AI and Expert System

Sheet (2) on ch3 and ch4

# What is the main task of a problem-solving agent?

* 1. Solve the given problem and reach to goal
  2. To find out which sequence of action will get it to the goal state
  3. All of the mentioned
  4. None of the mentioned

# What is state space?

* 1. The whole problem
  2. Your Definition to a problem
  3. Problem you design
  4. Representing your problem with variable and parameter

# The problem-solving agent with several immediate options of unknown value can decide what to do by just examining different possible sequences of actions that lead to states of known value, and then choosing the best sequence. This process of looking for such a sequence is called Search.

* 1. True
  2. False

# A search algorithm takes as an input and returns as an output.

* 1. Input, output
  2. Problem, solution
  3. Solution, problem
  4. Parameters, sequence of actions

# A problem in a search space is defined by one of these state.

* 1. Initial state
  2. Last state
  3. Intermediate state
  4. All of the mentioned

# The Set of actions for a problem in a state space is formulated by a

* 1. Intermediate states
  2. Initial state
  3. Successor function, which takes current action and returns next immediate state
  4. None of the mentioned

# A solution to a problem is a path from the initial state to a goal state. Solution quality is measured by the path cost function, and an optimal solution has the highest path cost among all solutions.

1. True
2. False

# The process of removing detail from a given state representation is called

1. Extraction
2. Abstraction
3. Information Retrieval
4. Mining of data

# The is a touring problem in which each city must be visited exactly once. The aim is to find the shortest tour.

1. Finding shortest path between a source and a destination
2. Travelling Salesman problem(TSP)
3. Map coloring problem
4. Depth first search traversal on a given map represented as a graph

# Web Crawler is a/an

1. Intelligent goal-based agent
2. Problem-solving agent
3. Simple reflex agent
4. Model based agent

# What is the major component/components for measuring the performance of problem solving?

1. Completeness
2. Optimality
3. Time and Space complexity
4. All of the mentioned

# Which search method takes less memory?

1. Depth-First Search
2. Breadth-First search
3. Linear Search
4. Optimal search

# Which is the best way to go for Game playing problem?

1. Linear approach
2. Heuristic approach (Some knowledge is stored)
3. Random approach
4. An Optimal approach

# Which search strategy is also called as blind search?

1. Uninformed search
2. Informed search
3. Simple reflex search
4. All of the mentioned

# How many types are available in uninformed search method?

1. 3
2. 4
3. 5
4. 6

# Which search is implemented with an empty first-in-first-out queue?

1. Depth-first search
2. Breadth-first search
3. Bidirectional search
4. None of the mentioned

# When is breadth-first search is optimal?

1. When there is less number of nodes
2. When all step costs are equal
3. When all step costs are unequal
4. None of the mentioned

# What is the space complexity of Depth-first search?

1. O(b)
2. O(bl)
3. O(m)
4. O(bm)

# How many parts does a problem consists of?

1. 1
2. 2
3. 3
4. 4

# Which algorithm is used to solve any kind of problem?

1. Breadth-first algorithm
2. Tree algorithm
3. Bidirectional search algorithm
4. None of the mentioned

# Which search algorithm imposes a fixed depth limit on nodes?

1. Depth-limited search
2. Depth-first search
3. Iterative deepening search
4. Bidirectional search

# Which search implements stack operation for searching the states?

1. Depth-limited search
2. Depth-first search
3. Breadth-first search
4. None of the mentioned

# What is the general term of Blind searching?

1. Informed Search
2. Uninformed Search
3. Informed & Unformed Search
4. Heuristic Search

# Strategies that know whether one non-goal state is “more promising” than another are called

1. Informed & Unformed Search
2. Unformed Search
3. Heuristic & Unformed Search
4. Informed & Heuristic Search

# Which of the following is/are Uninformed Search technique/techniques?

1. Breadth First Search (BFS)
2. Depth First Search (DFS)
3. Bidirectional Search
4. All of the mentioned

# Which data structure conveniently used to implement BFS?

1. Stacks
2. Queues
3. Priority Queues
4. All of the mentioned

# Which data structure conveniently used to implement DFS?

1. Stacks
2. Queues
3. Priority Queues
4. All of the mentioned

# The time and space complexity of BFS is (For time and space complexity problems consider b as branching factor and d as depth of the search tree.)

1. O(b^d+1) and O(b^d+1)
2. O(b2) and O(d2)
3. O(d2) and O(b2)
4. O(d2) and O(d2)

# Breadth-first search is not optimal when all step costs are equal, because it always expands the shallowest unexpanded node.

1. True
2. False

# uniform-cost search expands the node n with the

1. Lowest path cost
2. Heuristic cost
3. Highest path cost
4. Average path cost

# Depth-first search always expands the node in the current fringe of the search tree.

1. Shallowest
2. Child node
3. Deepest
4. Minimum cost

# Breadth-first search always expands the node in the current fringe of the search tree.

1. Shallowest
2. Child node
3. Deepest
4. Minimum cost

# Optimality of BFS is

1. When there is less number of nodes
2. When all step costs are equal
3. When all step costs are unequal
4. None of the mentioned

# LIFO is where as FIFO is

1. Stack, Queue
2. Queue, Stack
3. Priority Queue, Stack
4. Stack. Priority Queue

# When the environment of an agent is partially observable in search space following problem/problems could occur.

1. Sensorless problems: If the agent has no sensors at all, then (as far as it knows) it could be in one of several possible initial states, and each action might therefore lead to one of several possible successor states
2. Contingency problems: If the environment is partially observable or if actions are uncertain, then the agent’s percepts provide new information after each action. Each possible percept defines a contingency that must be planned for. A problem is called adversarial if the uncertainty is caused by the actions of another agent
3. Exploration problems: When the states and actions of the environment are unknown, the agent must act to discover them. Exploration problems can be viewed as an extreme case of contingency problems
4. All of the mentioned

# For general graph, how one can get rid of repeated states?

1. By maintaining a list of visited vertices
2. By maintaining a list of traversed edges
3. By maintaining a list of non-visited vertices
4. By maintaining a list of non-traversed edges

# DFS is efficient and BFS is efficient.

1. Space, Time
2. Time, Space
3. Time, Time
4. Space, Space

# The main idea of Bidirectional search is to reduce the time complexity by searching two way simultaneously from start node and another from goal node.

1. True
2. False

# What is the other name of informed search strategy?

1. Simple search
2. Heuristic search
3. Online search
4. None of the mentioned

# How many types of informed search method are in artificial intelligence?

1. 1
2. 2
3. 3
4. 4

# Which search uses the problem specific knowledge beyond the definition of the problem?

1. Informed search
2. Depth-first search
3. Breadth-first search
4. Uninformed search

# Which function will select the lowest expansion node at first for evaluation?

1. Greedy best-first search
2. Best-first search
3. Depth-first search
4. None of the mentioned

# What is the heuristic function of greedy best-first search?

1. f(n) != h(n)
2. f(n) < h(n)
3. f(n) = h(n)
4. f(n) > h(n)

# Which search uses only the linear space for searching?

1. Best-first search
2. Recursive best-first search
3. Depth-first search
4. None of the mentioned

# Which method is used to search better by learning?

1. Best-first search
2. Depth-first search
3. Metalevel state space
4. None of the mentioned

# Which search is complete and optimal when h(n) is consistent?

1. Best-first search
2. Depth-first search
3. Both Best-first & Depth-first search
4. A\* search

# Which is used to improve the performance of heuristic search?

1. Quality of nodes
2. Quality of heuristic function
3. Simple form of nodes
4. None of the mentioned

# Which search method will expand the node that is closest to the goal?

1. Best-first search
2. Greedy best-first search
3. A\* search
4. None of the mentioned

# A heuristic is a way of trying

1. To discover something or an idea embedded in a program
2. To search and measure how far a node in a search tree seems to be from a goal
3. To compare two nodes in a search tree to see if one is better than another
4. All of the mentioned

# A\* algorithm is based on

1. Breadth-First-Search
2. Depth-First –Search
3. Best-First-Search
4. Hill climbing

# The search strategy the uses a problem specific knowledge is known as

1. Informed Search
2. Best First Search
3. Heuristic Search
4. All of the mentioned

# Uninformed search strategies are better than informed search strategies.

1. True
2. False

# Best-First search is a type of informed search, which uses to choose the best next node for expansion.

1. Evaluation function returning lowest evaluation
2. Evaluation function returning highest evaluation
3. Evaluation function returning lowest & highest evaluation
4. None of them is applicable

# Best-First search can be implemented using the following data structure.

1. Queue
2. Stack
3. Priority Queue
4. Circular Queue

# The name “best-first search” is a venerable but inaccurate one. After all, if we could really expand the best node first, it would not be a search at all; it would be a straight march to the goal. All we can do is choose the node that appears to be best according to the evaluation function.

1. True
2. False

# Heuristic function h(n) is

1. Lowest path cost
2. Cheapest path from root to goal node
3. Estimated cost of cheapest path from root to goal node
4. Average path cost

# Greedy search strategy chooses the node for expansion in

1. Shallowest
2. Deepest
3. The one closest to the goal node
4. Minimum heuristic cost

# What is the evaluation function in greedy approach?

1. Heuristic function
2. Path cost from start node to current node
3. Path cost from start node to current node + Heuristic cost
4. Average of Path cost from start node to current node and Heuristic cost

# What is the space complexity of Greedy search?

1. O(b)
2. O(bl)
3. O(m)
4. O(bm)

# What is the evaluation function in A\* approach?

1. Heuristic function
2. Path cost from start node to current node
3. Path cost from start node to current node + Heuristic cost
4. Average of Path cost from start node to current node and Heuristic cost

# A\* is optimal if h(n) is an admissible heuristic-that is, provided that h(n) never underestimates the cost to reach the goal.

1. True
2. False

# General games involves

1. Single-agent
2. Multi-agent
3. Neither Single-agent nor Multi-agent
4. Only Single-agent and Multi-agent

# Adversarial search problems uses

1. Competitive Environment
2. Cooperative Environment
3. Neither Competitive nor Cooperative Environment
4. Only Competitive and Cooperative Environment

# Mathematical game theory, a branch of economics, views any multi-agent environment as a game provided that the impact of each agent on the others is “significant,” regardless of whether the agents are cooperative or competitive.

1. True
2. False

# Zero sum games are the one in which there are two agents whose actions must alternate and in which the utility values at the end of the game are always the same.

1. True
2. False

# Zero sum game has to be a game.

1. Single player
2. Two player
3. Multiplayer
4. Three player

# A game can be formally defined as a kind of search problem with the following components.

1. Initial State
2. Successor Function
3. Terminal Test
4. All of the mentioned

# The initial state and the legal moves for each side define the for the game.

1. Search Tree
2. Game Tree
3. State Space Search
4. Forest

# General algorithm applied on game tree for making decision of win/lose is

1. DFS/BFS Search Algorithms
2. Heuristic Search Algorithms
3. Greedy Search Algorithms
4. MIN/MAX Algorithms

# The minimax algorithm computes the minimax decision from the current state. It uses a simple recursive computation of the minimax values of each successor state, directly implementing the defining equations. The recursion proceeds all the way down to the leaves of the tree, and then the minimax values are backed up through the tree as the recursion unwinds.

1. True
2. False

# What is the complexity of minimax algorithm?

1. Same as of DFS
2. Space – bm and time – bm
3. Time – bm and space – bm
4. Same as BFS

# Which search is equal to minimax search but eliminates the branches that can’t influence the final decision?

1. Depth-first search
2. Breadth-first search
3. Alpha-beta pruning
4. None of the mentioned

# Which values are independent in minimax search algorithm?

1. Pruned leaves x and y
2. Every states are dependent
3. Root is independent
4. None of the mentioned

# To which depth does the alpha-beta pruning can be applied?

1. 10 states
2. 8 States
3. 6 States
4. Any depth

# Which search is similar to minimax search?

1. Hill-climbing search
2. Depth-first search
3. Breadth-first search
4. All of the mentioned

# Which value is assigned to alpha and beta in the alpha-beta pruning?

1. Alpha = max
2. Beta = min
3. Beta = max
4. Both Alpha = max & Beta = min

# Where does the values of alpha-beta search get updated?

1. Along the path of search
2. Initial state itself
3. At the end
4. None of the mentioned

# How the effectiveness of the alpha-beta pruning gets increased?

1. Depends on the nodes
2. Depends on the order in which they are executed
3. All of the mentioned
4. None of the mentioned

# What is called as transposition table?

1. Hash table of next seen positions
2. Hash table of previously seen positions
3. Next value in the search
4. None of the mentioned

# Which is identical to the closed list in Graph search?

1. Hill climbing search algorithm
2. Depth-first search
3. Transposition table
4. None of the mentioned

# Which function is used to calculate the feasibility of whole game tree?

1. Evaluation function
2. Transposition
3. Alpha-beta pruning
4. All of the mentioned