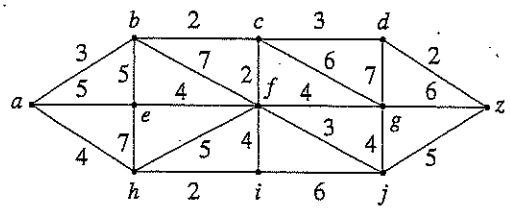
**Dijkstra's Algo Part 2** **Worksheet 9**

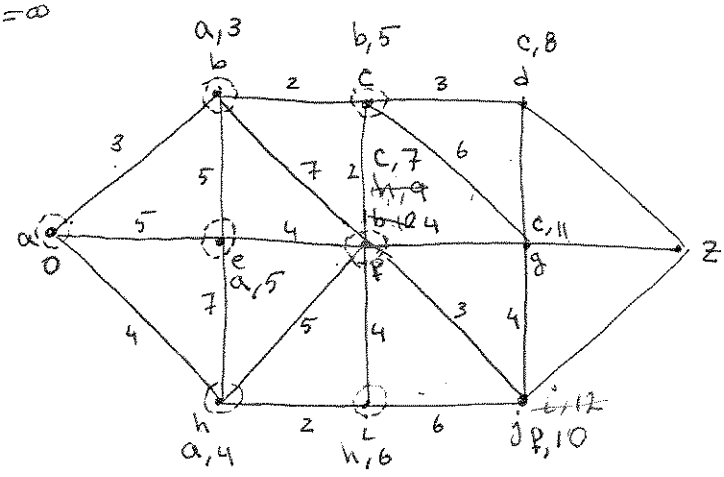
**Name:** **Date:**

Find the length of the shortest path and a shortest path between each pair of vertices in the weighted graph.

1. $a, f$




Initialize: $L(a)=0, L(b)=\dots=L(z)=\infty$




1st iteration:

circle vertex a

$L(b) = \min\{\infty, 0+3\} = 3$
$L(e) = \min\{\infty, 0+5\} = 5$
$L(h) = \min\{\infty, 0+4\} = 4$

2nd iteration:

circle vertex b

$L(e) = \{5, 3+5\} = 5$ ✓
$L(c) = \{\infty, 3+2\} = 5$ ✓
$L(f) = \{\infty, 3+7\} = 10$ ✓

3rd iteration

circle vertex h

$L(i) = \min\{\infty, 4+2\} = 6$
$L(f) = \min\{10, 4+5\} = 9$ ✓
$L(e) = \min\{5, 4+7\} = 5$ ✓

4th iteration

circle vertex e

$L(f) = \min\{9, 5+4\} = 9$ ✓

5th iteration

circle vertex c

$L(f) = \min\{9, 5+2\} = 7$ $L(g) = \min\{\infty, 5+6\} = 11$

4th iteration

Circle vertex c

$L(f) = \min\{9, 7\} = 7$ ✓
$L(d) = \min\{\infty, 5+3\} = 8$
$L(g) = \min\{\infty, 5+6\} = 11$

5th iteration

circle vertex e

↓ $L(f) = \min\{7, 5+4\} = 7$

6th iteration

Circle vertex i

$L(f) = \{7, 6+4\} = 7$
$L(j) = \{\infty, 6+6\} = 12$

7th iteration

Circle vertex f

$L(g) = \min\{11, 7+4\} = 11$
$L(j) = \min\{12, 7+3\} = 10$

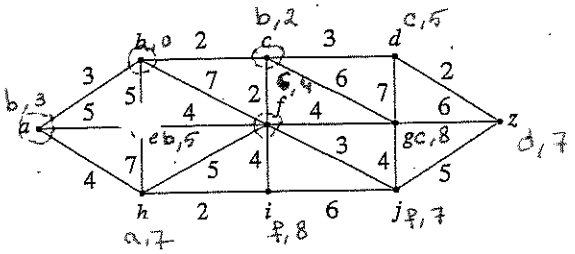
path:

path:

(a, b, c, f)

Length: 7

2. b, j




Initial step: $L(b) = 0$

$L(a) = L(c) = \dots = L(z) = \infty$

1st iteration $L(a) = \min\{\infty, 0+3\} = 3$, $L(e) = 5$, $L(c) = 2$, $L(f) = 7$

Circle vertex b

2nd iteration $L(f) = 4$, $L(d) = 5$, $L(g) = 8$

Circle vertex c

3rd iteration $L(e) = 5$, $L(h) = 7$

Circle vertex a

4th iteration $L(h) = 7$, $L(j) = 7$, $L(i) = 8$

Circle vertex f

5th iteration $L(g) = 8$, $L(z) = 7$

Circle vertex d

Circle vertex e $L(h) = 7$

6th iteration $L(i) = 8$, $L(g) = 8$

Circle vertex j $L(z) = 7$

Circle vertex h

$L(i) = 8$

Circle vertex z

$L(g) = 8$, $L(j) = 7$,

Path: (b, c, f, j)

length: 7