CSE2DMO Discrete Maths Solutions to Assignment 3

1. $e_1 = v_1v_3$ $e_2 = v_2v_4$ $e_3 = v_4v_5$ $e_4 = v_1v_6$ $e_5 = v_2v_5$
   $e_6 = v_3v_6$ $e_7 = v_5v_6$ $e_8 = v_1v_4$ $e_9 = v_1v_5$ $e_{10} = v_2v_3$

	N(1)	N(2)	N(3)	N(4)	N(5)	N(6)	Edges	Weight
Initially	1	2	3	4	5	6	$\varnothing$	0
Step 1	1	2	1	4	5	6	e_1	1
Step 2	1	2	1	2	5	6	$e_1\ e_2$	3
Step 3	1	2	1	2	2	6	$e_1\ e_2\ e_3$	6
Step 4	1	2	1	2	2	1	$e_1\ e_2\ e_3\ e_4$	10
Step 5	1	2	1	2	2	1	$e_1\ e_2\ e_3\ e_4$	10
Step 6	1	2	1	2	2	1	$e_1\ e_2\ e_3\ e_4$	10
Step 7	1	1	1	1	1	1	$e_1\ e_2\ e_3\ e_4\ e_7$	17

Minimal spanning tree:- Edges $e_1\ e_2\ e_3\ e_4\ e_7$ Weight 17

2. (a)

List to be sorted	After Pass 1	After Pass 2	After Pass 3
→ Hash	→ Bubble	Binary*	Binary*
Insert	Binary	Bubble*	Bubble*
Bubble	Hash*	Hash*	Hash*
Quick	→ Insert	Insert*	Insert*
Select	Quick	→ Quick	Merge*
Merge	Select	Select	Quick*
Binary	Merge	Merge	Select*

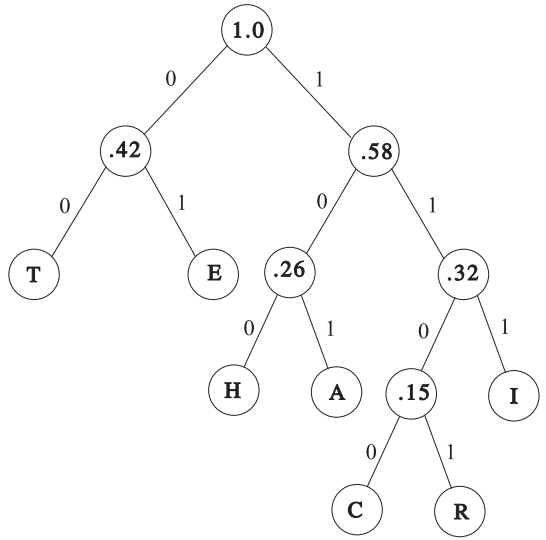
(b)

	Pass 1	Pass 2	Pass 3
Number of Comparisons	6	4	2

3. (b) ITERATE is encoded as: 111 00 01 1101 101 00 01
   (c) CHARACTER
   (d) ARCHITECT

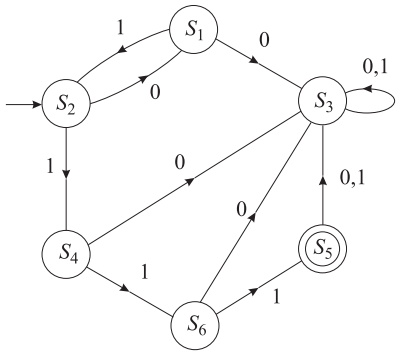
3. (a)

Character	Code
A	101
C	1100
E	01
H	100
I	111
R	1101
T	00

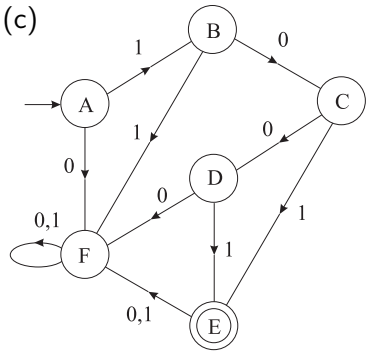


4. Eulerian path: a b c a f c d b e d f e

5. (a)



(c)



(b) $(01)^n111 : n \geq 0$ or $(01)^*111$.

6. (a) $(0|1)^*1111$ or $\{w1111 : w \text{ is any word}\}$
   (b)