

GLOSSARY 3

1. **Abstraction:** The process of removing irrelevant detail from a representation is called Abstraction. The goal of a good abstraction involves removing as much detail as possible while retaining validity and ensuring that the abstract actions are easy to carry out. Suppose if we are traveling from Lincoln to Omaha, several external factors like whether we are using radio or not is irrelevant and thus it is abstracted in determining the solution. [1]
2. **Branching factor:** Branching factor is defined as the maximum number of successors of any node. Complexity of a search is indicated in terms of Branching Factor 'b'. [1]
3. **Complete-state Formulation:** It is defined as where each state has all the objects in a problem. It uses all the objects and then tries to approach a solution. [1]
4. **Completeness:** It is defined as 'Is an algorithm guaranteed to find a solution when there is one?' [1]
5. **Fringe:** It is defined as the set of all leaf nodes that are available for expansion at any given point is called the Fringe. [1]
6. **Frontier:** It is defined as the set of all leaf nodes that are available for expansion at any given point is called the Frontier. [1]
7. **Goal test:** It is defined as a test which answers 'whether we are at the final destination specified by the user?'. [1]
8. **Incremental Formulation:** It is defined as the technique which starts with an empty state and finally approaches the goal state by performing actions incrementally. [1]
9. **Initial state:** It is defined as the state from which an agent starts in the beginning. [1]
10. **Intractability:** It is defined as a problem which cannot be solved in polynomial time as the complexity of a problem exponentially grows with size. [1]
11. **Loopy path:** It is defined as a path whose complete search tree is infinite because there is no limit on how one can traverse a loop. Loopy paths generate repeated states. [1]
12. **Leaf node:** It is defined as node with no children in a tree. [1]
13. **Missionaries and Cannibals Problem:** It is defined as a problem where three missionaries and three cannibals are on one side of a river, along with a boat that can hold one or two people. Find a way to get everyone to the other side without ever leaving a group of missionaries in one place outnumbered by the cannibals in that place. [1]
14. **N-queen problem:** The goal of the N-queen problem is to place N queens on a chessboard such that no queen attacks any other. (A queen attacks any piece in the same row, column or diagonal.) [1]
15. **Node Expansion:** It is defined as expanding a node by applying the possible set of actions. A search strategy is defined by picking the order of node expansion. [1]
16. **Open-Loop:** An agent which performs its actions ignoring the percepts is called an open-loop system because it breaks the loop between agent and environment. [1]
17. **Operator:** It is defined as those things which augment the state description. The problem-solving procedure or an algorithm applies an operator to a "state" to get the next state. [1]

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18. **Optimal Solution:** It is defined as the solution which has the lowest cost among all the solutions. [1]
19. **Path:** It is defined as a sequence of states in the state space connected by a sequence of actions. [1]
20. **Path Cost:** It is defined as a function which assigns a numeric cost to each path. The problem-solving agent chooses a cost function that reflects its own performance measure. [1]
21. **Problem Formulation:** It is defined as the process of deciding what actions and states to consider, given a goal. [1]
22. **Planning:** It is defined as devising a Course of action to achieve one's goals. [1]
23. **Route Finding problem:** It is defined as a problem where a route must be found in terms of specified locations and transitions along links between them. [1]
24. **Search:** It is defined as the process of looking for a sequence of actions that reaches the goal. [1]
25. **Search Cost:** It is defined as the cost required in searching a goal state and typically depends on the time complexity but can also include a term for memory usage whereas total cost combines both search cost and the path cost of the solution found. [1]
26. **Search Node:** It is defined as the node that correspond to state in the search tree of a problem. It is a node in the search tree. [1]
27. **Search strategy:** It is defined as the strategy followed by an algorithm, about how they choose which state to expand next. [1]
28. **Search tree:** It is defined as a tree which is formed with initial state as root and the possible set of action sequences starting from initial state as branches to corresponding nodes. [1]
29. **Solution Quality:** It is defined as the quality of a solution which is measured by the path cost function. An optimal solution has the lowest path cost among all solutions. [1]
30. **State space:** It is defined as a directed graph which consists of all possible states as nodes and the actions among states as directed edges among them. [1]
31. **Step cost:** It is defined as the cost of taking an action 'a' in state 's' to reach as state 's'. [1]
32. **Successor Function:** It is defined as a function which returns the set of all successors. A successor refers to any state reachable from a given state by a single action. [1]
33. **Touring problem:** It is defined as a problem where each state must include not just the current location but also the set of states the agent has visited. In this problem, every node must be visited at least once. [1]
34. **Toy problem:** It is defined as a problem which is intended to illustrate or exercise various problem-solving methods. It can be given a concise, exact description and hence is usable by different researchers to compare the performance of algorithms. [1]
35. **Traveling Salesperson problem:** It is defined as a touring problem in which each city must be visited exactly once and be returned to the starting city. The aim is to find the shortest tour. The Travelling Salesman Problem describes a salesman who must travel between N cities with the aim of cost function minimized. [1]

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References:

- [1] Artificial Intelligence, A Modern Approach (AIMA), Third Edition, 2010 by Russell & Norvig.