Soln. Q1 Samples

T.1

BFS [A possible Soln]

Fringe has (A)

Nodes Popped	States Added to Closed	Nodes Added to Fringe.
(A)	A	(B) (C)
(B)	B	(A) (C) (E) (D)
(C)	C	(A) (B) (E)
(A)	—	—
(C)	—	—
(E)	E	(C) (B) (D) (F)
(D)	D	(B) (E) (F)
(A)	—	—
(B)	—	—

Goal Found

DFS [A Possible Solution]

Fringe has (A)

Nodes Popped	Nodes Added to Closed	Nodes Added to Fringe
A	A	B C
C	C	A B E
E	E	C B D F

IDS [A Possible Soln]

Set $l = 0$ Fringe has (A/0) ---Depth.

Nodes Popped	States added to Closed	Nodes Added to Fringe
A/0	—	—
—	—	—

Search Failed

Set $l = 0$, Fringe has (A/0)

Nodes Popped	States added to closed	Nodes added to Fringe
(A/0)	A	(B/1) (C/1)
(C/1)	—	—
(B/1)	—	—
—	—	—

Search Failed.

Set $l = 2$, Fringe has (A/0)

Node Popped	St in closed	Nodes in Fringe.
(A/0)	A	(B/1) (C/1)
(C/1)	C	(A/2) (B/2) (E/2)
(E/2)	—	—

Search Failed.

Set $l = 3$ Fringe has $A/0$

Nodes Popped	States Added to Closed	Nodes Added to Fringe
$A/0$	A	$B/4$ $C/1$
$C/1$	C	$A/2$ $B/2$ $E/2$
$E/2$	E	$C/3$ $B/3$ $D/3$ $F/3$
$F/3$	—	—

=

Goal Found.

UCS [A Possible Solution]

Fringe has (A/0) ---- g(n)

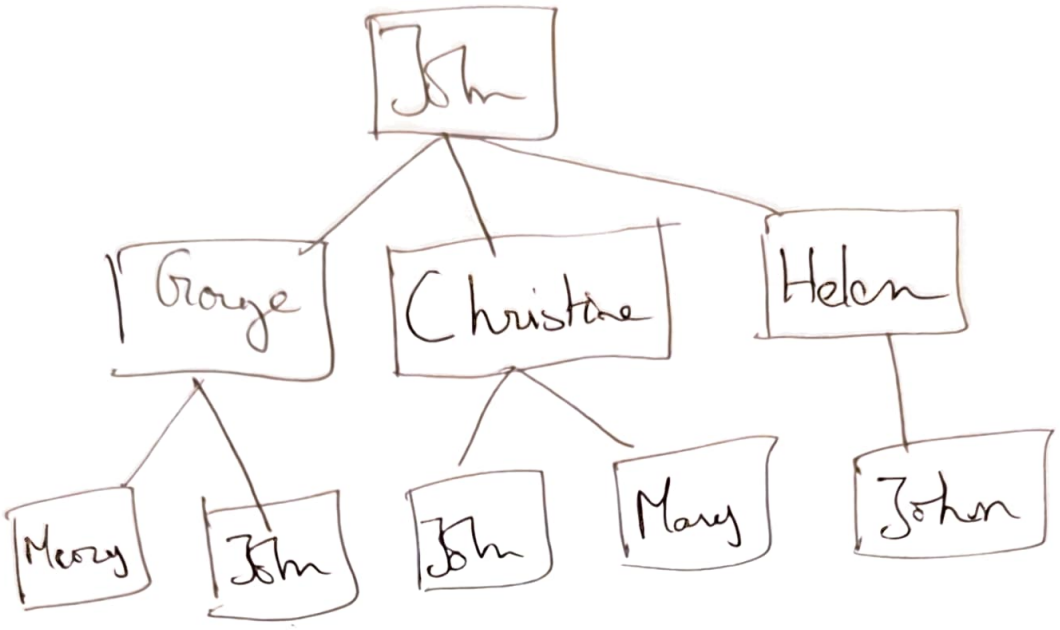
Nodes Popped	States Added to Closed	Nodes Added to Fringe
(A/0)	A	(B/2) (C/7)
(B/2)	B	(A/4) (B/10) (E/6) (D/11)
~~(A/4)~~	—	—
(E/6)	E	(C/12) (B/10) (D/10) (F/14)
(C/7)	C	(A/14) (B/15) (E/13)
(B/10)	—	—
(B/10)	—	—
(D/10)	D	(B/19) (B/14) (F/13)
(D/11)	—	—
(C/12)	—	—

Goal Found.

Task 2

(i) Closest degree of separation requires path with fewest number of hops (shallowest solution) since cost of any action is 1, BFS, UCS & IDS will give optimal solution.

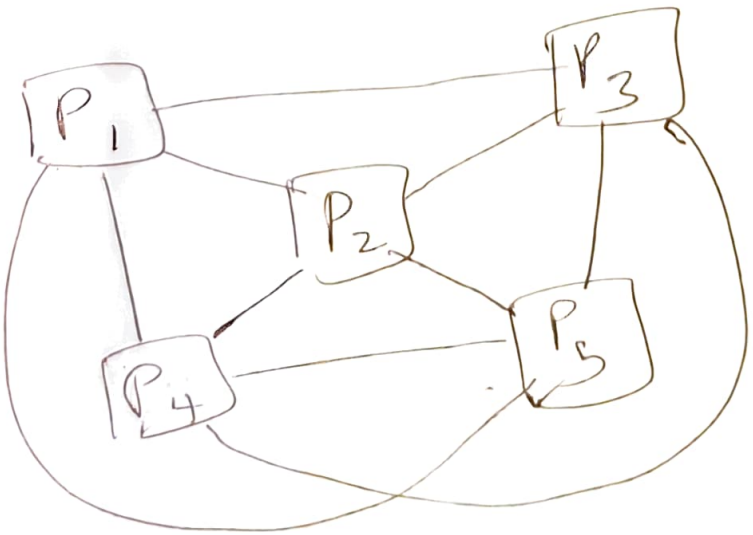
(II)



(III) No. As we can see above, the same State can be represented by many nodes.

(IV)

(V)



(vi)

For this we need to modify Tree Search with BFS to Graph seach with BFS where the check against goal is done when a node is generated rather than when it is popped from the Fringe.

T3

H1 NOT Admissible

$h(B) \leq 17 \quad h(C) \leq 5$

H2 NOT Admissible.

$h(A) \leq 27 \quad h(B) \leq 17$

$h(C) \leq 5 \quad h(D) = 0$

$h(E) \leq 25 \quad h(F) \leq 9$

H_3 & H_4 Admissible As Is.

Is

For Fig 4.

Consider 2,1 as Src.

4,3 as Goal.

Greedy will explore fewer nodes than A^*

Ex: 2,1 → 2,2 → 3,2 → 3,3 → 4,3

But A^*: 2,1; 2,3; 3,2; 3,3; 3,4; 4,3; 4,4

In all the scenios, Greedy & A^* will explore same set

Greedy performs better than or same as A^*

For Fig 5.

Depedy on scenario

Greedy performs better than A*

[Ex: 3,6 to 5,8]

worse than A*

[Ex: 3,1 to 3,2]

one same as A*

[Ex 4,6 to 4,8]