

Problem 1: Search Algorithms [20]**(a) 5 points in total**

[3] for getting the correct list of states expanded as shown below.

- [1.5] for getting a partially correct list of states expanded

[2] for getting the correct solution path

- [1] for getting a partially correct solution path

List of states expanded: W-N-Y-R-I-O-X-M-J-S-V-H

The solution path is: W-N-Y-R-O-H

(b) 5 points in total

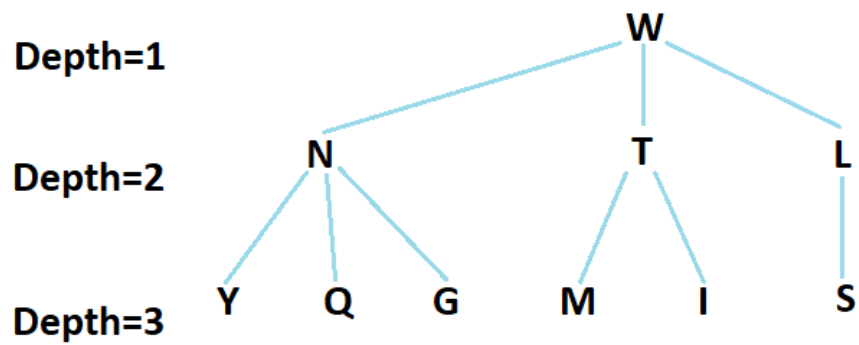
[4] for having all four trees as shown below

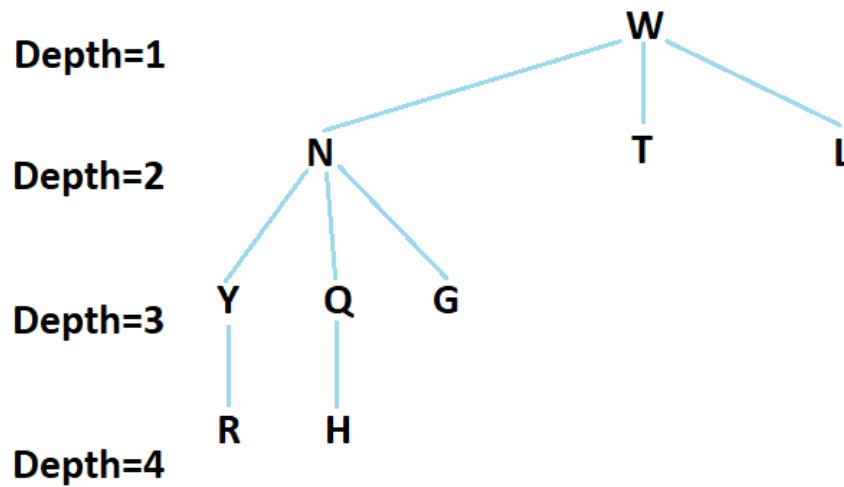
- [1] for each tree

[1] for stopping the algorithm after the goal node H is reached, in the last tree (i.e. nothing is expanded after node H)

Depth=1

W





(c) 2 points in total

[2] for stating $h(n)$ is **not** admissible.

(d) 8 points in total

[1] for pushing the nodes into the frontier in the correct order

[3] for getting all the correct $g(n)$, $h(n)$, and $f(n)$ values

- [-0.25] for each incorrect value (deduct a maximum of 3 points for incorrect values)

[2] for having the correct order of expanded nodes

- [1] for getting a partially correct order of expanded nodes

[2] for getting the correct solution path

- [1] for getting a partially correct solution path

Frontier	W	L	T	N	S	I	R	G	Q	Y	X	H
$g(n)$	0	1	1	1	2	2	3	2	2	2	3	3
$h(n)$	3	2	4	2	3	1	2	1	3	5	4	0
$f(n)$	3	3	5	3	5	3	5	3	5	7	7	3
expanded	1	2		4		3		5	6			7

Solution Path: W-N-Q-H

Problem 2: Stimulus Plan [20]**a) 4 points in total****[1]** Initial state: (N, 1, 0)**[1]** Goal state: (0, 0, 1)

- $\{(1, 1, x) \mid x = 0, 1, \text{ or } 2\}$ is also acceptable, but only saying one state like (1, 1, 1) will only get **[0.5]**

[1] The step cost function will be defined to be 1 for each year that goes by.**[1]** The successor function: $\text{Successor}(n, s, s') = \{(n-s, s+1, s), (n-s, s, s), (n-s, s-1, s)\}$.**b) 5 points in total****[2]** for stating not admissible.**[2]** for providing a valid counterexample for inadmissibility.**[1]** for stating not consistent.**c) 5 points in total****[2]** for stating admissible.**[3]** for stating consistent.**d) 6 points in total****[3]** for solution path

- **[0.5]** for each correct state in the correct position
- **[-1]** for showing the whole search tree but not the solution path

[3] for heuristic

- **[0.5]** for each correct corresponding heuristic value

State	(12,1,0)	(11,2,1)	(9,3,2)	(6,3,3)	(3,2,1)	(1,1,2)	(0,0,1)
h	5	5	4	3	2	1	0