Q1 Adjacency Matrix

	A	B	C	D	E	F	G	H	I
A	0	1	1	1	0	0	0	0	0
B	1	0	1	0	0	1	0	1	0
C	1	1	0	1	1	1	0	0	0
D	1	0	1	0	1	0	0	0	1
E	0	0	1	1	0	1	1	0	0
F	0	1	1	0	1	0	1	1	0
G	0	0	0	0	1	1	0	1	1
H	0	1	0	0	0	1	1	0	1
I	0	0	0	1	0	0	1	1	0

Q2 Find the shortest path from A to all other vertices using Dijkstras Algorithm

1. A { A-B : 22 ⇐ ; A-C : 9 ⇐ ; A-D : 12 ⇐ }
2. C { C-D : 13 X ; C-E : 74 X ; C-F : 51 ⇐ }
3. D { D-E : 45 ⇐ ; D-I : 42 ⇐ }
4. B { B-C : 57 X ; B-F : 58 X ; B-H : 56 ⇐ }
5. E { E-F : 63 X ; E-G : 68 ⇐ }
6. F { F-G : 90 X ; F-H : 75 X }
7. H { H-I : 75 X }
8. G { G-H : 93 X ; G-I : 89 X }

(4). I

dis:

A	B	C	D	E	F	G	H	I
0	22	9	12	45	51	68	56	42

path:

A	B	C	D	E	F	G	H	I
{ }	{A-B}	{A-C}	{A-D}	{A-D-E}	A-C-F	A-D-E-G	A-B-H	A-D-I

Q3 What is the time complexity?

Q4 Find a minimum spanning tree using Kruskal's Algorithm

$L = \{(C,D)_4, (A,C)_3, (E,F)_{18}, (H,I)_{19}, [illegible]_{21}(G,I), (A,B)_{22}, (E,G)_{23}, (F,H)_{24}, (G,H)_{25}$
$(B,I)_{30}, (B,E)_{31}, (B,H)_{34}, (B,C)_{35}, (B,F)_{36}, (F,G)_{39}, (C,F)_{42}, (C,E)_{65}\}$

Union-Find: $\{A\}, \{B\}, \{C\}, \{D\}, \{E\}, \{F\}, \{G\}, \{H\}, \{I\}$ => n = 9
MST edges = 9 - 1 = 8

fuck(C,D) => Find(C) ≠ find(D). Union(C,D)

$\{A\}, \{B\}, \{C,D\}, \{E\}, \{F\}, \{G\}, \{H\}, \{I\}$

fuck(A,C) => Find(A) ≠ Find(C). Union(A,C)

$\{A,C,D\}, \{B\}, \{E\}, \{F\}, \{G\}, \{H\}, \{I\}$

fuck(E,F) => Find(E) ≠ Find(F). Union(E,F)

$\{A,C,D\}, \{B\}, \{E,F\}, \{G\}, \{H\}, \{I\}$

fuck(H,I) => Find(H) ≠ Find(I). Union(H,I)

$\{A,C,D\}, \{B\}, \{E,F\}, \{G\}, \{H,I\}$

fuck(G,I) => Find(G) ≠ Find(I). Union(G,I)

$\{A,C,D\}, \{B\}, \{E,F\}, \{G,H,I\}$

fuck(A,B) => Find(A) ≠ Find(B). Union(A,B)

$\{A,B,C,D\}, \{E,F\}, \{G,H,I\}$

fuck(E,G) => Find(E) ≠ Find(G). Union(E,G)

$\{A,B,C,D\}, \{E,F,G,H,I\}$

fuck(B,I) => Find(B) ≠ Find(I). Union(B,I)

$\{A,B,C,D,E,F,G,H,I\}$ // we can stop here since we have n-1 edges