

Enrollment No. :

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2025

(MOOCs) IDC

Paper : MOOCIDC2013

**(Artificial Intelligence: Search
Methods for Problem Solving)**

Full Marks : 50

Pass Marks : 20

Time : 2 hours

(Question carries 1 mark each)

Please tick (✓) the correct answer

*Use of correction fluid is prohibited ** Multiple ticks will be treated as incorrect.*

1. In AI, a search algorithm is used to

A. Store data

C. Compile programs

B. Explore possible states to reach a goal

D. Manage memory

2. A state space refers to

A. All possible solutions in memory

C. Internet storage

B. Set of all possible states reachable from the initial state

D. Data structure for sorting

3. Uninformed search methods are also called

A. Heuristic search

C. Local search

B. Blind search

D. Genetic search

4. Breadth-First Search (BFS) uses

A. Stack

C. Priority queue

B. Queue

D. Random selection

5. Depth-First Search (DFS) uses

A. Queue

C. Array

B. Stack

D. Heuristic table

6. Which search guarantees optimality if all step costs are equal?

A. DFS

C. Hill climbing

B. BFS

D. Simulated annealing

7. A heuristic function is used to

A. Randomly select nodes

C. Replace cost functions

B. Estimate cost to reach the goal

D. Assign memory

8. In A, the evaluation function is*

A. $f(n) = h(n)$

C. $f(n) = g(n) + h(n)$

B. $f(n) = g(n)$

D. $f(n) = g(n) - h(n)$

9. If a heuristic never overestimates the actual cost, it is called
- A. Dominant
 - B. Inadmissible
 - C. Admissible
 - D. Weak
10. Greedy Best-First Search uses
- A. $g(n)$
 - B. $h(n)$
 - C. $g(n)+h(n)$
 - D. Depth cost
11. Depth-limited search is
- A. BFS with depth limit
 - B. DFS with depth restriction
 - C. Hill climbing
 - D. Random search
12. Iterative Deepening Search combines
- A. DFS + hill climbing
 - B. BFS + A*
 - C. DFS + BFS advantages
 - D. A* + greedy search
13. Which search is complete but not always optimal?
- A. BFS
 - B. DFS
 - C. A*
 - D. Uniform-cost search
14. Uniform-cost search expands the node with
- A. Highest cost
 - B. Lowest path cost $g(n)$
 - C. Lowest heuristic cost
 - D. Lowest $f(n)=h(n)$
15. A problem formulation includes
- A. Initial state
 - B. Actions
 - C. Goal test
 - D. All of the above
16. In a search tree, branching factor means
- A. Cost of tree
 - B. Number of child nodes
 - C. Height of tree
 - D. Search speed
17. The traveling salesman problem is
- A. Polynomial
 - B. Linear
 - C. NP-hard
 - D. Simple search
18. Local search algorithms work on
- A. Complete paths
 - B. Evaluating only neighbors
 - C. Queue structures
 - D. No heuristics
19. Hill climbing suffers from
- A. Local maxima
 - B. Plateaus
 - C. Ridges
 - D. All of the above
20. Simulated annealing allows
- A. Only improving moves
 - B. Occasional non-improving moves
 - C. Random solutions always
 - D. BFS behavior
21. Genetic algorithms are inspired by
- A. Mathematics
 - B. Biology
 - C. Physics
 - D. Chemistry
22. A solution to the 8-puzzle can be found using
- A. BFS
 - B. A*
 - C. DFS
 - D. All of the above

- 23. Heuristic search methods are also known as**
- A. Blind methods
 - B. Informed search
 - C. Random search
 - D. Greedy-only algorithms
- 24. The Manhattan distance is used in**
- A. 8-puzzle heuristics
 - B. Depth-limited search
 - C. Genetic algorithms
 - D. Simulated annealing only
- 25. Which method uses heating and cooling analogy?**
- A. Hill climbing
 - B. A*
 - C. Simulated annealing
 - D. BFS
- 26. Constraint satisfaction problems (CSP) involve**
- A. Maximization only
 - B. Finding values that satisfy constraints
 - C. Memory dumping
 - D. Graph traversal only
- 27. A node's successor is**
- A. Parent
 - B. Any state
 - C. A state reachable from current node
 - D. A dead-end
- 28. Backtracking is used in**
- A. BFS
 - B. DFS
 - C. Greedy search
 - D. Uniform-cost search
- 29. The best search strategy for finding the shortest path is**
- A. DFS
 - B. BFS (equal cost)
 - C. Hill climbing
 - D. Genetic algorithm
- 30. A heuristic is considered consistent if**
- A. $h(n) > h(n')$
 - B. $h(n) \leq c(n, n') + h(n')$
 - C. $h(n) > g(n)$
 - D. $h(n) < 0$
- 31. A closed list in search stores**
- A. Nodes already expanded
 - B. Nodes not visited
 - C. All possible states
 - D. Solutions only
- 32. Open list stores**
- A. Expanded nodes
 - B. Nodes to be explored
 - C. Dead-end nodes
 - D. Constraints
- 33. Beam search keeps**
- A. All nodes
 - B. Best k nodes at each level
 - C. Only the goal node
 - D. All leaf nodes
- 34. Depth-first search is not**
- A. Memory efficient
 - B. Complete for finite trees
 - C. Guaranteed to find optimal solution
 - D. Recursive
- 35. Search trees differ from state space graphs because**
- A. States may repeat in search trees
 - B. They are identical
 - C. State space is larger
 - D. Graphs cannot have cycles
- 36. The main drawback of BFS is**
- A. Slow speed
 - B. High memory consumption
 - C. No solution
 - D. Incorrect results

37. Which is NOT a local search method?

- A. Hill climbing
- C. A* search

- B. Genetic algorithm
- D. Simulated annealing

38. A plateau in hill climbing means

- A. Steep slope
- C. Deep valley

- B. Flat area with no improvement
- D. Too many goals

39. Bidirectional search works by

- A. Searching forward only
- C. Searching from both initial and goal states

- B. Searching backward only
- D. Random search

40. A heuristic with higher accuracy leads to

- A. Worse performance
- C. Better search efficiency

- B. More exploration
- D. No effect

41. The state with lowest $f(n)$ in A is selected from*

- A. Stack
- C. List

- B. Priority queue
- D. Array

42. Beam search may lose optimality because

- A. It explores all nodes
- C. It uses large memory

- B. It restricts number of nodes
- D. It stores all solutions

43. In AI, a problem is defined by

- A. Initial state
- C. Goal test

- B. Set of actions
- D. All of the above

44. Constraint propagation is used in

- A. BFS
- C. A*

- B. CSPs
- D. DFS

45. Hill climbing chooses the move that

- A. Is random
- C. Minimizes memory

- B. Maximizes heuristic improvement
- D. Ignores data

46. Simulated annealing avoids local maxima by

- A. Restarting always
- C. Using BFS

- B. Accepting worse moves probabilistically
- D. Ignoring heuristics

47. Greedy search chooses

- A. Lowest $g(n)$
- C. Lowest $h(n)$

- B. Lowest $f(n)$
- D. Highest $h(n)$

48. In A, if $h(n)=0$ for all n , A acts like**

- A. BFS
- C. DFS

- B. Uniform-cost search
- D. Greedy search

49. Which search is optimal for varying step cost?

- A. Uniform-cost search
- C. DFS

- B. BFS
- D. Greedy search

50. Artificial intelligence search techniques aim to

- A. Avoid computation
- C. Always be random

- B. Systematically explore options
- D. Replace hardware