

National University of Computer and Emerging Sciences, Lahore Campus



Course: Artificial Intelligence
Program: BS(Computer Science)
Duration: 30 Minutes
Paper Date: 18-March-23
Section: D/F/F
Exam: Quiz 2A

Course Code: AI-2002
Semester: Spring 2024
Total Marks: 10
Weight: 3.33 %
Page(s): 2
Roll No.

Instruction/Notes:

- Provide your solution on this sheet. You may use an extra page for rough work.

Problem#1 (CLO-2)

3 Points

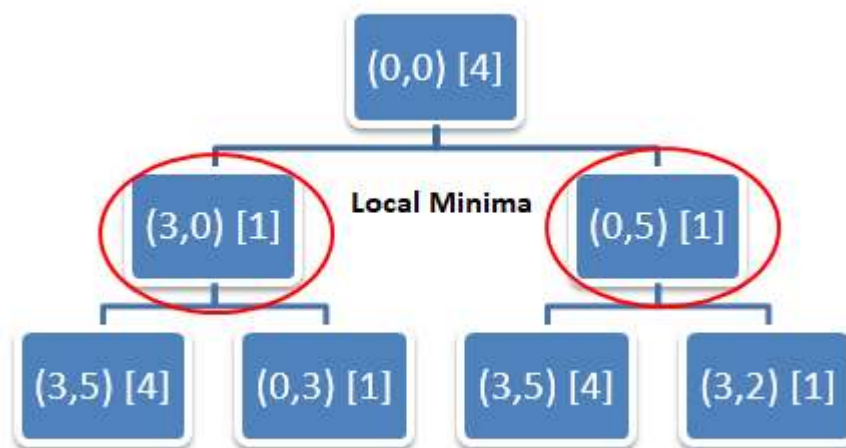
In this problem, the goal is to measure exactly 4 liters of water using jugs of capacities 3 liters (A) and 5 liters (B). The operations you can perform are filling a jug, emptying a jug, or pouring water from one jug to another until the receiving jug is full or the pouring jug is empty. If a jug already has some water and needs to be filled completely, it must be emptied first.

Initial State: (0, 0) # Jug A, Jug B

Goal: Measure 4 liters (0,4)

Apply hill climbing algorithm on this problem to minimize the heuristic function.

Heuristic value of a node = $|4 - (\text{Water in Jug A} + \text{Water in Jug B})|$



Problem#2(CLO-2)

2+5 Points

You are provided with a board position for tic tac toe state. Your task is to build a complete min-max tree from this state, assign values to leaf nodes and perform alpha beta pruning. Clearly mention the alpha and beta values for each node.

initial_board = ['X', 'O', 'X', 'O', 'O', ' ', 'X', ' ', ' '] (Level = Min (O))

Evaluation score = #No of open options for Max to win - #No of open options for Min to win

