

Sample Solutions Tutorial 2 - Trees

Question 1 : Tree-connected graph, no cycles,
if there are n vertices then $n-1$ edges...

a) Tree, connected, no cycles, 6 vertices, 5 edges

b) Not a Tree ~ contains cycles...

c) Not a Tree ~ contains cycles

d) Tree, connected, no cycles, 6 vertices, $6-1=5$ edges.

Question 2 :

	A	B	C	D	E	F
A	0	4	∞	∞	15	20
B	4	0	10	7	12	∞
C	∞	10	0	6	∞	∞
D	∞	7	6	0	25	∞
E	15	12	∞	25	0	22
F	20	∞	∞	∞	22	0

∞ - infinity symbol

Question 3 :

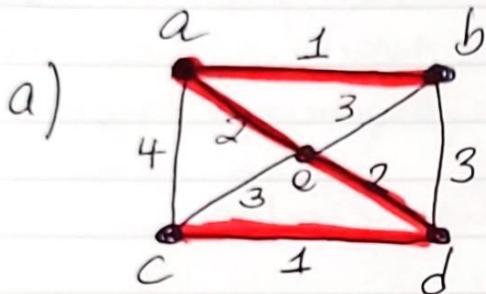
a) see lecture notes... Prim's Algorithm.

b) start at A

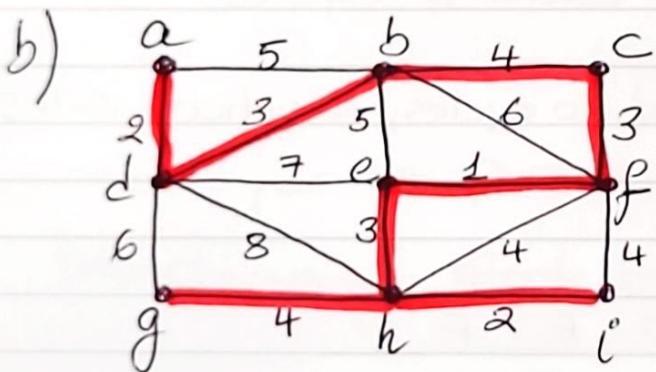
$T = \{ A \xrightarrow{\text{ab}} B \xrightarrow{\text{ad}} D \xrightarrow{\text{dc}} C \xrightarrow{\text{ce}} E \} \quad \begin{matrix} 5 \text{ vertices} \\ 4 \text{ edges} \end{matrix}$

Contains the original vertices, n vertices, $n-1$ edges, no cycle

Question 4:



$$T = \{Aab, Bae, Ead, Ddc, C\}$$



$$T = \{Ad, Ddb, Bbc, Ccf, Ffe, Eeh, Hhi, ihg, G\}$$

Question 6: see lecture notes for description...

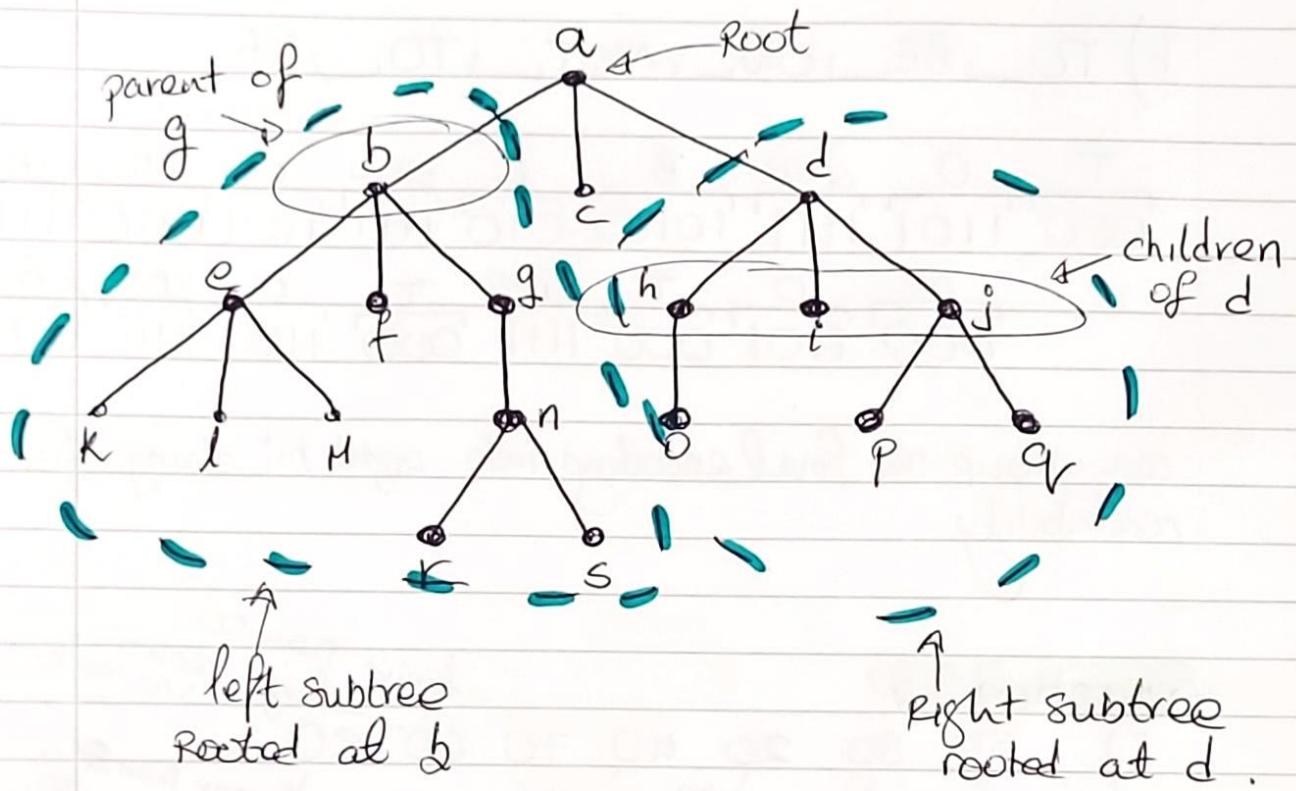
Question 7:

Root ~ a

children of d ~ h, e, j
parent of g ~ b

leaf nodes ~ K, l, m, f, r, s, c, o, i, p, q,

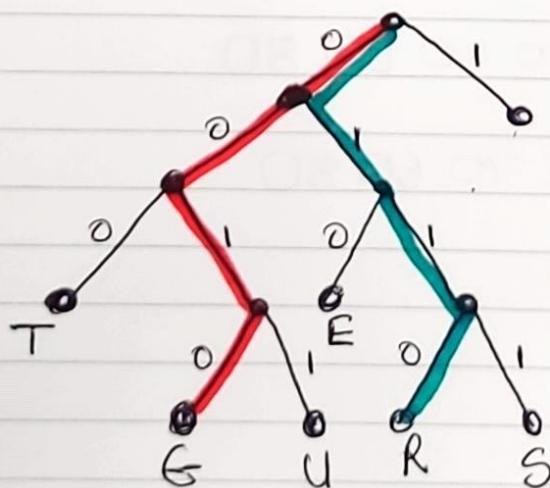
diagram over
page →



Question 8:

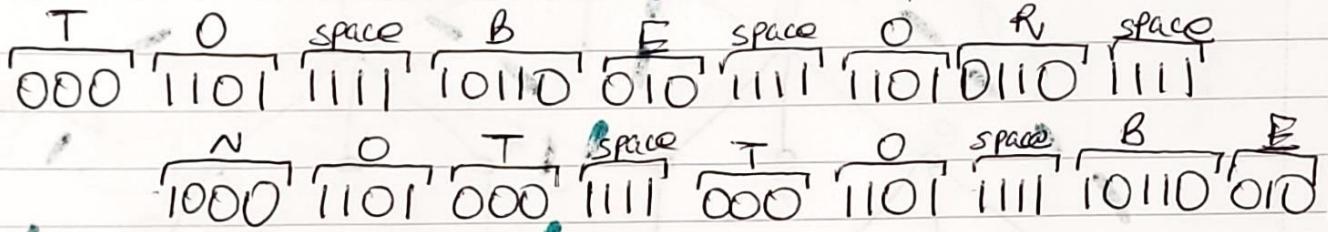
a) Decode: GRAPH THEORY IS FUN

e.g. GRAPH space
00100110 11101011 11010111 100...



(NOT the full diagram, see
the tutorial sheet)

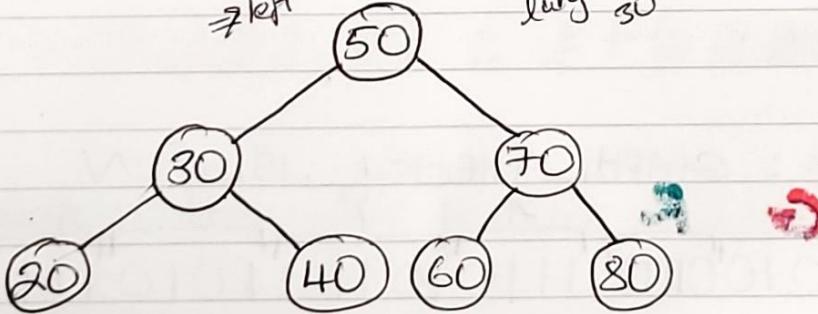
b) TO BE OR NOT TO BE



can group the final encodings into eight bit strings for readability

Question 9:

- i) 50 30 20 40 70 60 80 ,



- ii) BFS: 50 30 70 20 40 60 80

DFS: 50 30 20 40 70 60 80