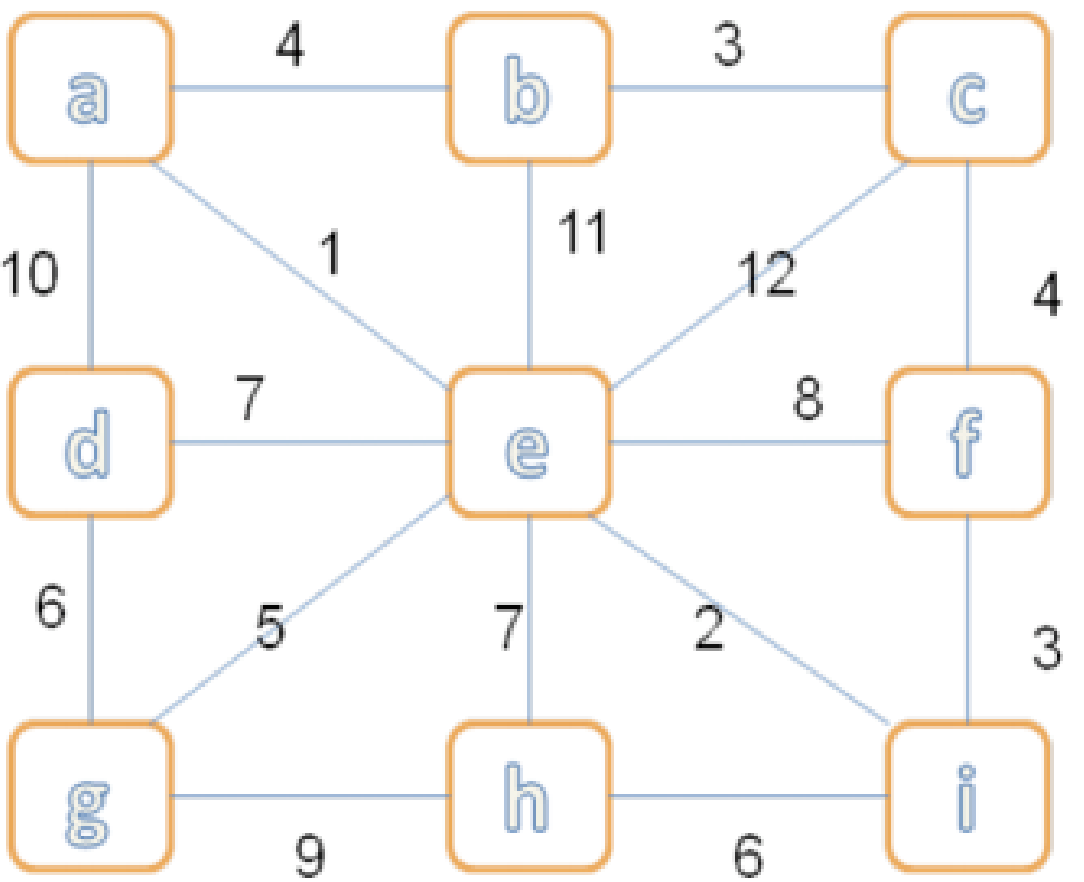
CSE 332 Winter 2011
Section Worksheet 7 Solutions

Dijkstra's Algorithm – Shortest Paths

Draw the following graph:
V={a,b,c,d,e,f,g,h,i}
E={ (a,b):4, (a,e):1, (a,d):10,
(b,e):11, (b,c):3,
(c,e):12, (c,f):4,
(d,e):7, (d,g):6,
(e,g):5, (e,h):7,
(e,i):2, (e,f):8,
(f,i):3,
(g,h):9,
(h,i):6 }

where (x,y):z represents an undirected edge between x & y with weight z.

Find the shortest path from vertex *a* to each vertex using Dijkstra's algorithm. As with your homework problem, please show (1) the *order* in which the vertices are added to the "known" cloud, and (2) table with best-known distance and predecessor node on the path.



First, visit “A”:

Vertex	Known	Distance	Path
A	T	0	-
B	F		
C	F		
D	F		
E	F		
F	F		
G	F		
H	F		
I	F		

Then explore all A’s edges.

Vertex	Known	Distance	Path
A	T	0	-
B	F	4	A
C	F		
D	F	10	A
E	F	1	A
F	F		
G	F		
H	F		
I	F		

Then pick the next lowest distance found so far, which is for E, with a distance of 1 through A.

Explore ‘E’

Vertex	Known	Distance	Path
A	T	0	-
B	F	4	A
C	F	13	E
D	F	8	E
E	T	1	A
F	F	9	E
G	F	6	E
H	F	8	E
I	F	3	E

Continue in this fashion.

Explore 'I'

Vertex	Known	Distance	Path
A	T	0	-
B	F	4	A
C	F	13	E
D	F	8	E
E	T	1	A
F	F	6	I
G	F	6	E
H	F	8	E
I	T	3	E

Explore 'B'

Vertex	Known	Distance	Path
A	T	0	-
B	T	4	A
C	F	7	B
D	F	8	E
E	T	1	A
F	F	6	I
G	F	6	E
H	F	8	E
I	T	3	E

Explore 'F'

Vertex	Known	Distance	Path
A	T	0	-
B	T	4	A
C	F	7	B
D	F	8	E
E	T	1	A
F	T	6	I
G	F	6	E
H	F	8	E
I	T	3	E

Explore 'G'

Vertex	Known	Distance	Path
A	T	0	-
B	T	4	A
C	F	7	B
D	F	8	E
E	T	1	A
F	T	6	I
G	T	6	E
H	F	8	E
I	T	3	E

Explore 'C'

Vertex	Known	Distance	Path
A	T	0	-
B	T	4	A
C	T	7	B
D	F	8	E
E	T	1	A
F	T	6	I
G	T	6	E
H	F	8	E
I	T	3	E

Explore "D"

Vertex	Known	Distance	Path
A	T	0	-
B	T	4	A
C	T	7	B
D	T	8	E
E	T	1	A
F	T	6	I
G	T	6	E
H	F	8	E
I	T	3	E

Explore 'H'

Vertex	Known	Distance	Path
A	T	0	-
B	T	4	A
C	T	7	B
D	T	8	E
E	T	1	A
F	T	6	I
G	T	6	E
H	T	8	E
I	T	3	E

Order added is: a e i b f g c d h