Asignment W3D5

Figure 1

Q 1

	A	B	C	D	E	F	G	H	I
A	0	22	9	12	0	0	0	0	0
B	22	0	35	0	0	36	0	34	0
C	9	35	0	4	65	42	0	0	0
D	12	0	4	0	33	0	0	0	30
E	0	0	65	33	0	18	23	0	0
F	0	36	42	0	18	0	39	24	0
G	0	0	0	0	23	39	0	25	21
H	0	34	0	0	0	24	25	0	19
I	0	0	0	30	0	0	21	19	0

Figure 2

Q . 6

	P	Q	R	S	T	U
P	0	1	0	6	7	0
Q	0	0	1	4	0	0
R	0	0	0	2	0	1
S	0	0	0	0	3	2
T	0	0	0	0	0	2
U	0	0	0	0	0	0

Dijkstra's algo

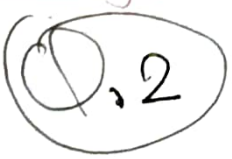
A[A] = 0

A[B] = A[A] + ω(A,B) ⇒ 0 + 22 ⇒ 22

A[C] = " + ω(A,C) ⇒ 0 + 9 ⇒ 9

A[D] = " + ω(A,D) ⇒ 0 + 12 ⇒ 12

A[C] = 9



A[B] = 22

A[D] = 12

A[B] = A[C] + ω(C,B) ⇒ 9 + 35 = 44

A[D] = " + ω(C,D) ⇒ 9 + 4 = 13

A[E] = " + ω(C,E) ⇒ 9 + 65 = 74

A[F] = " + ω(C,F) ⇒ 9 + 42 = 51

A[D] = 12

A[B] = 22

A[E] = 74

A[F] = 51

A[E] = A[D] + ω(D,E) ⇒ 12 + 33 = 45

A[I] = " + ω(D,I) ⇒ 12 + 30 = 42

A[B] = 22

A[E] = 45

A[F] = 51

A[I] = 42

A[F] = A[B] + ω(B,F) = 22 + 36 ⇒ 58

A[H] = " + ω(B,H) = 22 + 34 ⇒ 56

A[I] = 42

A[E] = 45

A[F] = 51

A[H] = 56

A[H] = A[I] + ω(I,H) ⇒ 42 + 19 ⇒ 61

A[G] = " + ω(I,G) ⇒ 42 + 21 ⇒ 63

A[E] = 45

A[F] = 51

A[H] = 56

A[G] = 63

A[F] = A[E] + ω(E,F) ⇒ 45 + 18 ⇒ 63

A[G] = " + ω(E,G) ⇒ 45 + 23 ⇒ 68

A[F] = 51

A[G] = 63
A[H] = 56

A[H] = 56
A[G] = A[F] + ω(F,G) ⇒ 51 + 39 = 90 A[G] = 63
A[H] = " + ω(F,H) ⇒ 51 + 24 = 75

~~A[G] = 63~~
A[

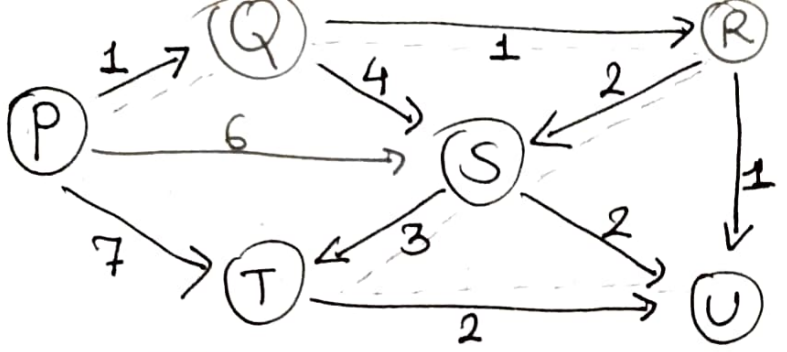
A	B	C	D	E	F	G	H	I
0	22	9	12	45	51	63	56	42

3. ~~O(n + m log n)~~ ~~O(n + m log n)~~

$n + m \log n \leq O(m(\log n))$

4. Not Studied Yet.

5. " ".



Q.7

Topology Order ⇒

P	Q	R	S	T	U

$D[P] = 0$

$D[Q] = 0 + 1 = 1$

$D[R] = D[Q] + \omega(Q,R) \Rightarrow 1 + 1 = 2$

$D[S] = \min\{D[P] + \omega(P,S), D[Q] + \omega(Q,S), D[R] + \omega(Q,B)\} \Rightarrow \min\{0+6, 1+4, 2+2\} \Rightarrow \min\{6,5,4\}$

$D[S] = 4$

$D[T] = \min\{D[P] + \omega(P,T), D[S] + \omega(S,T)\} \Rightarrow \min\{0+7, 3+4\} \Rightarrow \min\{7,7\}$

$D[T] = 7$

$D[U] = \min\{D[R] + \omega(U,R), D[S] + \omega(U,S), D[T] + \omega(U,T)\} \Rightarrow \min\{2+1, 3+2, 7+2\} \Rightarrow \min\{3,5,9\}$

$D[U] = 3$

0	1	2	4	7	3
P	Q	R	S	T	U

(8) ⇒ $O(n+m)$

(9) ⇒ Yes

(10) ⇒

$A[P] = 0$

$A[Q] = A[P] + \omega(P,Q) \Rightarrow 0 + 1 \Rightarrow 1$ $\quad A[Q] = 1$

$A[S] = \,\,''\,\, + \omega(P,S) \Rightarrow 0 + 6 \Rightarrow 6$

$A[T] = \,\,''\,\, + \omega(P,T) \Rightarrow 0 + 7 \Rightarrow 7$

$A[S] = 6$

$A[T] = 7$

$A[S] = A[Q] + \omega(Q,S) \Rightarrow 1 + 4 \Rightarrow 5$ $\quad A[R] = 2$

$A[R] = \,\,''\,\, + \omega(Q,R) \Rightarrow 1 + 1 \Rightarrow 2$

$A[S] = 5$

$A[T] = 7$

$A[S] = A[R] + \omega(R,S) \Rightarrow 2 + 2 \Rightarrow 4$ $\quad A[U] = 3$

$A[U] = \,\,''\,\, + \omega(R,U) \Rightarrow 2 + 1 \Rightarrow 3$

$A[S] = 4$

$A[T] = 7$ $\quad A[S] = 4$

$A[T] = 7$

$A[T] = A[S] + \omega(T,S) \Rightarrow 4 + 3 = 7$ $\quad A[T] = 7$