JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT TEST-3 EXAMINATION-2025

B.Tech- 8th Semester (ECE)

COURSE CODE (CREDITS): 18B1WEC838 (3)

MAX. MARKS: 35

COURSE NAME: Artificial Intelligence Techniques

COURSE INSTRUCTORS: Dr. Naveen Jaglan

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Q.No	Questions	CO	
Q1	Use the Alpha-Beta pruning algorithm to prune the same to	CO	Marks
	below assuming child nodes are visited from left to right. Show all	3	5
	final alpha and beta values are visited from left to right. Show all		
	final alpha and beta values computed at root, each internal node		
	explored, and at the top of pruned branches.		
PROCESSION OF THE PERSON OF TH			September 1
	MAX 3 A		
	a_1 a_3		
	MIN 3 B		
	2 0		
	b_1 / b_3		
	b_2 c_2 c_3 d_1 d_3		
	3 12 8 2 4 6 14 5 2	- 4	
02	XXI.		
Q2	Write a Python program to perform Depth-First Search (DFS)	2	5
	Program to use all explicit stack (instead of recursion) to	2	3
	graph from node 'A':		
	Α		
	/ \		
	В С	14-	
	D E F	n. in rest	
	/ \		
	G H		THE STATE OF THE S
	(a) Print the order in which nodes are visited.		
an unamed pla	(b) Ensure nodes are processed in Last In Fig. 10	esta esta la pro-	N/COMPENSATE OF
	(b) Ensure nodes are processed in Last In, First Out (LIFO) order. Assume the graph is stored as an adjacency list in a dictionary.		
	Braph is stored as all adjacency list in a dictionary		

1	4	5	
Use linear regression to predict house prices based on area, number	4	3	
of bedrooms, and house age. Create your own dataset, train the and evaluate it using percentage accuracy based on Mean Absolute			
Tight to the following blocks world problem using simple	4	5	
Find the solution to the following blocks works problem in the limitations of hill hill method. State the heuristics used. What are the limitations of hill climbing algorithms?			
A D C B B A			
Initial State Final State	2	5	
Discuss the time and space complexity of the A* algorithm in	3	3	(
How do tactors like the liculation that a			
the sping factor affect its periorillative; what toling		no le constant	
1 1 to reduce memory 118806 WILLS III III IIII III III	4	5	
Suppose a genetic algorithm uses chromosomes of the form a abcdefgh with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as: $f(x) = (a + b) - (c + d) + (e + f) - (g + h), \text{ and let the initial population}$			
x1 = 6 5 4 1 3 5 3 2, x2 = 8 7 1 2 6 6 0 1, x3 = 2 3 9 2 1 2 8 5 and x4 = 4 1 8 5 2 0 9 4			
workings, and arrange them in order with the littest first and the least fit last. (b) Perform the following crossover operations: (i) Cross the fittest two individuals using one-point			
(ii) Cross the second and third fittest individuals using a two-point crossover (points b and f).	A TOTAL CONTRACTOR	M AFRONSON	
(iii) Cross the first and third fittest individuals (ranked 1st and 3rd) using a uniform crossover.			
What is the purpose of one-hot encoding, and when is it necessary? Can one-hot encoding lead to multicollinearity issues in linear regression models? If so, how do you address them? Explain with the help of a python program.	r	5	
	of bedrooms, and house age. Create your own tatasts, that the and evaluate it using percentage accuracy based on Mean Absolute Error. Find the solution to the following blocks world problem using simple hill method. State the heuristics used. What are the limitations of hill climbing algorithms? Initial State Final State Discuss the time and space complexity of the A* algorithm in different scenarios. How do factors like the heuristic function, graph size, and branching factor affect its performance? What techniques can be used to reduce memory usage while maintaining efficiency? Suppose a genetic algorithm uses chromosomes of the form x = abcdefgh with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as: f(x) = (a + b) - (c + d) + (e + f) - (g + h), and let the initial population consist of four individuals with the following chromosomes: x1 = 6 5 4 1 3 5 3 2, x2 = 8 7 1 2 6 6 0 1, x3 = 2 3 9 2 1 2 8 5 and x4 = 4 1 8 5 2 0 9 4 (a) Evaluate the fitness of each individual, showing all your workings, and arrange them in order with the fittest first and the least fit last. (b) Perform the following crossover operations: (i) Cross the fittest two individuals using one—point crossover at the middle point. (ii) Cross the second and third fittest individuals using a two—point crossover (points b and f). (iii) Cross the first and third fittest individuals (ranked 1st and 3rd) using a uniform crossover.	of bedrooms, and house age. Create your own dataset, that and evaluate it using percentage accuracy based on Mean Absolute Error. Find the solution to the following blocks world problem using simple hill method. State the heuristics used. What are the limitations of hill climbing algorithms? A D C B A D C B A D C B A D C B A D C B A D C B A D C B A D C B A D C B A A D C B A A D C B A A D C B A A D C B A A D C B A A D C B A A D C B A A D C B A A D C B A A D C B A A A D C B A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A D C B A A A A A A A A A A A A	of bedrooms, and house age. Create your own totalest, the mand evaluate it using percentage accuracy based on Mean Absolute Error. Find the solution to the following blocks world problem using simple hill method. State the heuristics used. What are the limitations of hill climbing algorithms? A