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| **Q1** |  | Draw the schematic diagram and write the pseudocode function of a simple reflex agent.  ANS: |
| **Q2** |  | Consider the following given state space graph, the weighted edge represents the action cost between the two states and values in the bracket represents the heuristic cost of a state. Consider “A” as a start state and “G” as a goal state. Assume, states are explored in the clockwise direction starting from 12 O’clock. State priority is decided as per sequence of exploration to break the tie between equal path-cost state.  Trace the iteration of following searching algorithms in a tabular format consisting Open-List (OL), Selected Current State (N), Closed-List (CL), Goal-Test (GT(N)), Successor of Current State (Successor(N)). Also, draw the search tree and find resultant path with its cost.     1. DFS 2. UCS 3. A-Star   ANS:   |  |  |  |  | | --- | --- | --- | --- | | Algo | Sequence of Exploration | Path | Cost | | DFS | A, B, C, E, F, I, G | A-B-E-F-I-G | 9 | | UCS | (A,0), (B,1), (C,2), (D,3), (J,4), (E,4), (F,5), (H,6), (I,7), (G,8) | A-B-D-E-I-G | 8 | | A-Star | (A,10), (B,9), (J,9), (E,9), (D,9), (E,8), (F,8), (I,8), (G,8) | A-B-D-E-I-G | 8 | |
| **Q3** |  | Consider the following board, your task is to assign colors (B, R) to five blocks such that no two horizontal and vertical blocks have the same color.   |  |  |  | | --- | --- | --- | | 1 | 2 | 3 | | 4 | 5 |  | |  |  |  | |
|  | **a** | Formulate the above problem as Constraint Satisfaction Problem (CSP)  ANS: Variables: {1, 2, 3, 4}  Domain: {B, R}  Constraint: D(Vi) ≠ D(Vj) |
|  | **b** | Consider domain value “R” is assigned to a block 1, at this point you run forward checking. Trace the iterations of algorithm and find remaining domains of all the blocks.  ANS: 1 = {R} 2 = {B} 3 = {R, B} 4 = {B} 5 = {R, B} |
|  | **c** | Draw the backtracking tree by assuming following:   1. First assign the color R and then B. 2. Explore the variables in ascending numerical order. 3. Domain of variable 5 = (B), the other variables domain is (R, B)   ANS: |
|  | **d** | Consider the following 2×2 board, your task is to assign colors (R, G, B) to four blocks such that no two horizontal and vertical blocks have the same color. Domain of variable 1 = (R), the other variables domain = (R, G, B)   |  |  | | --- | --- | | 1 | 2 | | 4 | 3 |   Trace the iteration of AC3 algorithm and find the remaining domain values of variable 2,3, and 4.  ANS: 1 = {R} 2 = {G, B} 3 = {R, G, B} 4 = {G, B} |
| **Q4** |  | Find the α and β values ​​of each non-pruned node of the following game tree using the AlphaBeta algorithm. Draw a neat and clean game tree, show the pruned edges and write the α and β values ​​in front of each node using a pen. Also, clearly state the total number of pruned nodes.    ANS: |
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