



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, July 2020

Course: Artificial Intelligence

Course Code: CSEG3005

Programme: DevOps

Instructions:

Semester: 6th

Time: 3hrs

Max. Marks: 100

- **Multiple Choice: Which is used to improve the performa...**



Points: 1

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

Answer

Quality of nodes



Quality of heuristic function

Simple form of nodes

None of the mentioned



2. **Multiple Choice: Which of the following is/are Uninfo...**



Points: 1

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

Answer

Breadth First Search (BFS)

Depth First Search (DFS)

Bidirectional Search



All of the above



3. Multiple Choice: The time and space complexity of BFS ...



Points: 1

Question 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.)

- Answer**
- $O(b^2)$ and $O(d^2)$
 - $O(d^2)$ and $O(b^2)$
 - $O(d^2)$ and $O(d^2)$
 - $O(b^{d+1})$ and $O(b^{d+1})$



4. Multiple Choice: Which of the Following problems can b...



Points: 1

Question Which of the Following problems can be modeled as CSP?

- Answer**
- 8-Puzzle problem
 - 8-Queen problem
 - Map coloring problem
 - All of the above



5. Multiple Choice: The term _____ is used for a de...



Points: 1

Question The term _____ is used for a depth-first search that chooses values for one variable at a time and returns when a variable has no legal values left to assign.

Answer



- Backtrack search
- Forward search
- Hill algorithm
- Reverse-Down-Hill search



6. Multiple Choice: Consider a problem of preparing a sch...




Points: 1

Question

Consider a problem of preparing a schedule for a class of student. What type of problem is this?

Answer

- Search Problem
- Backtrack Problem
- Planning Problem
-  CSP



7. Multiple Choice: Constraint satisfaction problems on f...




Points: 1

Question

Constraint satisfaction problems on finite domains are typically solved using a form of _____

Answer

- Search Algorithms
- Heuristic Search Algorithms
- Greedy Search Algorithms
-  All of the above



8. Multiple Choice: When do we call the states are safely...



Points: 1

Question When do we call the states are safely explored?

Answer A goal state is unreachable from any state



A goal state is reachable from every state

A goal state is denied access

None of the above



9. **Multiple Choice: Which values are independant in minim...**



Points: 1

Question Which values are independant in minimax search algorithm?

Answer



Pruned leaves x and y

Every states are dependant

Root is independent

None of the above



10. **Multiple Choice: Which value is assigned to alpha and ...**



Points: 1

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

Answer Alpha = max


Beta = min



Both Alpha = max & Beta = min

Beta = max

•

11.  Multiple Choice: Which is identical to the closed list...



Points: 1

Question

Which is identical to the closed list in Graph search?

Answer



Transposition table

Hill climbing search algorithm

Depth-first search

None of the above

•

12.  Multiple Choice: Which is a refutation complete inference...



Points: 1

Question

Which is a refutation complete inference procedure for propositional logic?

Answer

Clauses

Variables



Propositional resolution

Proposition

•

13.  Multiple Choice: When the resolution is called as refu...



Points: 1

Question When the resolution is called as refutation-complete?

Answer Sentence is satisfiable



Sentence is unsatisfiable

Sentence remains the same

None of the above



14. Multiple Choice: "The adjective first-order distinguis..."



Points: 1

Question "The adjective first-order distinguishes first-order logic from _____ in which there are predicates having predicates or functions as arguments, or in which one or both of predicate quantifiers or function quantifiers are permitted."

Answer Representational Verification



Higher Order Logic

Representational Adequacy

Inferential Efficiency



15. Multiple Choice: How to eliminate the redundant rule m...



Points: 1

Question How to eliminate the redundant rule matching attempts in the forward chaining?

Answer Decremental forward chaining




Incremental forward chaining

Data complexity

None of the above

•

16.  Multiple Choice: Which of the following elements const...



Points: 1

Question Which of the following elements constitutes the frame structure?

Answer Procedures and default values



Facts or Data

Frame names

Frame reference in hierarchy

•

17.  Multiple Choice: Semantic Network represents _____...



Points: 1

Question Semantic Network represents _____

Answer Syntactic relation between concepts



Semantic relations between concepts

All of the above

None of the above

•

18.  Multiple Choice: What does the bayesian network provides?



Points: 1

Question What does the bayesian network provides?

Answer Partial description of the domain

Complete description of the domain

Complete description of the problem

None of the above

•

19. **Multiple Choice: What is meant by probability density ...**



Points: 1

Question What is meant by probability density function?

Answer Probability distributions

Probability distributions for Continuous variables

Continuous variable

Discrete variable

•

20. **Multiple Choice: The performance of an agent can be im...**



Points: 1

Question The performance of an agent can be improved by _____

Answer Observing

Learning

Perceiving

None of the above

•

21. **Multiple Choice: The action of the Simple reflex agent...**



Points:2

Question	The action of the Simple reflex agent completely depends upon _____
Answer	Perception History Learning Theory <input checked="" type="checkbox"/> Current Perception Utility Functions



22. Multiple Choice: An Artificial Neural Network Is based on



Points:2

Question	An Artificial Neural Network Is based on
Answer	Strong Artificial Intelligence approach Weak Artificial Intelligence approach <input checked="" type="checkbox"/> Cognitive Artificial Intelligence approach Applied Artificial Intelligence approach



23. Multiple Choice: What is the primary interactive metho...



Points:2

Question	What is the primary interactive method of communication used by humans?
Answer	Reading <input checked="" type="checkbox"/> Speaking

Writing

All of the above

•

24.  Multiple Choice: An expert system differs from a datab...



Points: 2

Question An expert system differs from a database program in that only an expert system _____

Answer



contains procedural knowledge

contains declarative knowledge

features the retrieval of stored information

expects users to draw their own conclusions

•

25.  Multiple Choice: Natural language understanding is use...



Points: 2

Question Natural language understanding is used in _____

Answer

natural language interfaces

natural language front ends



text understanding systems

all of the mentioned

•

26.  Multiple Choice: An Artificial Intelligence technique ...




Points: 2

Question An Artificial Intelligence technique that allows computers to understand associations and relationships between objects and events is called _____

Answer heuristic processing
cognitive science
 relative symbolism
pattern matching



27.  Multiple Choice: What is the field that investigates t...



Points: 2

Question What is the field that investigates the mechanics of human intelligence?

Answer history
 cognitive science
psychology
sociology



28.  Multiple Choice: What is the main task of a problem-so...



Points: 2

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

Answer Solve the given problem and reach to goal
To find out which sequence of action will get it to the goal state
 All of the mentioned
None of the mentioned

•

29. **Multiple Choice: What is state space?**



Points: 2

Question	What is state space?
Answer	The whole problem
	Your Definition to a problem
	<input checked="" type="checkbox"/>
	Representing your problem with variable and parameter
	Problem you design

•

30. **Multiple Choice: The Set of actions for a problem in a...**



Points: 2

Question	The Set of actions for a problem in a state space is formulated by a _____
Answer	<input checked="" type="checkbox"/>
	"Successor function, which takes current action and returns next immediate state"
	Intermediate states
	Initial state
	None of the mentioned

•

31. **Multiple Choice: A problem solving approach works well...**



Points: 2

Question	A problem solving approach works well for _____
Answer	8-Puzzle problem

8-queen problem



Mars Hover (Robot Navigation)

Finding a optimal path from a given source to a destination



32.  Multiple Choice: Web Crawler is a/an _____



Points: 2

Question Web Crawler is a/an _____

Answer Problem-solving agent

Simple reflex agent

Model based agent



Intelligent goal-based agent



33.  Multiple Choice: A* algorithm is based on _____



Points: 2

Question A* algorithm is based on _____

Answer Breadth-First-Search



Best-First-Search

Hill climbing

Depth-First Search



34.  Multiple Choice: Heuristic function $h(n)$ is _____



Points: 2

Question Heuristic function $h(n)$ is _____

Answer Lowest path cost



Estimated cost of cheapest path from root to goal node

Cheapest path from root to goal node

Average path cost



35.  **Multiple Choice: What is the contingency problem in ...**



Points: 2

Question What is the contingency problem in the context of game-playing programs?

Answer




" a degree of uncertainty, introduced by the presence of an opponent or by chance elements "

the outcome of a move may not be visible due to search limitations

the need for arbitration (e.g. by a referee) in some types of games

the elimination of branches that will never be explored



36.  **Multiple Choice: What is the horizon problem in the c...**



Points: 2

Question What is the horizon problem in the context of game-playing programs?

Answer



" a degree of uncertainty, introduced by the presence of an opponent or by chance elements "

the outcome of a move may not be visible due to search limitations

the need for arbitration (e.g. by a referee) in some types of games


the elimination of branches that will never be explored

•

37.  Multiple Choice: Why is it important in the minimax a...



Points: 2


Question	Why is it important in the minimax algorithm to generate the values of the evaluation function bottom-up rather than calculating them for each node when the node is visited first (top-down)?
Answer	"Minimax also works top-down, but the bottom-up method is more efficient." This is the foundation for considering the possible countermoves by the opponent.  Because the value of the utility function can only be computed for leaf nodes. Otherwise Minimax would have to be called Maximin.

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38.  Multiple Choice: Which statement describes the syntax...



Points: 2

Question	Which statement describes the syntax of a formal language for knowledge representation?
Answer	It describes how a particular sentence relates to the facts in the world.  It allows the generation of new sentences that follow from a set of given sentences. It specifies the admissible configurations of sentences in that language. It makes sure that only truth-preserving sentences are admitted in the language.

•

39.  Multiple Choice: A logical sentence is called satisfi...



Points: 2

Question

A logical sentence is called satisfiable if and only if

Answer

it is constructed according to the syntactical specification of the language



it is true under all possible interpretations in all possible worlds

it can be used by an inference procedure to construct a proof

there exists at least one interpretation for which the sentence is true.



40. Multiple Choice: What is the name of computer program ...



Points: 2

Question

What is the name of computer program that simulates the thought process of Human Beings

Answer

Human Logic

Expert Reason



Expert System

Personal Information



41. Multiple Choice: In a rule based system the procedural ...



Points: 2

Question

In a rule based system the procedural domain knowledge is in the form of

Answer



Production Rules

Rule Interpreters

Meta Rules

Control Rules



42.  **Multiple Choice: "A process that is repeated , evaluat...**



Points: 2

Question	"A process that is repeated , evaluated and refined is called as "
Answer	diagnostic descriptive interpretive <input checked="" type="checkbox"/> iterative iterative



43.  **Multiple Choice: The primary interactive method of com...**



Points: 2

Question	The primary interactive method of communication used by humans is
Answer	reading writing <input checked="" type="checkbox"/> speaking All of the above



44.  **Multiple Choice: 13: Using alpha-beta pruning, consider th...**



Points: 2

Question	Using alpha-beta pruning, consider the nodes from right to left, which nodes are cut off ?
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- Answer**
- 2, 3
 - 1, 3
 - 4, 6
 -
 - 2, 1



45.  **Multiple Choice: 15: Write down the FOL for the statement ...**



Points: 2

Question Write down the FOL for the statement "All farmer's wives cut the tail off blind mice that chase them".

Answer $\forall x \forall y \text{FarmersWife}(x) \wedge \text{Blind}(y) \wedge \text{Mouse}(y) \wedge \text{Chase}(x, y) \rightarrow \text{Cut}(x, y)$

$\forall x \forall y \text{FarmersWife}(x) \wedge \text{Blind}(y) \wedge \text{Mouse}(y) \wedge \text{Chase}(y, y) \rightarrow \text{Cut}(x, y)$

$\forall x \forall y \text{FarmersWife}(x) \wedge \text{Blind}(y) \wedge \text{Mouse}(y) \wedge \text{Chase}(y, x) \rightarrow \text{Cut}(y, x)$



$\forall x \forall y \text{FarmersWife}(x) \wedge \text{Blind}(y) \wedge \text{Mouse}(y) \wedge \text{Chase}(y, x) \rightarrow \text{Cut}(x, y)$



46.  Multiple Choice: 19: Consider the search graph below, wher...



Points: 2

Question Consider the search graph below, where S is the start node and G1, G2, and G3 are goal states. Which goal state is reached for A* search.

Answer G1



G2

G3

None of these



47.  Multiple Choice: 1: Write the following statements in Fir...



Points: 2

Question

Write the following statements in First Order Logic:

“Every city has a postman that has been bitten by every dog in the city.”

Use predicates:

- City(x) means x is a city
- Postman(x) means x is a postman
- Dog(x) means x is a dog
- Lives(x, y) means x lives in city y
- Bit(x, y) means x bit y

Answer

$\forall c. \text{City}(c) \rightarrow (\exists p. \text{Postman}(p) \wedge \text{Lives}(p, c) \wedge (\forall d. \text{Dog}(d) \wedge \text{Lives}(d, c) \rightarrow \text{Bit}(d, p)))$



$\forall c. \text{City}(c) \rightarrow (\exists p. \text{Postman}(p) \wedge \text{Lives}(p, c) \wedge (\forall d. \text{Dog}(d) \wedge \text{Lives}(d, c) \rightarrow \text{Bit}(d, p)))$

$\forall c. \text{City}(c) \rightarrow (\exists p. \text{Postman}(p) \wedge \text{Lives}(p, c) \wedge (d. \text{Dog}(d) \wedge \text{Lives}(d, c) \rightarrow \text{Bit}(d, p)))$

$\forall c. \text{City}(c) \rightarrow (\exists p. \text{Postman}(p) \wedge \text{Lives}(p, c) \wedge (\forall d. \text{Dog}(d) \wedge \text{Lives}(d, c) \rightarrow \text{Bit}(d)))$



48. Multiple Choice: 20: What is the expected value of the nod...



Points: 2

Question

What is the expected value of the node labeled R?

Answer

2

3

1



None of these



49.  Multiple Choice: "Which of the following options canno..."



Points: 2

Question

"Which of the following options cannot be the probability of any event? a. -0.00001, b. 0.5, c. 1.001"

Answer

Only a

Only b

Only c



a and c



50. Multiple Choice: "A roulette wheel has 38 slots, 18 ar..."



Points: 2

Question

"A roulette wheel has 38 slots, 18 are red, 18 are black, and 2 are green. You play five games and always bet on red. What is the probability that you win all the 5 games?"

Answer

0.0368



0.0238

0.0526

0.0473



51. Multiple Choice: Markov analysis is a technique that d...



Points: 2

Question

Markov analysis is a technique that deals with the probabilities of future occurrences by

Answer

Using Baye's Theorem



analyzing presently known probabilities

time series forecasting

The maximal flow technique



52. Multiple Choice: "In Markov analysis, the likelihood t..."



Points: 2

Question "In Markov analysis, the likelihood that any system will change from one period to the next is revealed by the"

Answer Identity matrix
transition-elasticities
matrix of state probabilities

matrix transition probabilities



53.  **Multiple Choice: Point out correct statement**



Points: 2

Question Point out correct statement

Answer The choice of an appropriate metric will influence the shape of clusters.
Hierarchical clustering is also called HCA
"In general, the merges and splits are determined in a greedy manner"

All of mentioned



54.  **Multiple Choice: "In regression, the equation that des...**



Points: 2

Question "In regression, the equation that describes how the response variable (y) is related to the explanatory variable (x) is:"

Answer the correlation model

the regression model
used to compute the correlation coefficient

None of these alternatives is correct.



55.  **Multiple Choice: Constraint satisfaction is also refer...**



Points: 2

Question Constraint satisfaction is also referred to as

Answer Divide and Conquer algorithm

Greedy Algorithm



Relaxation Algorithm

None of these alternatives is correct.



56.  **Multiple Choice: Peer models have been used to teach c...**



Points: 2

Question Peer models have been used to teach children with disabilities to perform complex tasks using which form of chaining?

Answer Forward chaining

Backward chaining



Total task chaining

Backward chaining with leap aheads



57.  **Multiple Choice: Adding more basis functions in a lin...**



Points: 2

Question Adding more basis functions in a linear model... (pick the most probably option)

Answer



- Decreases model bias
- Decreases estimation bias
- Decreases variance 4
- Does not affect bias and variance



58. Multiple Choice: Which algorithm works by first runnin...



Points:2

Question Which algorithm works by first running the standard forward pass to compute?

Answer



- Smoothing
- Modified smoothing
- HMM
- DFS algorithm



59. Multiple Choice: 14: Consider the following constraint gra...



Points:2

Question Consider the following constraint graph for a graph coloring problem. The domains are shown in the boxes next to each variable node . What are the variable domains of X after a full constraint propagation .

Answer

G B

R G B



B

R G



60.  Multiple Choice: 9: What will be the total estimated cost...



Points: 2

Question

What will be the total estimated cost for the graph using A* search . A is the starting node and G is the

goal node.

Answer

3

4

5



6