The National Higher School of Artificial Intelligence
Introduction to AI
QUIZ #1 05/03/2024
Duration: 30 minutes

READ CAREFULLY:

1. **Each of the 20 questions is marked out of 1 mark.**
2. **Each incorrect answer is penalised 0.5 marks. You may leave questions unanswered.**
3. **For any question, there is ONLY ONE CORRECT ANSWER. If in doubt and you want to answer any question, select the most correct one.**
4. **N.B.: The questions may appear to you in a different order than your classmates.**

QUESTIONS:

1. Which of the following is a type of artificial intelligence agent?
   a. Learning AI Agent
   b. Simple Reflex AI Agent
   c. Goal-Based AI Agent
   d. All of the above
   e. None of the above

2. Best-First search is a type of informed search, which uses _____ to choose the best next node for expansion.
   a. An evaluation function that returns the lowest cost
   b. An evaluation function that returns the highest cost
   c. An evaluation function that returns both the lowest & highest costs
   d. All of the above
   e. None of the above

3. A search strategy that uses problem-specific knowledge is known as
   a. Informed Search
   b. Best First Search
   c. Heuristic Search
   d. All of the above
   e. Only two of the answers a, b, c.

4. Which of the following is a component of a learning agent?
   a. Goal
   b. Model
   c. Utility function
   d. All of the above
   e. None of the above

5. In search, backtracking can be achieved using
   a. A LIFO data structure
   b. A FIFO data structure
   c. Recursion
   d. Either using a LIFO data structure or Recursion
   e. Either using a FIFO data structure or Recursion

6. Which of the following statements is true regarding BFS (Breadth First Search)?
    a. BFS will get trapped exploring a single path.
    b. In BFS the entire tree generated at any point of the search must be stored.
    c. BFS is not guaranteed to find a solution, if one exists.
    d. BFS is nothing but Best First Search without a heuristic.
    e. None of the above.

7. Strong Artificial Intelligence is …
    a. the embodiment of human intellectual capabilities within a computer.
    b. a set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans.
    c. the study of mental faculties through the use of mental models implemented on a computer.
    d. all of the above.
    e. none of the above.

8. *Logical positivism* is a school in the philosophy of science which ...
    a. holds that all knowledge can be characterized by logical theories connected, ultimately, to observation sentences that correspond to sensory inputs.
    b. was developed by Carnap and which studies explicit computational procedures for extracting knowledge from elementary experiences.
    c. holds that the brain's operation according to the laws of physics *constitutes* the mind.
    d. advocates that "nothing is in the understanding, which was not first in the senses".
    e. None of the above.

9. Aristotle's syllogisms…
    a. provided patterns to know how two logical statements are similar.
    b. provided patterns to know how two logical statements represent parallel arguments that do not contradict one another.
    c. provided patterns to know how two logical statements represent parallel arguments that contradict one another.
    d. provided patterns for argument structures that always yielded correct conclusions for correct premises.
    e. None of the above.

10. A rational agent is an agent that…
    a. is able to reason using the percepts it has got from its environment.
    b. is able to perceive the environment and act upon its percepts.
    c. can take a goal and works towards its achievement.
    d. can select an action that is expected to maximize its performance measure.
    e. is about none of the above.

11. Suppose you have an agent that does not have any actuators. Such an agent…
    a. there is no way it can behave as a simple reflex agent.
    b. there is no way it can achieve goals.
    c. can definitely not try to maximise a utility function.
    d. cannot learn.
    e. All of the above.
    f. None of the above.

12. Which of the following is not a characteristic of a rational agent?
    a. Reactivity
    b. Proactiveness
    c. Creativity
    d. Adaptivity
    e. All of the above are characteristics of a rational agent.

13. In an informed search algorithm, how are heuristic functions used?
    a. To select the next node to expand based on past experience
    b. To evaluate the cost of reaching the goal from a given state
    c. To determine the depth of the search tree
    d. To randomly select nodes for expansion
    e. None of the above

14. Which of the following is a limitation of depth-first search?
    a. It guarantees finding the optimal solution.
    b. It requires less memory compared to breadth-first search.
    c. It may get stuck in an infinite loop if the search space contains cycles.
    d. It is not suitable for tree structures.
    e. None of the above.

15. Which search algorithm expands the shallowest unexpanded node first?
    a. Breadth-first search
    b. Uniform-cost search
    c. Depth-first search
    d. Iterative deepening search
    e. Best-First Search

16. In the context of search algorithms, what does the term 'blind' mean?
    a. The algorithm has no predetermined stopping criteria.
    b. The algorithm blindly selects actions without considering their consequences.
    c. The algorithm does not use any information about the goal.
    d. The algorithm is unable to differentiate between different states.

17. Which of the following search algorithms is guaranteed to find a solution if one exists, provided the search space is finite?
    a. Depth-first search
    b. Depth-limited search
    c. Iterative deepening search
    d. Greedy best-first search

18. In what scenarios would depth-first search be preferable over breadth-first search?
    a. When the search space is infinite
    b. When the optimal solution is required
    c. When memory usage is a concern
    d. When the search space is small and compact
    e. None of the above

19. What is the Turing Test used for in the context of AI?
    a. To evaluate the computational power of a computer
    b. To measure the intelligence of a machine
    c. To optimize search algorithms
    d. To determine the efficiency of heuristic functions
    e. To test the space complexity of a an intelligent machine

20. Given that *b*, *d*, *l* and *m* have the meanings seen in class, what is the worst-case space complexity of Depth-first search?
    a. O(b^d)
    b. O(b*d)
    c. O(b*l)
    d. O(b^m)
    e. O(b*m)