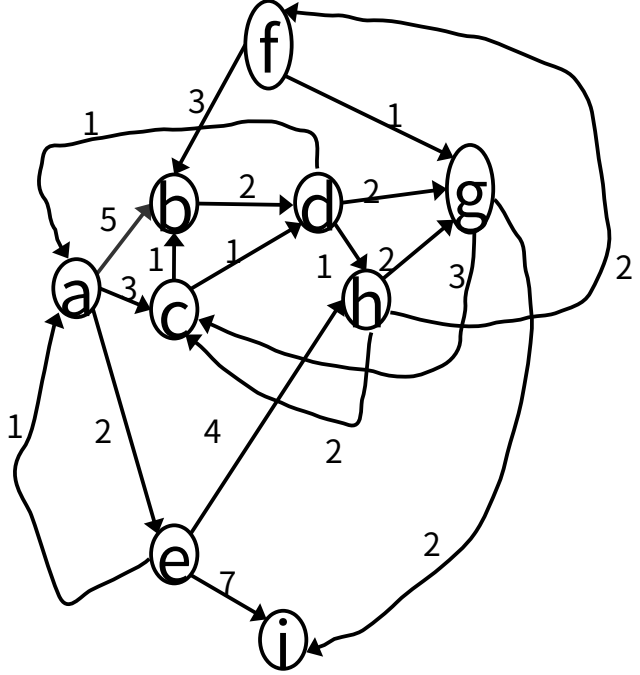


```
graph.add_edge('a', 'b', weight=5)
graph.add_edge('a', 'c', weight=3)
graph.add_edge('a', 'e', weight=2)
graph.add_edge('b', 'd', weight=2)
graph.add_edge('c', 'b', weight=1)
graph.add_edge('c', 'd', weight=1)
graph.add_edge('d', 'a', weight=1)
graph.add_edge('d', 'g', weight=2)
graph.add_edge('d', 'h', weight=1)
graph.add_edge('e', 'a', weight=1)
graph.add_edge('e', 'h', weight=4)
graph.add_edge('e', 'i', weight=7)
graph.add_edge('f', 'b', weight=3)
graph.add_edge('f', 'g', weight=1)
graph.add_edge('g', 'c', weight=3)
graph.add_edge('g', 'i', weight=2)
graph.add_edge('h', 'c', weight=2)
graph.add_edge('h', 'f', weight=2)
graph.add_edge('h', 'g', weight=2)

shortest_path = ShortestPath(graph)
result = shortest_path.find_shortest_path('a', 'I')    should be 8
self.assertEqual(result, ['a', 'c', 'd', 'g', 'i'])
```

| unvisited | | | | | | | | | a | b | c | d | e | f | g | h | i | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | b | c | d | e | f | g | h | i | inf | inf | inf | inf | inf | inf | inf | inf | inf | {a:None, b:None, c:None, d:None, e:None, f:None, g:None, h:None, i:None} | |
| | | | | | | | | a | | | | | | | | | | aは指定される | |
| | | | | | | | | A=0 | 0 | inf | inf | inf | inf | inf | inf | inf | inf | | |
| | | | | | | | | | | | | | | | | | | aのadjacent nodes(b5/c3/e2。数値はaから) | |
| | | | | | | | | | 0 | 5 | 3 | inf | 2 | inf | inf | inf | inf | weightが低いeからc、bへ(0+5=5, 0+3=3, 0+2=2) | Cが最低値で更新される。fromはA |
| | b | c | d | e | f | g | h | i | | | | | | | | | | aはvisited | {a:None, b:A, c:A, d:None, e:A, f:None, g:None, h:None, i:None} |
| | | | | | | | | E=2 | | | | | | | | | | unvisitedの一番低いweightのノードを選択。eを選択 | |
| | | | | | | | | | | | | | | | | | | eのadjacent nodes(a1/h4/i7。数値はeから) | |
| | | | | | | | | | 0 | 5 | 3 | inf | 2 | inf | inf | inf | inf | a=2+1=3で現在値0がそのまま | |
| | | | | | | | | | 0 | 5 | 3 | inf | 2 | inf | inf | 6 | inf | H=2+4=6 | |
| | | | | | | | | | 0 | 5 | 3 | inf | 2 | inf | inf | 6 | 9 | I=2+7=9 | {a:None, b:A, c:A, d:None, e:A, f:None, g:None, h:E, i:E} |
| | b | c | d | | f | g | h | i | | | | | | | | | | eはvisited | |
| | | | | | | | | C=3 | 0 | 5 | 3 | inf | 2 | inf | inf | 6 | 9 | unvisitedの一番低いweightのノードを選択。cを選択 | |
| | | | | | | | | | | | | | | | | | | cのadjacent nodes(b1/d1。数値はcから) | |
| | | | | | | | | | 0 | 4 | 3 | inf | 2 | inf | inf | 6 | 9 | B=3+1=4 | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | inf | inf | 6 | 9 | D=3+1=4 | Dが最低値で更新される。fromはC |
| | b | | d | | f | g | h | i | 0 | 4 | 3 | 4 | 2 | inf | inf | 6 | 9 | cはvisited | {a:None, b:C, c:A, d:C, e:A, f:None, g:None, h:E, i:E} |
| | | | | | | | | B=4 | 0 | 4 | 3 | 4 | 2 | inf | inf | 6 | 9 | unvisitedの一番低いweightのノードを選択。bを選択 | |
| | | | | | | | | | | | | | | | | | | bのadjacent nodes(d2。数値はbから) | 変わらず |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | inf | inf | 6 | 9 | D=4+2=6。現在値4なのでアップデートしない | {a:None, b:C, c:A, d:C, e:A, f:None, g:None, h:E, i:E} |
| | | | d | | f | g | h | i | 0 | 4 | 3 | 4 | 2 | inf | inf | 6 | 9 | bはvisited | |
| | | | | | | | | D=4 | | | | | | | | | | unvisitedの一番低いweightのノードを選択。dを選択 | |
| | | | | | | | | | | | | | | | | | | dのadjacent nodes(a1/g2/h1。数値はdから) | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | inf | inf | 6 | 9 | A=4+1=5。アップデート無し | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | inf | 6 | 6 | 9 | G=4+2=6 | Gが最低値で更新される。fromはD |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | inf | 6 | 5 | 9 | H=4+1=5 | {a:None, b:C, c:A, d:C, e:A, f:None, g:D, h:D, i:E} |
| | | | | f | g | h | i | | 0 | 4 | 3 | 4 | 2 | inf | 6 | 5 | 9 | dはvisited | |
| | | | | | | | | H=5 | | | | | | | | | | unvisitedの一番低いweightのノードを選択。hを選択 | |
| | | | | | | | | | | | | | | | | | | hのadjacent nodes(c2/f2/g2。数値はhから) | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | inf | 6 | 5 | 9 | C=5+2=7 | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 9 | F=5+2=7 | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 9 | G=5+2=7 | {a:None, b:C, c:A, d:C, e:A, f:H, g:D, h:D, i:E} |
| | | | | f | g | | l | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 9 | hはvisited | |
| | | | | | | | | G=6 | | | | | | | | | | unvisitedの一番低いweightのノードを選択。gを選択 | |
| | | | | | | | | | | | | | | | | | | gのadjacent nodes(c3/i2。数値はgから) | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 9 | C=6+3=9 | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 8 | I=6+2=8 | iが最低値で更新される。fromはG |
| | | | | f | | | l | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 8 | gはvisited | {a:None, b:C, c:A, d:C, e:A, f:H, g:D, h:D, i:G} |
| | | | | | | | | F=7 | | | | | | | | | | unvisitedの一番低いweightのノードを選択。fを選択 | |
| | | | | | | | | | | | | | | | | | | fのadjacent nodes(b3/g1。数値はfから) | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 8 | B=7+3=10 | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 8 | G=7+1=8 | |
| | | | | | | | l | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 8 | fはvisited | |
| | | | | | | | | I=8 | | | | | | | | | | unvisitedの一番低いweightのノードを選択。iを選択 | |
| | | | | | | | | | | | | | | | | | | iのadjacent nodes無し | |
| | | | | | | | | | 0 | 4 | 3 | 4 | 2 | 7 | 6 | 5 | 8 | iはvisited | |
| | | | | | | | | | | | | | | | | | | unvisited無しで終わり | |