

UNITED INTERNATIONAL UNIVERSITY

MID ASSIGNMENT 1

Artificial Intelligence - D

Presented by

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Presented to

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Ans to the ques no: 1

a)

Performance Measures:

watering plants, removing weeds, monitoring plant health, optimizing plant growth with high success rate.

Environment: Garden.

Actuators: watering pipe, weed cutter, moving wheel, lighting system for night.

sensors: Camera, ultrasonic sensor, temperature sensor, weather sensor, etc.

b)

Initial state: Any position in the garden.

the robot is staying without inspecting

Goal state: Remove all the insects from all infected trees.

2
Action: move and apply pesticides on infected trees.

Transition model: first of all move to the infected tree by inspecting it then apply pesticides then again move to another infected tree.

state space: All the area the robot covers and multiplied it by the size of garden.

Ans to the ques no: 2

(a)

following the shortest path from A to k:

$$A \rightarrow C \rightarrow G \rightarrow k = 4 + 9 + 5 = 18 < 20[h(A)]$$

$h(A)$ is inadmissible.

if $[A=18, B=17, E=12, F=11]$ then
 (heuristic of A, B, E, F) it becomes
 admissible and consistent.

$$A \rightarrow B = h(A) - h(B) = 18 - 17 = 1 \leq 5$$

$$A \rightarrow C = h(A) - h(C) = 18 - 14 = 4 \leq 4$$

$$B \rightarrow C = h(B) - h(C) = 17 - 14 = 3 \leq 3$$

$$B \rightarrow F = h(B) - h(F) = 17 - 11 = 6 \leq 6$$

$$B \rightarrow D = h(B) - h(D) = 17 - 15 = 2 \leq 5$$

$$C \rightarrow E = h(C) - h(E) = 14 - 12 = 2 \leq 3$$

$$C \rightarrow G = h(C) - h(G) = 14 - 5 = 9 \leq 9$$

$$D \rightarrow F = h(D) - h(F) = 15 - 11 = 4 \leq 9$$

$$E \rightarrow F = h(E) - h(F) = 12 - 11 = 1 \leq 7$$

$$F \rightarrow G = h(F) - h(G) = 11 - 5 = 6 \leq 8$$

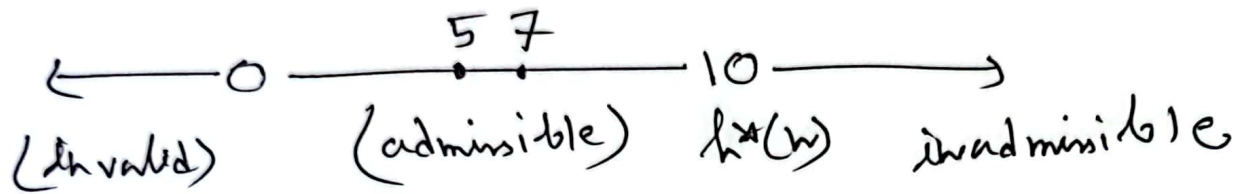
$$G \rightarrow H = h(G) - h(H) = 5 - 0 = 5 \leq 5$$

So, updated heuristic values:

$$[h(A)=18, h(B)=17, h(D)=15, h(E)=12, \\ h(F)=11] \quad \underline{\text{Ans}}$$

(b)

suppose, $A=5$, $B=7$, $h^*(w) = 10$



$$h_1 = \sqrt{(A^v + B^v)} = \sqrt{(5^v + 7^v)} = 8.6 \leq 10 \text{ [admissible]}$$

$$h_2 = A^v + B = 5^v + 7 = 32 > 10 \text{ [inadmissible]}$$

$$h_3 = A + (2B) = 5 + (2 \times 7) = 19 > 10 \text{ [inadmissible]}$$

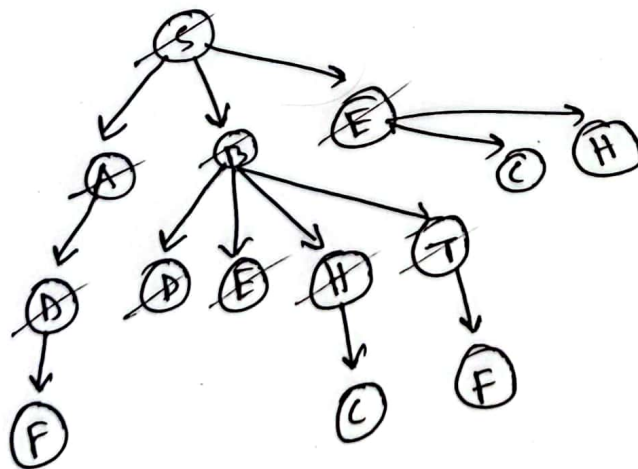
Ans to the ques no: 3

(c)

BFS:

Visited:

S, A, B, E, D, H, T



path: $S \rightarrow B \rightarrow T$

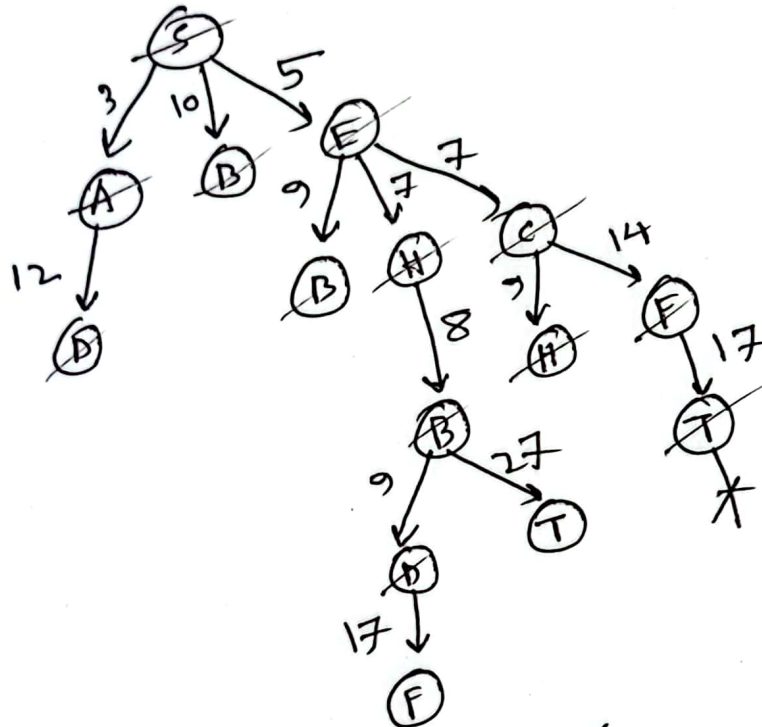
5

(16)

ULS:

Visited:

S, A, E, C, H, B, D, E, T



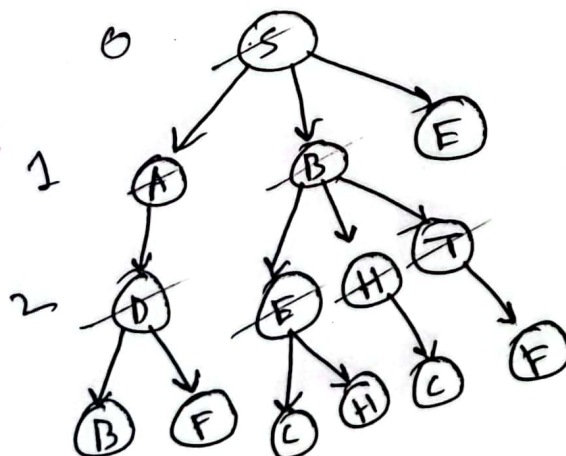
path: $S \rightarrow E \rightarrow C \rightarrow F \rightarrow T$ (cost: 17)

(17)

(1) DLS with limit = 2

Visited:

S, A, D, B, E, H, T



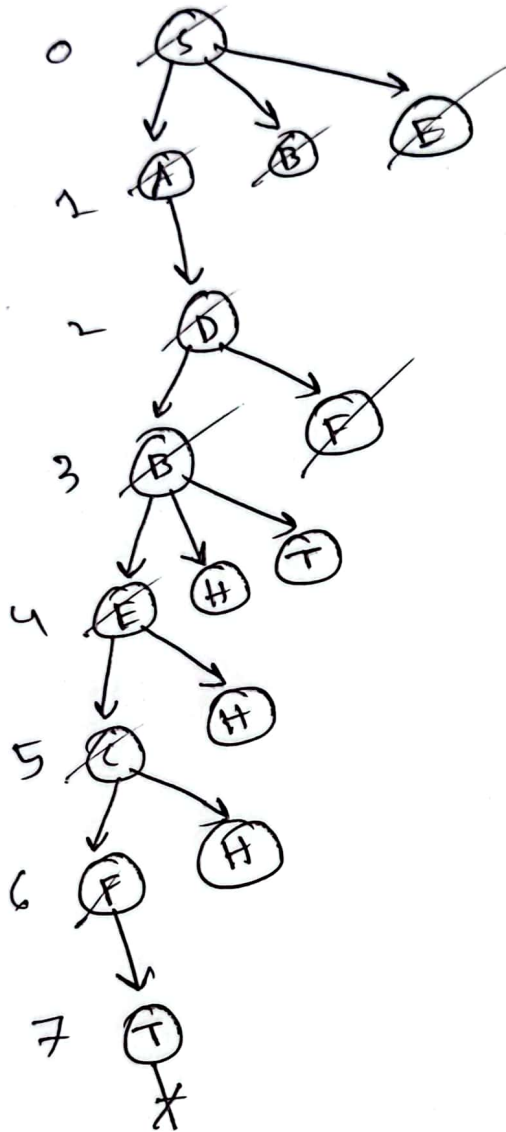
path: $S \rightarrow B \rightarrow T$

6

(11) DLS with limit = 7

Visited:

S, A, D, B, E, C, F, T



path: $S \rightarrow A \rightarrow D \rightarrow B \rightarrow E \rightarrow C \rightarrow F \rightarrow T$