Ans. to Q No - 1

a

Performance measure: Accuracy of object detection

Environment: Partially observable.

Actuators: It can be " producing alert sound".

Sensors: As it is for visually impaired people, camera is a must. Moreover there can also be sonar sensors, optical sensors etc.

Suitable agent: Utility - based agent is suitable in this case as happiness factors is a must.

a

Yes, DFS and BFS can be combined together, and bring out advantages. The algorithm for achieving this, is known as Iterative Deepening Search.

Iterative Deepening Search: In this search, the DFS is run by increasing one level at a time. It is the extension of Depth Limited Search.
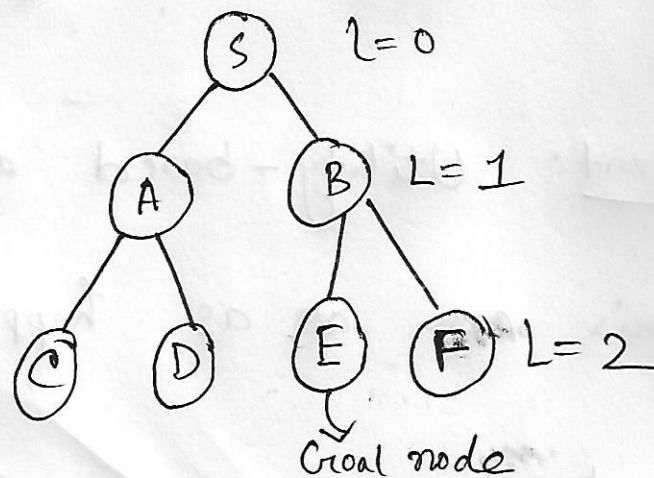
In First Iteration, DFS will run upto level 0.

In Second " , " " " " 1.

In third " , " " " " 2.

1st iteration ⟶ S

2nd " ⟶ S, A, B

3rd " ⟶ S, A, C, D, B, E, F

Completeness: It is complete as it works level by level like BFS.

Optimality: It is optimal as it will find the shortest path.

Time Complexity: $O(bd)$

Space Complexity: $O(bd)$

So, we can see that this algo finds out best depth limit and keep increasing depth limit until it reaches the goal node. So, it combines BFS and DFS into terms of Time and Space complexity.

Ans. to Q No-4

a

My student ID = 19101072

Here, $72 \% 6 = 0 = r$

$\therefore \Delta E = r - 4 = 0 - 4 = -4$

$\therefore$ probability for being chosen

$$= e^{\Delta E / T}$$

$$= e^{-4/10}$$

$$= e^{-0.4}$$

$$= 0.67$$

(approx).

(Ans)

Ans to Q.No-3

a

Informed and uninformed both are to good according to the problem at our hand. But, informed search is always advantageous as we know how far our got goal state is. So, we can take the more appropriate and optimal two path from very beginning.

b

UCS → A, C, F, G, B, ~~&~~, D, E

Greedy Best → A, B, E, D, C, G

A* → A, C, G, B, F, E, D

IDS → A, A, B, C, A, B, D, E, C, F, G

$$\underline{\underline{a}}$$

※ fitness of $x_1 = (6+5) - (4+1) + (3+5) - (3+2)$

$$= 11 - 5 + 8 - 5$$

$$= 9$$

fitness of $x_2 = (8+7) - (1+2) + (6+6) - (0+1)$

$$= 15 - 3 + 12 - 1$$

$$= 23$$

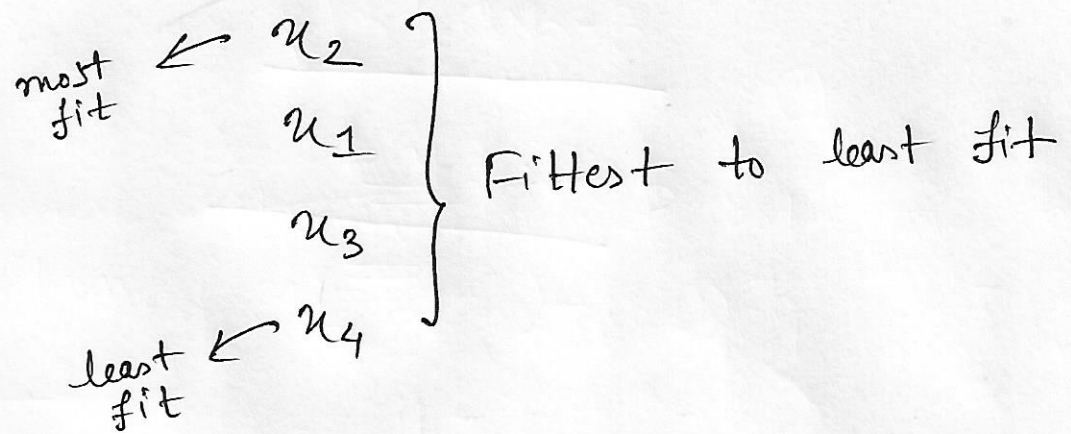fitness of $x_3 = (2+3) - (9+2) + (1+2) - (8+5)$

$$= 5 - 11 + 3 - 13$$

$$= -16$$

fitness of $x_4 = (4+1) - (8+5) + (2+0) - (9+4)$

$$= 5 - 13 + 2 - 13$$

$$= -19$$

Arranging them

most fit ← u_2
u_1
u_3 } Fittest to least fit
least fit ← u_4

$\underline{b}$

middle point

Second fittest → 6 5 4 1 | 3 5 3 2

Third fittest → 2 3 9 2 | 1 2 8 5

After one point crossover

⟹ child-1 → 6 5 4 1 1 2 8 5

child-2 → 2 3 9 2 3 5 3 2