

Multiple Choice Questions for Lecture 3: Solving Problems by Searching Algorithm

Types of Search Algorithms

1. What are the two main types of search algorithms in AI?

- A) Fast search and slow search
- B) Uninformed search and informed search
- C) Easy search and hard search
- D) Online search and offline search

Answer: B) Uninformed search and informed search

2. What is another name for uninformed search?

- A) Smart search
- B) Blind search
- C) Quick search
- D) Easy search

Answer: B) Blind search

3. In uninformed search, what does the agent know?

- A) The number of steps needed to reach the goal
- B) The path cost to reach the goal
- C) Only when it reaches a goal
- D) How far away the goal is

Answer: C) Only when it reaches a goal

4. What is the main advantage of informed search over uninformed search?

- A) It's always faster
- B) It always finds a solution
- C) It uses background information about the problem
- D) It never gets stuck

Answer: C) It uses background information about the problem

Uninformed Search Strategies

5. What is Breadth-First Search (BFS)?

- A) A search method that explores the deepest nodes first
- B) A search method that explores all nodes at the current depth before moving to the next level
- C) A search method that only looks at the first few nodes
- D) A search method that starts at the goal

Answer: B) A search method that explores all nodes at the current depth before moving to the next level

6. What data structure is used in Breadth-First Search?

- A) FIFO queue
- B) LIFO stack
- C) Tree
- D) Array

Answer: A) FIFO queue

7. What happens in Uniform-Cost Search (UCS)?

- A) It always chooses random paths
- B) It prioritizes the lowest-cost path when multiple paths exist
- C) It always explores the deepest paths first
- D) It avoids paths with any cost

Answer: B) It prioritizes the lowest-cost path when multiple paths exist

8. When does Uniform-Cost Search (UCS) behave like Breadth-First Search (BFS)?

- A) When the goal is very far away
- B) When there are multiple goals
- C) When all transitions have equal costs
- D) When there are no solutions

Answer: C) When all transitions have equal costs

9. What is Depth-First Search (DFS)?

- A) A search method that explores all nodes at the current depth before moving deeper
- B) A search method that starts at the goal and works backward
- C) A search method that explores branch nodes deeply before backtracking
- D) A search method that only uses costs

Answer: C) A search method that explores branch nodes deeply before backtracking

10. What data structure is used in Depth-First Search?

- A) Queue
- B) FIFO
- C) LIFO stack
- D) Tree

Answer: C) LIFO stack

11. What is Bidirectional Search?

- A) A search method that only works in two dimensions
- B) A search that runs two searches simultaneously—one from start and one from goal
- C) A search that always goes left and right
- D) A search that uses two different algorithms

Answer: B) A search that runs two searches simultaneously—one from start and one from goal

Informed Search Strategies

12. What does Greedy Best-First Search use to decide which node to explore next?

- A) Random selection
- B) The lowest cost from the start
- C) A heuristic function that estimates distance to goal
- D) The shortest path

Answer: C) A heuristic function that estimates distance to goal

13. What is a limitation of Greedy Best-First Search?

- A) It is too slow
- B) It can get stuck in loops or dead ends
- C) It never works
- D) It uses too much memory

Answer: B) It can get stuck in loops or dead ends

14. In A* search, what does the evaluation function $f(n) = g(n) + h(n)$ represent?

- A) $f(n)$ is the total estimated cost, $g(n)$ is the path cost from start, $h(n)$ is the estimated cost to goal
- B) $f(n)$ is the total time, $g(n)$ is the speed, $h(n)$ is the distance
- C) $f(n)$ is the number of steps, $g(n)$ is steps taken, $h(n)$ is steps remaining
- D) $f(n)$ is the solution, $g(n)$ is the problem, $h(n)$ is the method

Answer: A) $f(n)$ is the total estimated cost, $g(n)$ is the path cost from start, $h(n)$ is the estimated cost to goal

15. How does A* search combine UCS and Greedy Best-First Search?

- A) It runs them one after another
- B) UCS keeps solution cost low, Best-first helps find solution quickly
- C) It chooses the better of the two
- D) It alternates between them

Answer: B) UCS keeps solution cost low, Best-first helps find solution quickly

Important Concepts

16. What is the difference between traversal and search?

- A) Traversal visits each node once, search finds a path between two nodes
- B) Traversal is faster, search is more accurate
- C) Traversal is for trees, search is for graphs
- D) Traversal goes forward, search goes backward

Answer: A) Traversal visits each node once, search finds a path between two nodes

17. What does it mean when an algorithm is "complete"?

- A) The algorithm is finished
- B) The algorithm is perfect
- C) The algorithm guarantees finding a solution if one exists
- D) The algorithm has no errors

Answer: C) The algorithm guarantees finding a solution if one exists

18. What is a heuristic function in search algorithms?

- A) A function that counts the number of steps
- B) A function that estimates the cost to reach the goal
- C) A function that measures algorithm speed
- D) A function that creates the search tree

Answer: B) A function that estimates the cost to reach the goal