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Question 1:

a) DFS

Order of vertex visit: {1,2,3,4,5,6,8,7}

Discovery edges in order of labeling: (1,2), (2,3), (3,4), (4,5), (5,6), (6,8), (5,7)

Back edges in order of labeling: (3,1), (5,3), (6,3), (8,4), (7,4)

b) BFS

Order of vertex visit: {1,2,3,4,5,6,7,8}

Lists Li: L0{(1), L1{(2), (3)}, L2{(4), (5), (6)}, L3{(7), (8)}

Discovery edges in order of labeling: (1,2), (1,3), (3,4), (3,5), (3,6), (4,7), (4,8)

Cross edges in order of labeling: (2,3), (4,5), (5,6), (5,7), (6,8)

Question 2: Dijkstra

a)

New Vertex	A	B	C	D	E	F	New Edge
A	0	5	∞	10	∞	4	---
F	0	5	∞	9	∞	4	(A,F)
B	0	5	7	8	∞	4	(A,B)
C	0	5	7	8	9	4	(B,C)
D	0	5	7	8	9	4	(B,D)
E	0	5	7	8	9	4	(D,E)

b) weight of shortest path spanning tree = $9+7+8+9 = 33$

Question 3:

a) Prim-Jarnik algorithm:

Edges in order they are added to MST (direction important): (A,F), (F,D), (D,E), (E,C), (E,B)

Total weight of the MST=14

b) Kruskal's algorithm

Edges in order they are added to MST: (D,E), (E,C), (C,B), (A,F), (A,B)

Total weight of the MST=14

Question 4:

a) chaining:

0	1	2	3	4	5	6	7	8	9	10
		13	3	15	5					
			->	->	->					
			25	4	16					

Average number of probes to find a key: $(10/7) = 1.43$

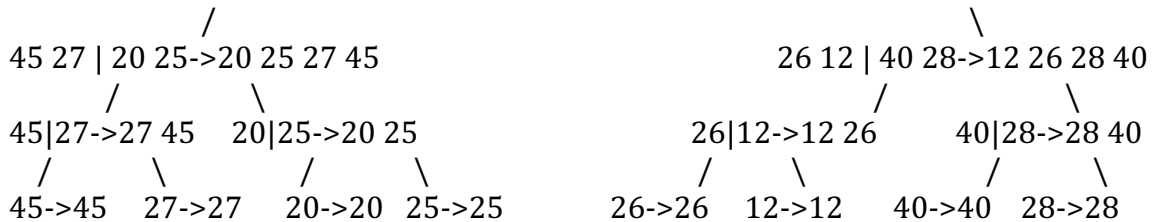
0	1	2	3	4	5	6	7	8	9	10
		13	3	15	5	16	25	4		

Average number of probes to find a key: $(12/7) = 1.71$

0	1	2	3	4	5	6	7	8	9	10
16		13	3	15	5			28	4	

Average number of probes to find a key: $(13/7) = 1.86$

45 27 20 25 | 26 12 40 28 → 12 20 25 26 27 28 40 45



a	b	S
-	-	[45, 27, 20, 25, 26, 12, 40, 28]
0	7	[12, 27, 20, 25, 26, 28, 40, 45]
0	4	[12, 25, 20, 26, 27, 28, 40, 45]
0	2	[12, 20, 25, 26, 27, 28, 40, 45]
6	7	[12, 20, 25, 26, 27, 28, 40, 45]
		[12, 20, 25, 26, 27, 28, 40, 45]

