

JK LAKSHMIPAT UNIVERSITY, JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination (Regular/BackLog), November-December 2017
B.Tech + M.Tech in Computer Science Engineering, Semester IX

Roll No.....

MTCS436: INTELLIGENT TECHNIQUES

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Assume suitable data wherever required and mention it clearly.
 3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
-

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Neural network is an example of _____.
 - i. Systems that thinks like human;
 - ii. Systems that thinks rationally.
 - iii. Systems that act like human
 - iv. Systems that act rationally

a) Only i; Both i & ii; c. Only iv; d. Both iii & iv
- ii. Fuzzy logic is a form of a) Two-valued logic; b) Crisp set logic; c) Many-valued logic; d) Binary set logic
- iii. Inference algorithm is complete only if,
 - a) It can derive any sentence;
 - b) It can derive any sentence that is an entailed version
 - c) It is truth preserving
 - d) Both b & c
- iv. In A* approach evaluation function is
 - a) Heuristic function
 - b) Path cost from start node to current node
 - c) Path cost from start node to current node + Heuristic cost
 - d) Average of Path cost from start node to current node and Heuristic cost
- v. Which is used to compute the truth of any sentence?
 - a) Semantics of propositional logic; b) Alpha-beta pruning; c) First-order logic
 - d) Both a & b
- vi. To which depth does the alpha-beta pruning can be applied?
 - a) 10 states; b) 8 States; c) 6 States; d) Any depth
- vii. Which value is assigned to alpha and beta in the alpha-beta pruning?
 - a) Alpha = max; b) Beta = min; c) Beta = max; d) Both a & b
- viii. Which function is used to calculate the feasibility of whole game tree?

	a) Evaluation function; b) Transposition; c) Alpha-beta pruning; d) All of the mentioned	
ix	Which is used to improve the performance of heuristic search? a) Quality of nodes; ; b) Quality of heuristic function; c) Simple form of nodes; d) None of the mentioned	
x	What kind of observing environments are present in artificial intelligence? d) a) Partial; b) Fully; c) Learning; d) Both a & b	
Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i.	What do you understand by Knowledge and Deduction? Explain giving an example.	
ii.	Give an example of system that: a. Acts like humans b. Acts rationally	
iii.	Define in your own words: (a) intelligence, , (b) agent, (c) rationality	
iv.	Can following computer systems be considered as instances of artificial intelligence? Justify your Answer. - Voice-activated telephone menus. - Internet routing algorithms that respond dynamically to the state of the network.	
Q.3A	Give a PEAS description of Driverless Car.	05
Q.3 B	Write down the difference between Blind and Heuristics Search stating disadvantages and advantages of each.	05
Q.4A	Write down State-Space Search Steps for 8-Puzzle Problem.	05
Q.4B	Comment on the statement related to search algorithm: "Is the algorithm guaranteed to terminate". Give an example where algorithm need not Terminate.	05
Q.5A	Differentiate between the following giving one example of each. - Deterministic and Stochastic Games - Adversial Games and Non-Adversial Games - Tacit Knowledge and Explicit Knowledge - Procedural Knowledge and Declarative Knowledge - Propositional Logic and Predicate Logic	05
Q.5B	Breadth First Search guarantees Solution but it may not be optimal. Prove the statement.	05
Q.6A	Prove the utility of Minimax algorithm for Adversial Search discussing with example of Tic-Tac-Toe.	05
Q.6B	Describe Problem Reduction Search. Describe Tower of Hanoi. Show how it Problem Reduction Search can be used to Solve Tower of Hanoi puzzle.	05
	OR	
Q.6B	Tag each of the following sentences with the NLP Issue with justification for each tag.	05

- At last, a computer that understands you like your mother.
- He bought a brand new car and drove it home.
- I will be there. What did you do?
- She learned how to play Mozart at a very young age.
- He is a walking dictionary! His room is a zoo.

Q.7A Explain alpha-beta pruning taking an example of zero-sum game. 05

Q.7B Write predicates /rules for following Russel's Paradox: 05

- There is a single Barber in town.
- Those and only those who do not shave themselves are shaved by barber.

Who shaves the barber?

OR

Q.7B Assume internet Shopping Agent.

1. What are the percepts for this agent?
2. Characterize the operating environment.
3. What are the actions the agent can take?
4. How can one evaluate the performance of the agent?
5. What sort of agent architecture do you think is most suitable for this agent?

Q.8A Create the search tree. Discuss which search strategy is appropriate for this problem. 10

Sailor Cat needs to bring a wolf, a goat, and a cabbage across the river. The boat is tiny and can only carry one passenger at a time. If he leaves the wolf and the goat alone together, the wolf will eat the goat. If he leaves the goat and the cabbage alone together, the goat will eat the cabbage. How can he bring all three safely across the river?

Q.9A Explain following critical Properties of Search Algorithm with respect to BFS, DFS, Uniform Cost Search and A* Algorithm. Completeness, Optimality, Time Complexity and Space Complexity. 10

Q.9B Consider a vocabulary with the following symbols: 10

Occupation(p, o): Predicate. Person p has occupation o.

Customer (p1, p2): Predicate. Person p1 is a customer of person p2. Boss (p1, p2): Predicate. Person p1 is a boss of person p2.

Doctor, Surgeon, Lawyer or, Actor: Constants denoting occupations. Emily, The: Constants denoting people.

Use these symbols to write the following assertions in first-order logic:

- a.Emily is either a surgeon or a lawyer.
- b.Joe is an actor, but he also holds another job,
- c.All surgeons are doctors.
- d.Joe does not have a lawyer (i.e., is not a customer of any lawyer).
- e.Emily has a boss who is a lawyer.

OR

Q.9B Explain the following Terms with respect to Machine Learning Techniques:
Training Set, Testing Set, Validation Set, Verification Set, Overfitting,
Underfitting, Confusion Matrix, True Positive, True Negative, False Positive and
False Negative, Accuracy, Precision, Sensitivity(Recall) and Specificity.

10