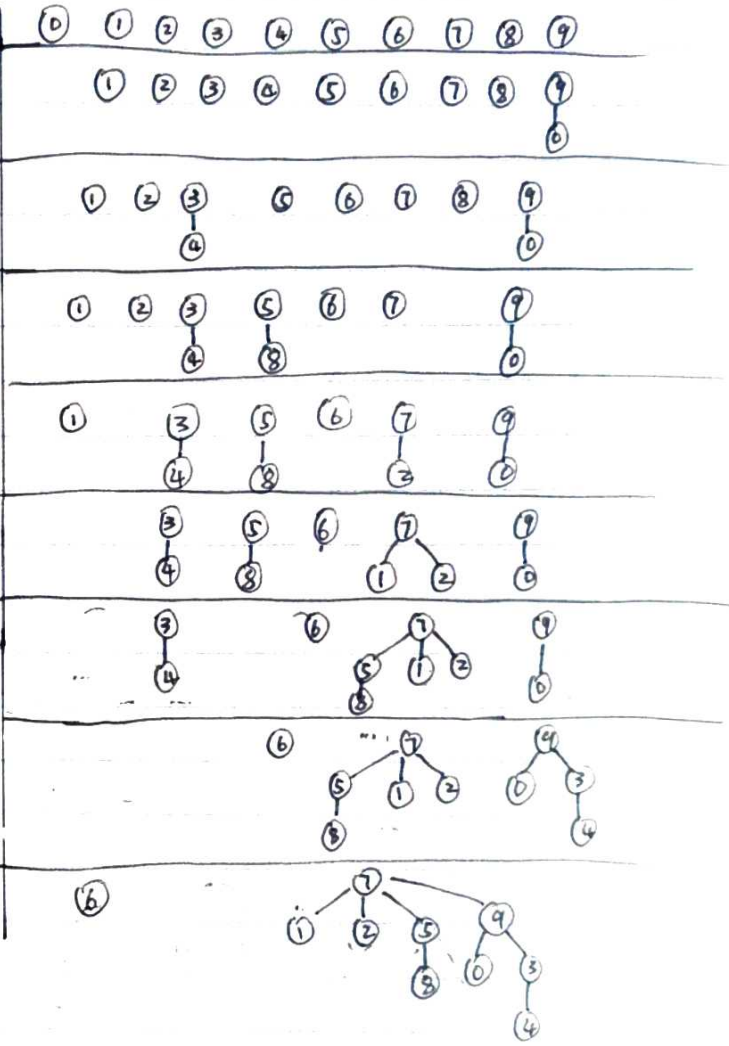
1. Suppose we have two minimum spanning tree A and B. If there is a edge which is the minimum weight in all edge in exactly A and B, and we call it e.
If $B \cup \{e\}$ must have a cycle and there must be a edge e' that not in A.
For $e \neq e'$, e or e' is contain in exactly A or B, and weight(e) < weight(e').
If $T = B \cup \{e\} - \{e'\}$ is still a spanning tree. weight(T) < weight(B), so we can say B is a minimum spanning tree

2. Do not know.

id[]

3

p	q	0	1	2	3	4	5	6	7	8	9
		0	1	2	3	4	5	6	7	8	9
9	0	9	1	2	3	4	5	6	7	8	9
3	4	9	1	2	3	4	5	6	7	8	9
		9	1	2	3	3	5	6	7	8	9
5	8	9	1	2	3	3	5	6	7	8	9
		9	1	2	3	3	5	6	7	5	9
7	2	9	1	2	3	3	5	6	7	5	9
		9	1	7	3	3	5	6	7	5	9
2	1	9	1	7	3	3	5	6	7	5	9
		9	7	7	3	3	5	6	7	5	9
5	7	9	7	7	3	3	5	6	7	5	9
		9	7	7	3	3	7	6	7	5	9
0	3	9	7	7	3	3	7	6	7	5	9
		9	7	7	9	3	7	6	7	5	9
4	2	9	7	7	9	3	7	6	7	5	9
		9	7	3	9	3	7	6	7	5	7



4. initially D=(0,∞,∞,∞.∞,∞,∞)

first: D=(0,4,7,5,∞,∞,∞)

2nd: D=(0,4.6,5.8,8,13)

3rd: D=(0,4,6,5,8,7,12)

4th: D=(0,4,6,5,8,7,11)

5th. D=(0,4,6,5,8,7,11)

6th D=(0,4,6,5,8,7,11)

5 (a) $M^2(i,j)=1$ means the graph G contains a path from i to j with two edges between i and j, and $M^2(i,j)=0$ means the graph G contain no path from i to j with two edge between i and j.

(b) The entrie in M^4 implies that $M^4(i,j)=1$ means the graph contain a path from i to j with 4 edge between i and j

$M^k=1$ means there is a path from a vertex to otherone with k edge between two vertex. if $M^k=0$, there is no path