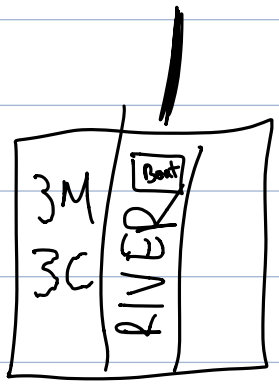
Phang Teng Fone 1003296 HW1

1. Let xM - number of Missionaries; yC - number of Cannibals. | denotes the side of the river.



State Space: All posible combination of nM and yC in the space of nM|yC; nMyC|; |nMyC; yC|nM. Constraint is that nM ≥ yC and | must exist.

m - missionaries
c - cannibals

Initial State: 3M3C|

Goal Test: |3M3C

Actions:

|2M	or	2M|
|2C	or	2C|
|1M1C	or	|1M1C|
|1M	or	1M|
|1C	or	1C|

Path Cost: Number of moves

2. a) Graph search has an explored set to keep track of nodes that had already been explored and visited while tree search can visit the same node multiple time.

b) A state is a physical configuration while a node is a data structure constituting part of a search tree (parent/child nodes/path cost etc)

c) Node. Node is a data structure that consist of information such as goal state, next nodes etc while the state has no configuration of the connected paths.

3. a) BFS (FIFO) Queue

Step	Frontier	Explored
1	A	–
2	AB, AC	A
3	AC, ABD	A, B
4	ABD	A, B, C
5	ABDX	A, B, C, D

∴ Solution is ABDX.

b) DFS (FILO) Stack

Step	Frontier	Explored
1	A	–
2	AB, AC	A
3	AB, ACD	A, C
4	AB, ACDX	A, C, D

∴ Solution is ACDX

c) ABA, ABC, ACB

d) ACA, ACB, ACDB

4. a) BFS (FIFO) Queue

Step	Frontier	Explored
1	A	–
2	AB, AC	A
3	AC, ABD	AB
4	ABD, ACE, ACF	ABC
5.	ACE, ACF, ABDH, ABDX	ABCD

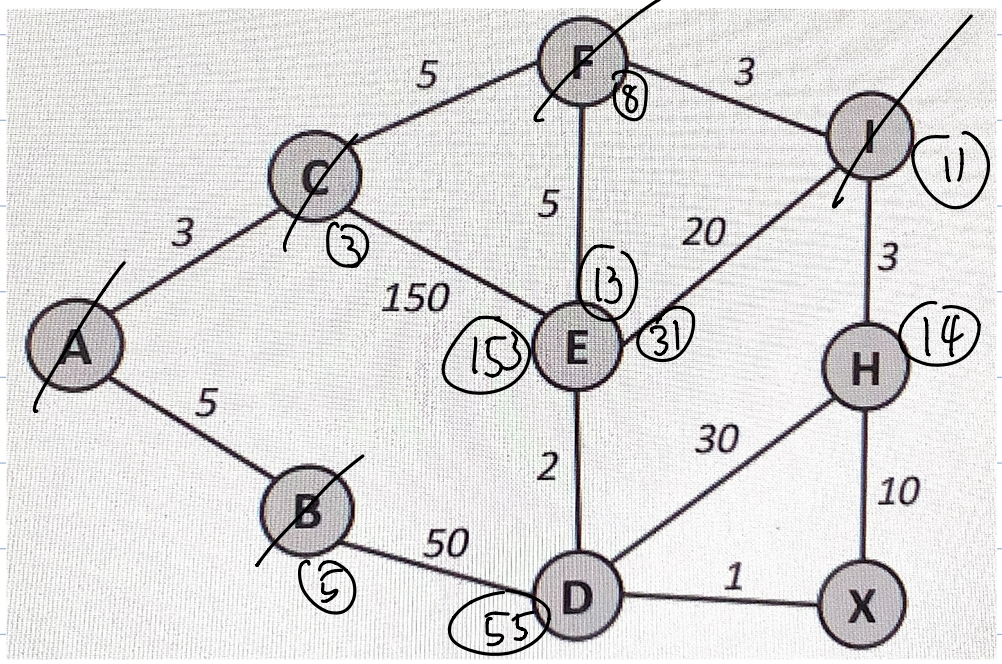
∴ Solution is ABDX.

b) DFS (FILO) Stack

Step	Frontier	Explored
1	A	–
2	AB, AC	A
3	AB, ACE, ACF	AC
4.	AB, ACE, ACFI	ACF
5.	AB, ACE, ACFIH	ACFI
6.	AB, ACE, ACFIHD, ACFIHX	ACFIH

∴ Solution is ACFIHX.

5.



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Step	Frontier	Explored
1	A(0)	–
2	A(C(3), AB(5)	A
3	AB(5), A(F(8), A(E(153)	A, C
4	ACF(8), ABD(55), ACE(153)	A, C, B
5	ACFI(11), ACFE(13), ABD(55)	A, C, B, F
6	ACFE(13), ACFIH(14), ABD(55)	A, C, B, F, I
7	ACFIH(14), ACFED(15)	A, C, B, F, I, E
8	ACFED(15), A(FIHX(24)	A, C, B, F, I, E, H
9	ACFEDX(16), ACFIHX(24)	A, C, B, F, I, E, H, D

∴ Solution is ACFEDX with 16 cost.