

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-VII Semester (CS/IT)

COURSE CODE (CREDITS): 18B1WC1742

MAX. MARKS: 15

COURSE NAME: Artificial Intelligence

COURSE INSTRUCTORS: Dr. Aman Sharma

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. Polynomials can be represented as lists of pairs of coefficients and exponents. For example the polynomial $4x^5 + 2x^3 - x + 27$ can be represented as the following Prolog list: $[(4,5), (2,3), (-1,1), (27,0)]$ Write a Prolog predicate `poly_sum/3` for adding two polynomials using that representation. Try to find a solution that is independent of the ordering of pairs inside the two given lists. Likewise, your output doesn't have to be ordered. Examples: [Marks: 3, CO-3]

?- `poly_sum([(5,3), (1,2)], [(1,3)], Sum).`

`Sum = [(6,3), (1,2)]`

Yes

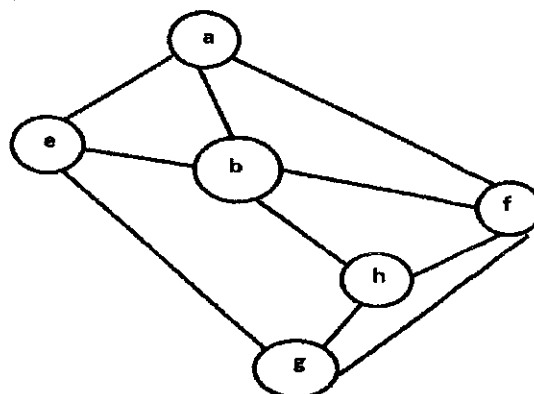
?- `poly_sum([(2,2), (3,1), (5,0)], [(5,3), (1,1), (10,0)], X).`

`X = [(4,1), (15,0), (2,2), (5,3)]`

Yes

Q2. Write all possible Depth first traversals and breadth first traversals for the following graph:

[Marks: 3, CO-3]



Q3. Write the problem characteristics of 8- puzzle problem. How many minimum steps are required for moving from Initial state to final state in the below described problem: [Marks: 3, CO-1]

Initial State

1	2	3
8	6	4
7		5

Final State

1	2	3
8		4
7	6	5

↑

Q4. Explain with example different types of environments in artificial agents? [Marks: 1, CO-1]

Q5. Write the recursive pseudo code for Tower of Hanoi problem. Tower of Hanoi is a mathematical puzzle. Traditionally, it consists of three poles and a number of disks of different sizes which can slide onto any poles. The puzzle starts with the disk in a neat stack in ascending order of size in one pole, the smallest at the top thus making a conical shape. The objective of the puzzle is to move all the disks from one pole (say 'source pole') to another pole (say 'destination pole') with the help of third pole (say auxiliary pole). [Marks: 3, CO-3]

The puzzle has the following two rules:

1. You can't place a larger disk onto smaller disk
2. Only one disk can be moved at a time