



CS607 Current Midterm Solved Subjective By Junaid

Artificial Intelligence (Virtual University of Pakistan)



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CS607- ARTIFICIAL
INTELLIGENT
(SOLVED Current Subject)
FROM MIDTERM PAPERS
LECTURE (1-22)



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1. "A bike is heavy" is uncertain or not? Explain

Answer:

It is uncertain whether the statement "A bike is heavy" is true or not, as the weight of a bike can vary depending on the specific model, material, and other factors. Some bikes may be heavy, while others may be lightweight. In order to determine whether a particular bike is heavy or not, more information about the bike in question would be needed.

OR

In artificial intelligence, the statement "A bike is heavy" would be considered certain because it is a statement of fact that can be objectively verified.

2. Differentiate between crossover and mutation.

Answer:

Crossover is a genetic operator used in genetic algorithms to combine the genetic material of two parents to create offspring with traits from both. Mutation is a random change in the genetic material of an organism, which can potentially introduce new traits or alter existing ones. Crossover typically occurs between two individuals, while mutation can occur within a single individual. Crossover and mutation are both used to introduce diversity into a population and allow for the evolution of new solutions to a problem.

OR

Crossover is a genetic operator used in genetic algorithms to combine the genetic material of two parents to create offspring, while mutation is a genetic operator that randomly changes the genetic material of an individual in a population.

3. Write the output without explaining

```
A
 / \
B   C
 /   \
D   E F
```

Answer:

A
B
D
C
E
F

4. Which search strategy you will use if there are large number of states in your solution space and you can't visit each state and why?

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Hint: you have to choose among the four strategies.

Answer:

In this scenario, it would be most efficient to use the best-first search strategy. This is because best-first search always selects the path that appears most promising, based on a heuristic evaluation function. This means that it will prioritize exploring states that are likely to lead to the solution, rather than just blindly searching every state. This can help to reduce the overall number of states that need to be considered and make the search more efficient in cases where there are a large number of states.

5. drawbacks of optimal search strategy and its example?

Answer:

One of the main drawbacks of optimal search strategies is that they can be very time- and resource-intensive, especially in large or complex search spaces. This is because they guarantee that the solution found is the optimal one, but in order to do so, they must explore the entire search space and compare all possible solutions.

An example of an optimal search strategy is branch and bound, which is a search algorithm that explores all possible solutions and selects the optimal one.

6. Who are the people work on the development of expert systems.

Answer:

Expert systems are developed by a team of people with diverse skill sets, including computer scientists, artificial intelligence researchers, software engineers, and domain experts. The specific roles and responsibilities of the team members can vary depending on the nature and scope of the expert system being developed. Some common roles on an expert system development team include:

- **Project manager:** responsible for overseeing the overall development process and ensuring that the project stays on track and meets its goals.
- **Software engineer:** responsible for designing and implementing the software that powers the expert system.
- **Artificial intelligence researcher:** responsible for designing and implementing the artificial intelligence algorithms and techniques that enable the expert system to reason and make decisions.
- **Domain expert:** responsible for providing the knowledge and expertise needed to build the expert system in a specific domain, such as medicine, finance, or engineering.

Other team members may include quality assurance engineers, user experience designers, and technical writers.

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7. What will be the issue if use crossover without mutation in genetic algorithm.

Answer:

If crossover is used without mutation in a genetic algorithm, the algorithm may become stuck in local optima and be unable to explore the full solution space. This can make it harder to find the global optimum solution. Additionally, a lack of mutation can lead to a loss of diversity in the population of solutions, which can make the algorithm less effective at finding good solutions.

8. Discuss A* procedure

Answer:

A* is an algorithm used to find the shortest path between two nodes in a graph. It maintains an open list of nodes to be explored and a closed list of nodes already visited. At each step, it expands the search to the lowest-cost neighbor and updates the cost of neighbors already on the open list if a shorter path is found. A* uses a heuristic function to guide the search and is more efficient than Dijkstra's algorithm.

9. which method you and how you can design an artificial machine that acts like human?

Answer:

To design an artificial machine that acts like a human, one can use AI techniques such as machine learning and natural language processing. Another approach is to use robotics and engineering techniques to design the machine to move and interact with its environment in a human-like manner. Designing such a machine requires a multidisciplinary approach and expertise in fields such as computer science, artificial intelligence, robotics, engineering, and psychology.

10. Write GA step

Answer:

- ❖ Initial Population
- ❖ Calculate Fitness
- ❖ Selection
- ❖ Crossover
- ❖ Mutation

OR

- Initialize a population of solutions.
- Evaluate the fitness of each solution.
- Select the fittest solutions to reproduce and create offspring.
- Apply genetic operators (such as crossover and mutation) to the offspring.
- Repeat steps 2-4 for a specified number of generations or until a satisfactory solution is found.

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11. "it is probably rainy today" is fuzzy or not?

Answer:

"It is probably rainy today" is a fuzzy statement because it involves uncertainty and imprecision. Fuzzy logic is a branch of mathematics that deals with reasoning under uncertainty and allows for the representation and manipulation of vague or imprecise information.

12. DFS or BFS search. Which one is best

Answer:

DFS (Depth-First Search) and BFS (Breadth-First Search) are two algorithms for traversing and searching a graph or tree data structure.

DFS begins at the root node and explores as far as possible along each branch before backtracking and exploring the next branch. BFS, on the other hand, starts at the root node and explores all the neighboring nodes at the current depth level before moving on to the next depth level. BFS is generally used to find the shortest path between two nodes, while DFS is used for tasks such as topological sorting and checking the connectivity of a graph.

OR

It depends on the situation, if the Node is close near the Goal BFS is BEST while if Node is Far down to the Goal then DFS Best

13. "Riding a horse is same as riding a donkey" explain which reasoning is best suited?

Answer:

The statement "riding a horse is the same as riding a donkey" is an analogy that compares the two activities based on their shared characteristic of being types of riding. Analogy is a form of reasoning that involves making comparisons in order to understand or explain something. The best suited reasoning for this statement would be inductive reasoning, which involves making a generalization based on specific examples or observations. In this case, the generalization being made is that riding a horse and riding a donkey are similar experiences.

14. how developing the artificial intelligence can play a significant rule in industries/companies?

Answer:

Artificial intelligence (AI) can play a significant role in industries and companies by automating tasks and processes, improving decision making, and enhancing the efficiency and productivity of business operations. AI technologies, such as

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machine learning and natural language processing, can be used to analyze large amounts of data, identify trends and patterns, and make predictions and recommendations that can help companies make better informed decisions. AI can also be used to automate routine tasks and processes, freeing up human workers to focus on more complex and value-added activities. By harnessing the power of AI, industries and companies can gain a competitive advantage and drive innovation and growth.

15. Applications of GA

Answer:

Genetic algorithms (GAs) are optimization algorithms that are inspired by the process of natural evolution. They are used to find solutions to problems that involve searching for the best combination of a set of parameters or variables.

Some common applications of GAs include:

- **Machine learning:** GAs can be used to optimize the parameters of machine learning models, such as neural networks, to improve their performance.
- **Scheduling and routing:** GAs can be used to optimize schedules and routes for logistics and transportation problems.
- **Optimization of complex systems:** GAs can be used to find the optimal configuration of a complex system, such as an electrical grid or a supply chain.
- **Search and rescue:** GAs can be used to search for missing persons or objects in a large, complex environment.
- **Data analysis and modeling:** GAs can be used to analyze and model large data sets to extract insights and make predictions.

16. Applications of AI

Answer:

Artificial intelligence (AI) has a wide range of applications across many industries and domains.

Some common applications of AI include:

- **Automation:** AI technologies, such as machine learning and natural language processing, can be used to automate tasks and processes, improving efficiency and freeing up human workers to focus on more complex and value-added activities.
- **Decision making:** AI can be used to analyze large amounts of data and make predictions or recommendations to support better decision making.
- **Customer service:** AI can be used to provide customer service through chatbots and virtual assistants, which can handle a high volume of customer inquiries and interactions.

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- **Healthcare:** AI can be used to analyze medical data and images to support diagnosis and treatment planning, as well as to monitor patients and identify potential health issues.
- **Finance:** AI can be used to analyze financial data and identify trends and patterns, as well as to detect fraudulent activity and support risk management.

17. Inductive deductive

Answer:

Inductive reasoning is a type of reasoning that involves moving from specific observations or examples to a general conclusion. It is based on the idea that if a certain pattern or relationship holds true for a number of specific cases, it is likely to hold true in other cases as well.

Deductive reasoning, on the other hand, involves moving from a general principle or premise to a specific conclusion. It is based on the idea that if a certain statement is true, and certain other statements follow logically from it, then those other statements must also be true. Deductive reasoning is often used to test the validity of a hypothesis or to prove or disprove a theory.

18. In eight queen method following sequence 4 5 8 etc... First three queens already placed in appropriate position you're required to put remaining six queens' position.

Answer:

To place the remaining six queens in the eight-queen problem using the sequence 4, 5, 8, etc., you would first place a queen on column 4 of the board. Then, you would place a queen on column 5. Next, you would place a queen on column 8, and so on, following the given sequence until all six queens have been placed. It is important to ensure that no queens are placed in positions that attack each other, as the goal of the problem is to place all eight queens on the board in a way that no queen is able to attack any of the others.

19. Illustrate Minimax in AI system

Answer:

Minimax is a decision-making algorithm used in artificial intelligence systems, particularly in the domain of game playing. It involves choosing the next best move by considering all possible moves and their potential outcomes, and selecting the move that will minimize the maximum potential loss (i.e., the worst-case scenario). This involves assigning a value to each possible move, such as a win or lose, and using these values to determine the best move to make. Minimax can be used to make decisions in a wide variety of situations, including in games, financial decision making, and other applications where the goal is to minimize risk or loss.

20. Write down the one benefit of DFS and BFS

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Answer:

- One benefit of BFS is that it is guaranteed to find the shortest path between two nodes in a graph, provided that the edges of the graph have uniform costs.
- One benefit of DFS is that it can be used to traverse and search a graph or tree data structure efficiently, as it only needs to store the current path being explored and does not need to store the entire breadth of the search tree.

21. Adverbial and Genetic algorithm

Answer:

- ❖ **Adversarial algorithms** are a type of algorithm used to model decision-making scenarios in which two or more agents or players act in opposition to each other.

Examples of adversarial algorithms include minimax, alpha-beta pruning, and Monte Carlo tree search.

- ❖ **Genetic algorithms** are optimization algorithms that use the principles of natural evolution to find solutions to problems involving the combination of variables or parameters.

22. Short from A*

Answer:

A* (A-star) is a popular algorithm used for pathfinding and graph traversal. It is an extension of Dijkstra's algorithm and is used to find the shortest path between two nodes in a graph.

23. Beam search.

Answer:

It is similar to breadth-first search, but instead of expanding the entire frontier of nodes at each step, it only expands a predetermined number of the most promising nodes, called the "beam."

Beam search is a search algorithm that expands the most promising paths and prunes less promising ones in order to find the most likely solution to a problem. It is used to reduce the search space and make the algorithm more efficient by avoiding the exploration of unlikely paths.

24. Strong AI

Answer:

Strong AI, also known as artificial general intelligence, is a type of artificial intelligence that is capable of performing any intellectual task that a human being can. It is a hypothetical form of AI that is able to understand or learn any intellectual task that a human being can, rather than being designed to perform a specific task or range of tasks. Strong AI is still largely in the realm of science fiction and is not yet a reality, but researchers and scientists are working towards its development.

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OR

Strong AI is a hypothetical form of artificial intelligence that is capable of performing any intellectual task that a human being can.

Note: Both are best details any one you can prepare

25. Week AI

Answer:

Weak AI is a type of artificial intelligence that is designed to perform a specific task or range of tasks.

OR

Weak AI, also known as artificial narrow intelligence, is a type of artificial intelligence that is designed to perform a specific task or range of tasks, rather than being capable of learning or understanding any intellectual task that a human being can. It is the most common form of AI that is used today, and it is found in a wide range of applications, including personal assistants, language translation, and image recognition. Weak AI is limited by its narrow scope and is not able to learn or adapt to new tasks or situations outside of its programmed capabilities.

Note: Both are best details any one you can prepare

26. Riding a horse is like riding a donkey

Answer:

Riding a horse is like riding a donkey in the sense that they are both forms of riding and involve controlling a large animal. However, there are also many differences between the two activities, such as the size and shape of the animal, the speed at which they can travel, and the terrain on which they are typically ridden. Horse riding is often seen as a more complex and challenging activity, while donkey riding may be more suitable for younger or less experienced riders.

27. What type of reasoning is it?

Answer:

The statement "**riding a horse is like riding a donkey**" is an example of analogy, which is a type of reasoning that involves making comparisons between two or more things in order to understand or explain something. In this case, the two things being compared are riding a horse and riding a donkey, and the shared characteristic is that they are both types of riding. Analogy is often used as a way to help clarify complex or abstract concepts by making them more relatable or concrete.

28. Explain Mutation and Evolution

Answer:

Mutation is the process by which genetic material changes or mutates. Mutation can occur spontaneously due to errors in DNA replication or environmental factors such as radiation or chemical exposure.

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Evolution is the process by which populations of living organisms change over time in response to their environment through the process of natural selection.

29. Alpha-Beta mouse and cheese

Answer:

Alpha-beta mouse and cheese is a scenario that illustrates the concept of alpha-beta pruning, a technique used to improve the efficiency of decision-making algorithms. It involves using two values, alpha and beta, to represent the best possible outcomes for the max and min players and pruning any branches of the search tree that cannot improve upon these values.

30. GA stand for

Answer:

GA stands for Genetic Algorithm, which is a type of optimization algorithm that uses the principles of natural evolution to find solutions to problems involving the combination of variables or parameters. It works by maintaining a population of solutions and using genetic operators to explore the solution space and search for good solutions.

31. R1/XCON

Answer:

R1/XCON is an early manufacturing expert system that automatically selects and orders computer components based on customer specifications.

32. write the tree graph of Min and Max

Answer:

I'm sorry, but it is not clear what you mean by "tree graph of Min Max."

33. State the Rules of Two-One Problem.

Answer:

- ❖ 1's Move only right
- ❖ 2's Move only Left
- ❖ Sweeping allowed
- ❖ Hope or Jumped Allowed
- ❖ Only One Move at a time

34. which ability is used in maze and mouse in artificial intelligence

Answer:

The ability used in maze and mouse in artificial intelligence is pathfinding, which involves finding a path through a complex environment using algorithms such as breadth-first search, depth-first search, A* search, and Dijkstra's algorithm.