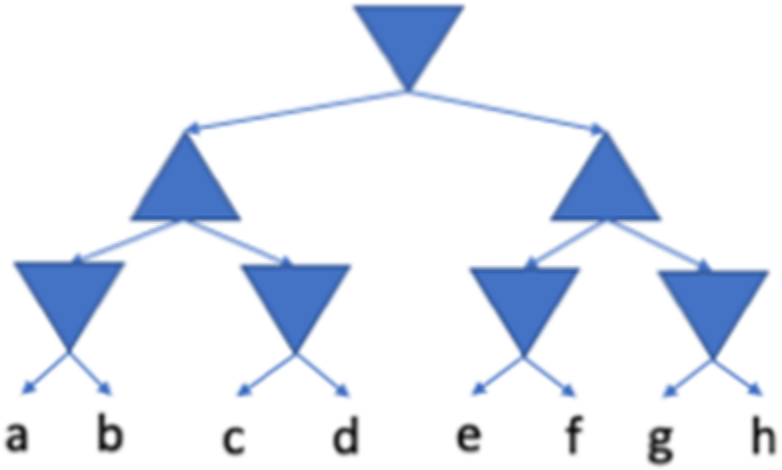
Adversarial Search - Alpha Beta Pruning

(1) Observe the Mini map below:



a. What is the minimax value of the root (M1)?
b. What is the smallest integer value? Could you change the highlighted 2 to change the value of M1?
c. With the original 2 in place again, what edges would be pruned in alpha-beta pruning?

(2) Consider the minimax game tree shown below. Decisions by MAX are represented as upward-pointing triangles; decisions by MIN are represented as downward-pointing triangles; small letters denote outcomes of the game:



The values of each of the outcomes, to the MAX player, are as shown in the following table:

	Outcome							
	a	b	c	d	e	f	g	h
Value to the MAX player:	8	3	1	7	2	5	6	4

a. What are the values of the two MAX nodes?
b. Of the eight outcomes, which one(s) would be pruned by an alpha-beta search?

Adversarial Search - Minimax

1. Apply the Mini Max algorithm and compute the value of the root of the tree.
2. Find the most convenient path for the max node.