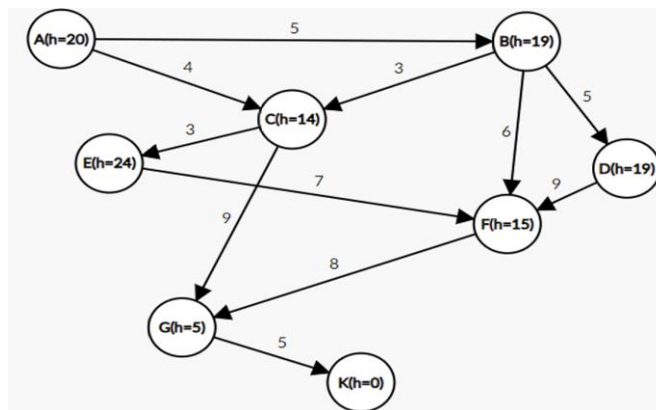


1. Imagine you are tasked with designing an autonomous gardening robot named "Gardenia". This robot is intended to maintain a home garden by performing tasks such as watering plants, removing weeds, monitoring plant health, and optimizing plant growth. The robot should function both during the day and at night, and it should be able to adapt to different types of plants and weather conditions.

- Write the PEAS description for the "Gardenia" robot.
- Suppose, some of the trees have been infected with insects. The robot, firstly, has to find out the plants affected by the worms and then apply pesticides on them. Formulate this as a search problem using the problem formulation steps.

2. Consider the following state-space graph below:

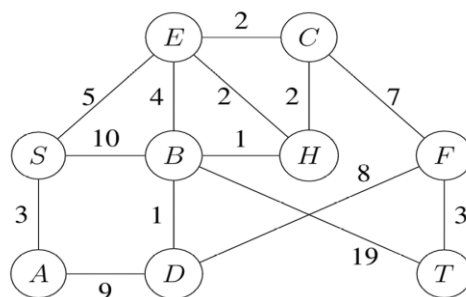


"A" is the start node and "K" is the goal node. Each node is represented with its name and heuristic value

- Check whether the heuristic used in the graph is admissible or not. If inadmissible, change the heuristic values of the nodes to make them both admissible and consistent. Show the calculations and mention the updated heuristic values.
- Given, two heuristics A and B are admissible.
 - $h_1 = \sqrt{A^2 + B^2}$
 - $h_2 = A^2 + B$
 - $h_3 = A + 2*B$

Which of these three will be **inadmissible**? Give proper reasoning and explain with equations.

3. Consider the following graph:



(Questions are on the next page)

- a. Run BFS on this graph and show the path returned.
- b. Run UCS on this graph and show the path returned along with its cost.
- c. Run DLS on this graph with:
 - i. Depth limit = 2
 - ii. Depth limit = 7