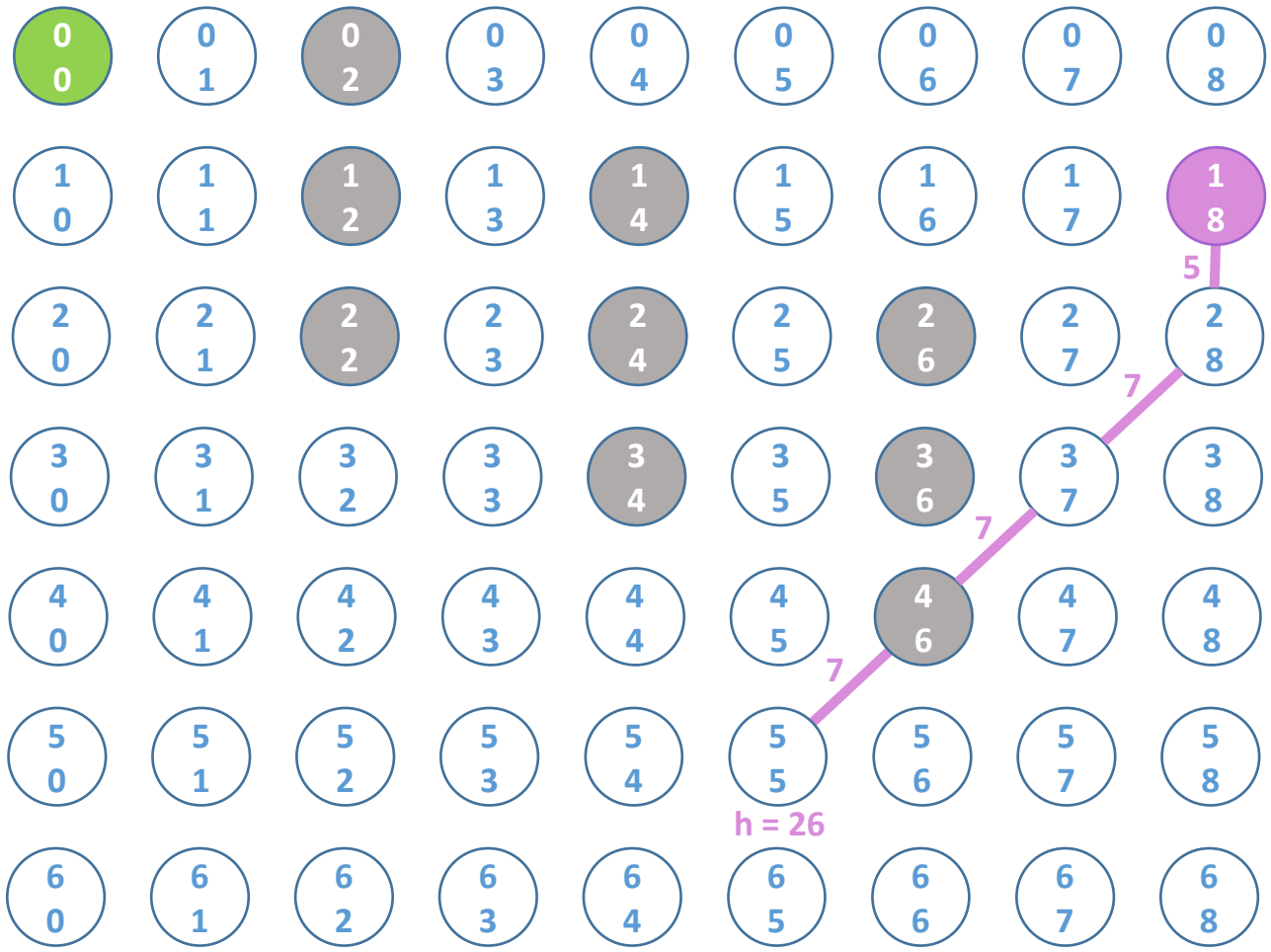
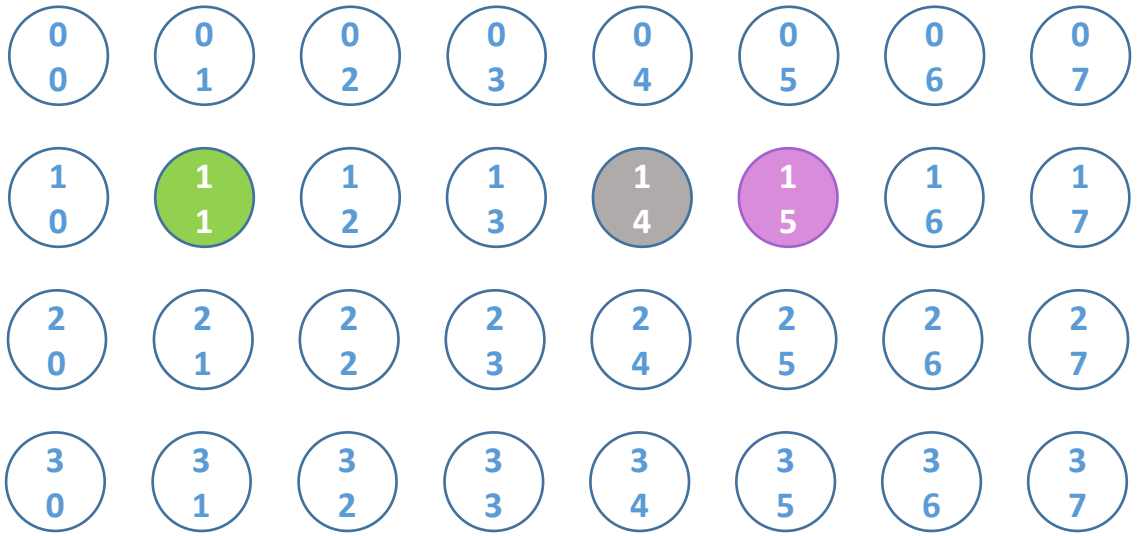
# Jump Point Search Algorithm

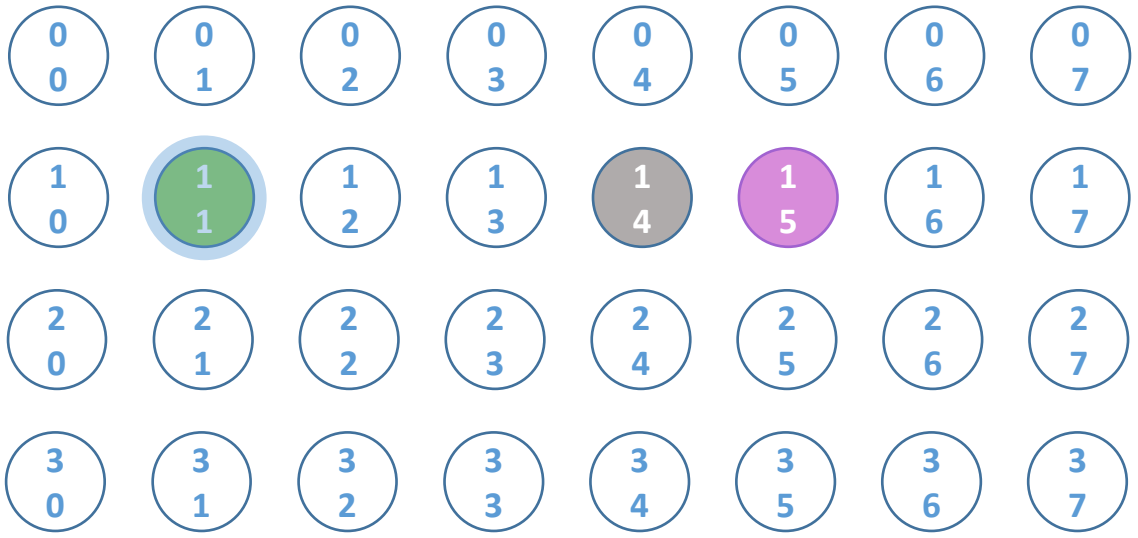
# Jump Point Search Algorithm




# Jump Point Search Algorithm – A simple case

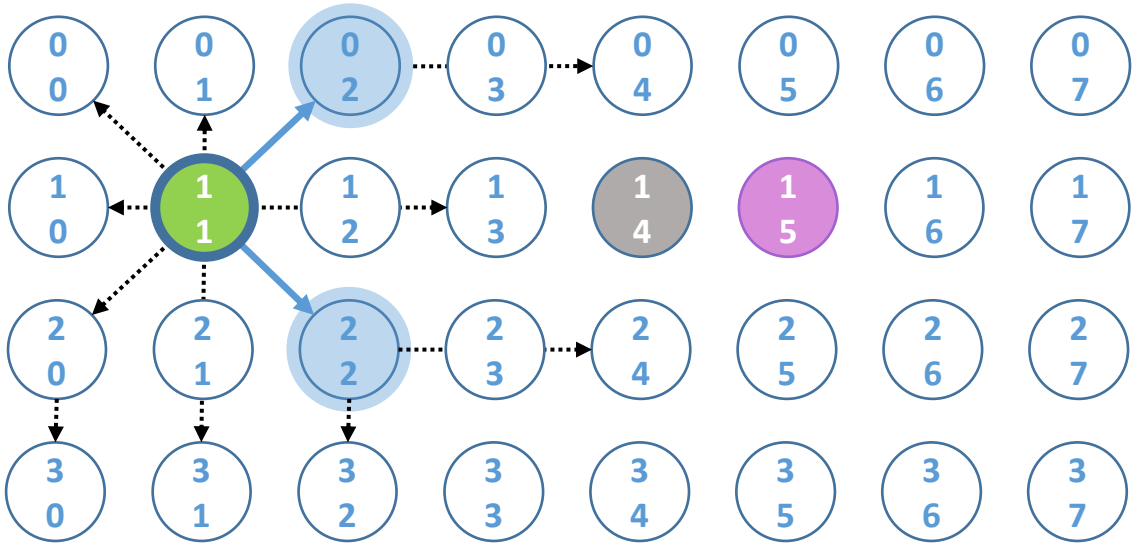


# Jump Point Search Algorithm – A simple case



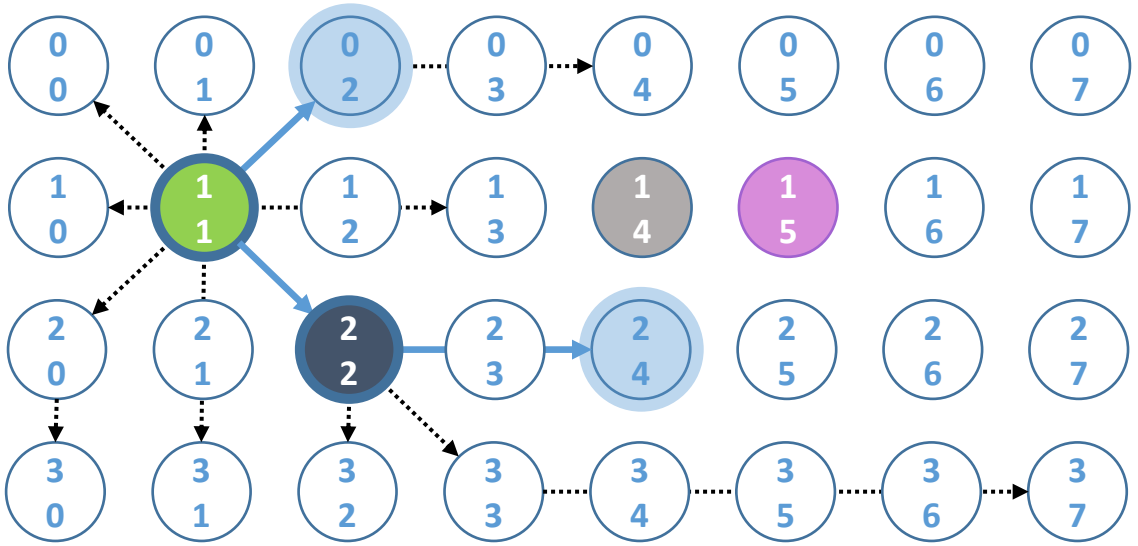

```
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 0, None)
```

# Jump Point Search Algorithm – A simple case



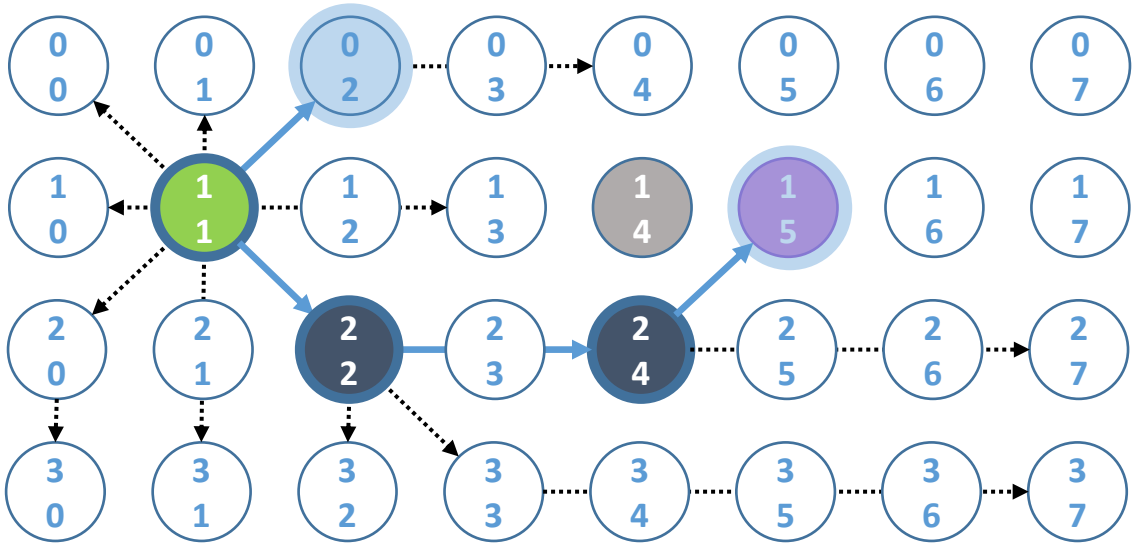

```
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 0, None)

Exploring vertex (1, 1)
Visiting/queueing vertex (0, 2)
Visiting/queueing vertex (2, 2)
Prioritized vertices (v, cost, dir): ((2, 2), 24, 7) ((0, 2), 24, 1)
```

# Jump Point Search Algorithm – A simple case



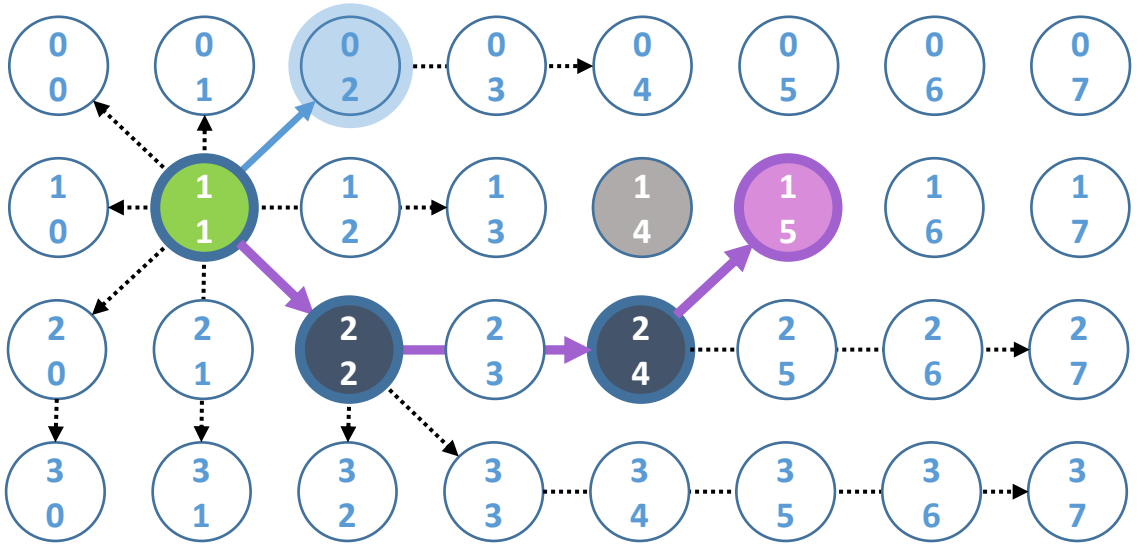

```
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 0, None)

Exploring vertex (1, 1)
Visiting/queueing vertex (0, 2)
Visiting/queueing vertex (2, 2)
Prioritized vertices (v, cost, dir): ((2, 2), 24, 7) ((0, 2), 24, 1)

Exploring vertex (2, 2)
Visiting/queueing vertex (2, 4)
Prioritized vertices (v, cost, dir): ((2, 4), 24, 0) ((0, 2), 24, 1)
```

# Jump Point Search Algorithm – A simple case



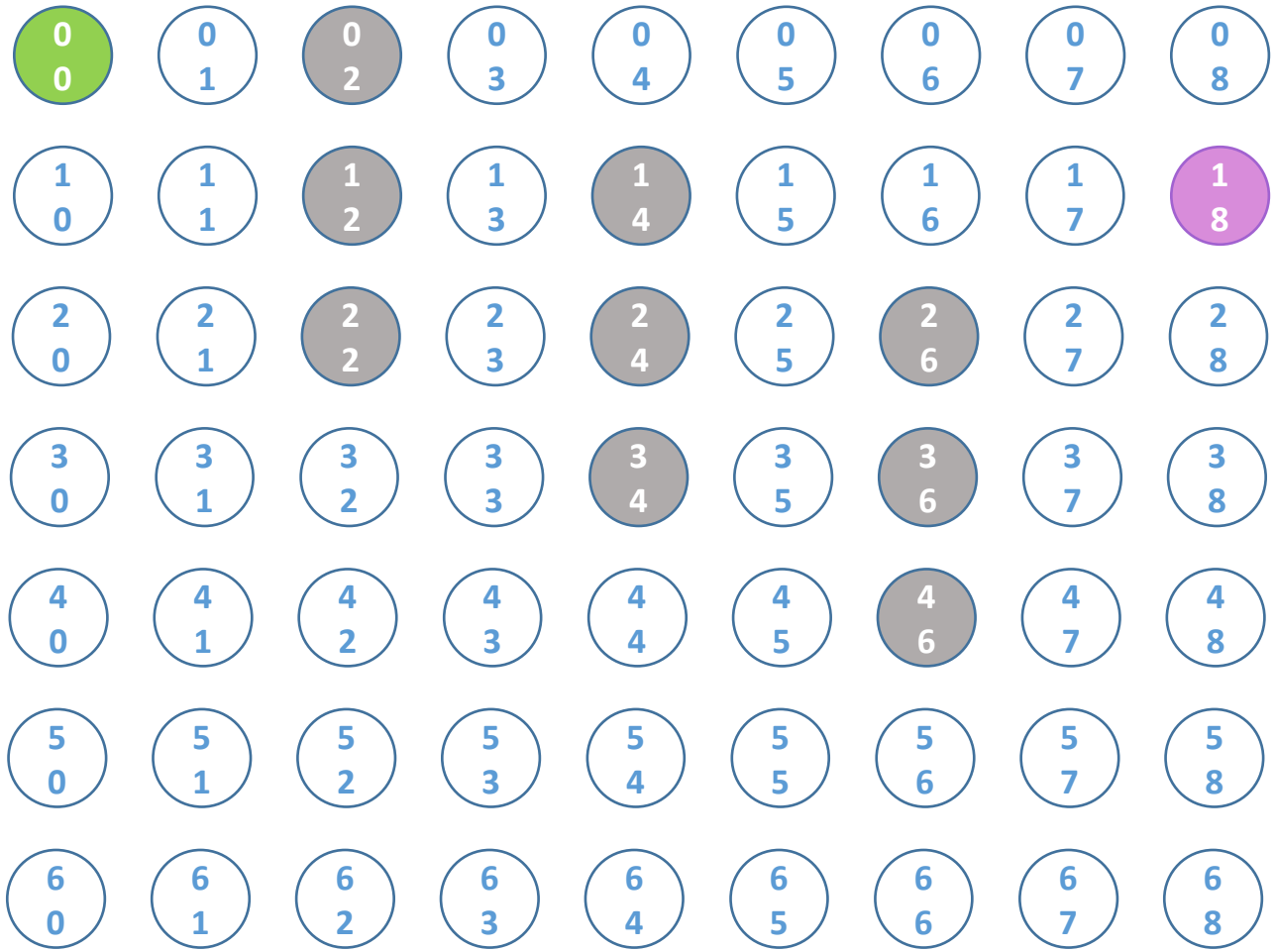

```
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 0, None)

Exploring vertex (1, 1)
Visiting/queueing vertex (0, 2)
Visiting/queueing vertex (2, 2)
Prioritized vertices (v, cost, dir): ((2, 2), 24, 7) ((0, 2), 24, 1)

Exploring vertex (2, 2)
Visiting/queueing vertex (2, 4)
Prioritized vertices (v, cost, dir): ((2, 4), 24, 0) ((0, 2), 24, 1)

Exploring vertex (2, 4)
Visiting/queueing vertex (1, 5)
Prioritized vertices (v, cost, dir): ((1, 5), 24, 1) ((0, 2), 24, 1)
```

# Jump Point Search Algorithm – A simple case



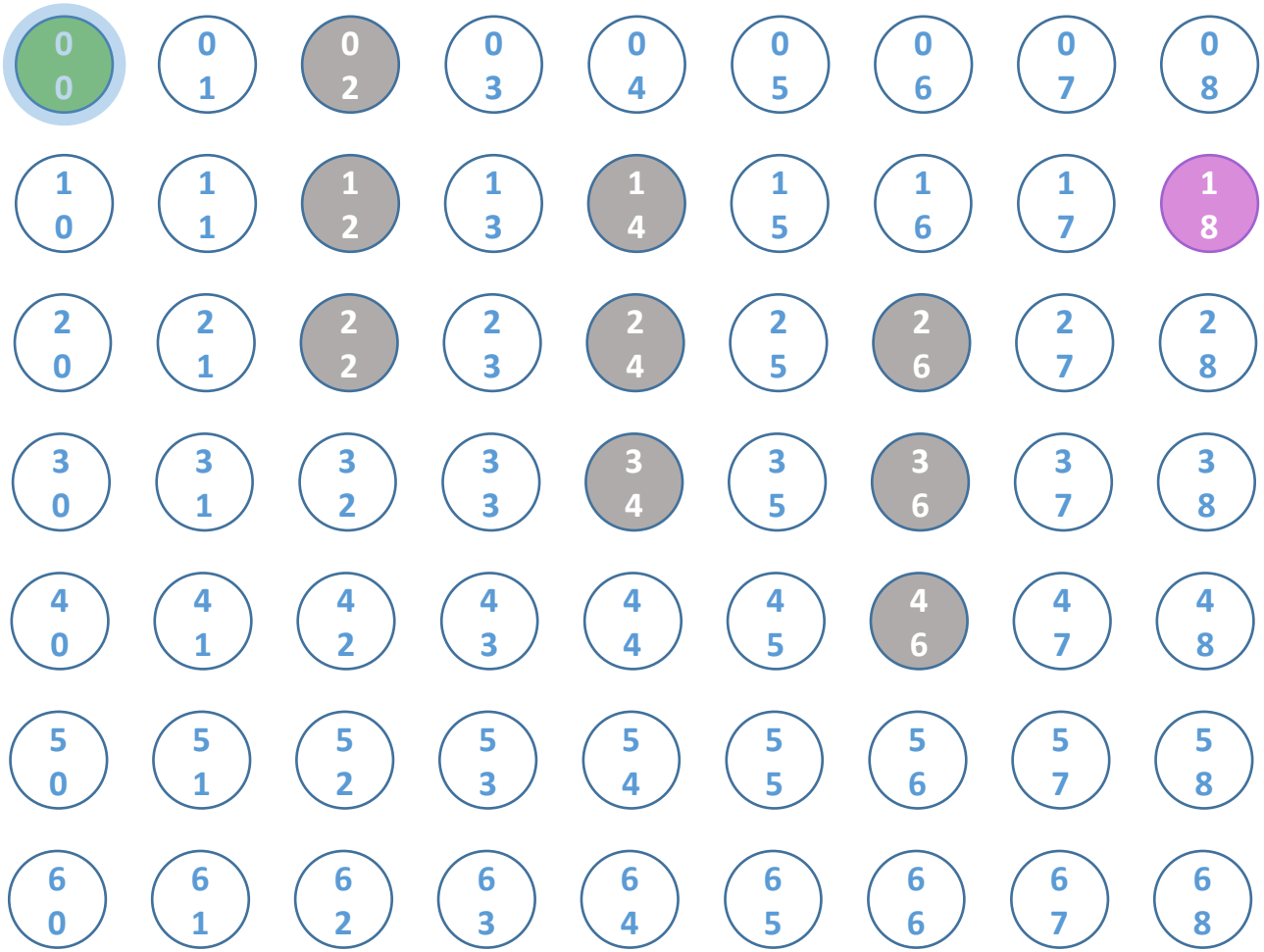

```
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 0, None)

Exploring vertex (1, 1)
Visiting/queueing vertex (0, 2)
Visiting/queueing vertex (2, 2)
Prioritized vertices (v, cost, dir): ((2, 2), 24, 7) ((0, 2), 24, 1)

Exploring vertex (2, 2)
Visiting/queueing vertex (2, 4)
Prioritized vertices (v, cost, dir): ((2, 4), 24, 0) ((0, 2), 24, 1)

Exploring vertex (2, 4)
Visiting/queueing vertex (1, 5)
Prioritized vertices (v, cost, dir): ((1, 5), 24, 1) ((0, 2), 24, 1)

Exploring vertex (1, 5)
Search path found: (1, 1) -> (2, 2) -> (2, 4) -> (1, 5)
```

# Jump Point Search Algorithm - A less simple case

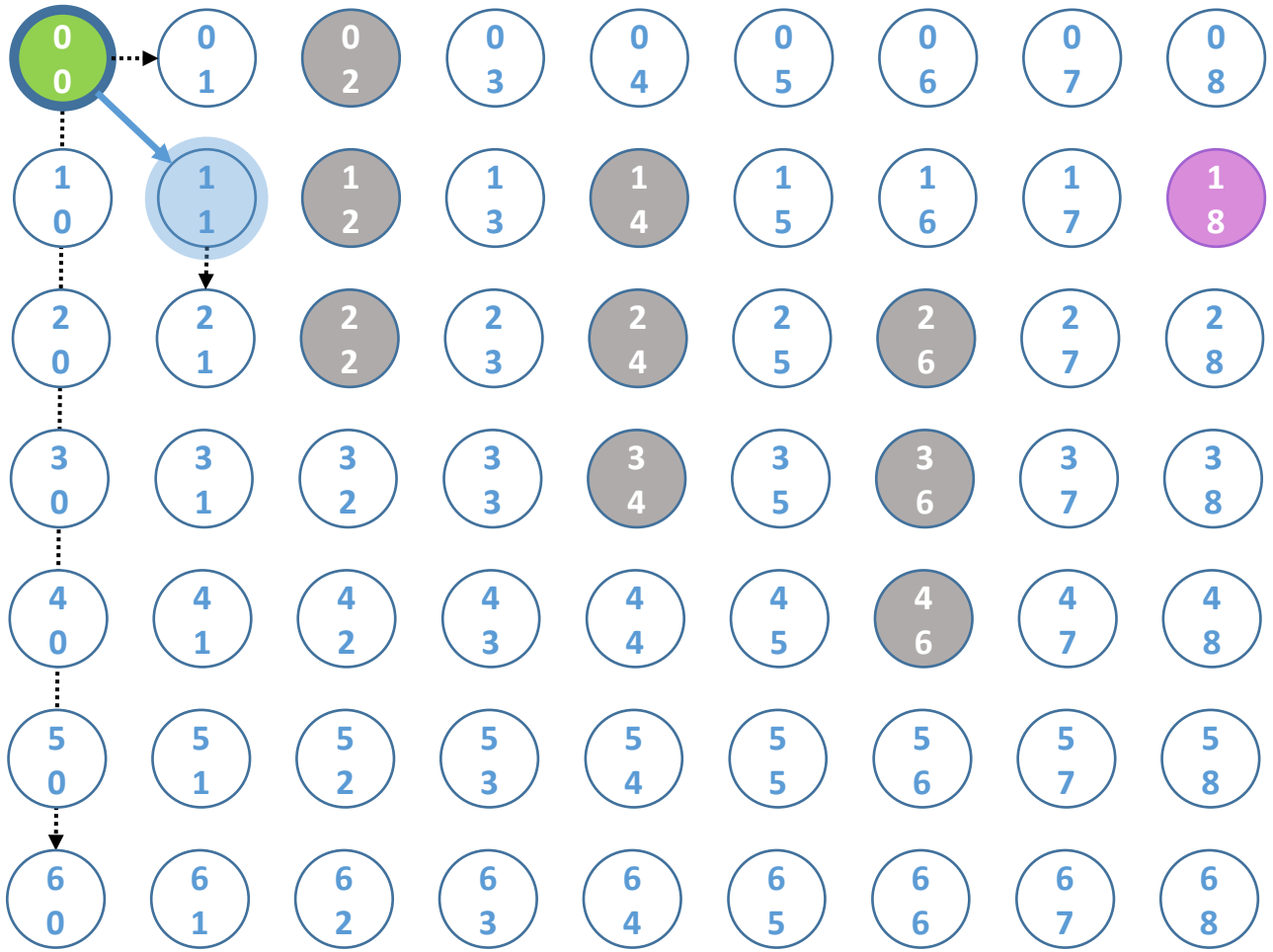


# Jump Point Search Algorithm - A less simple case

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)
```

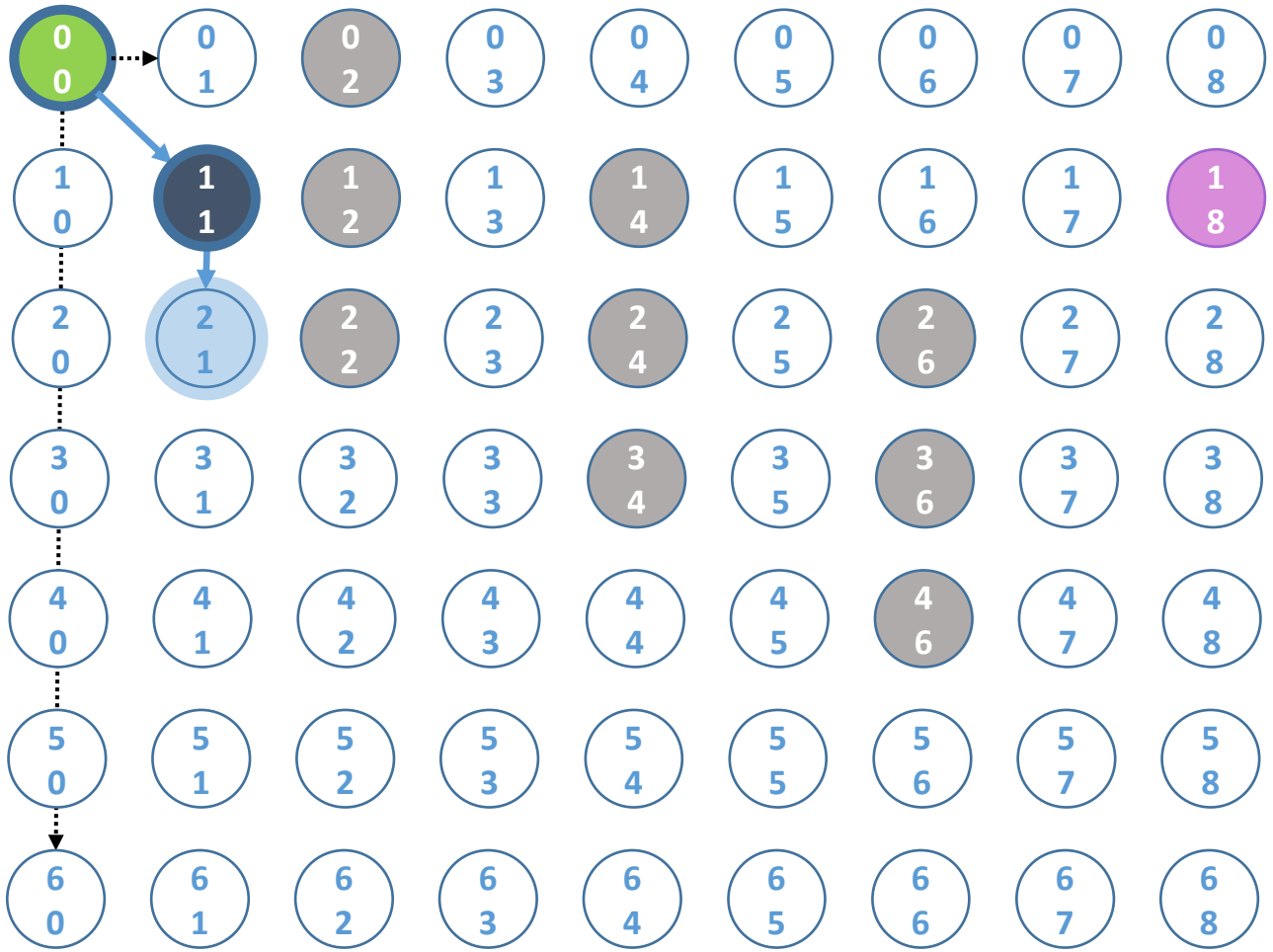


# Jump Point Search Algorithm - A less simple case



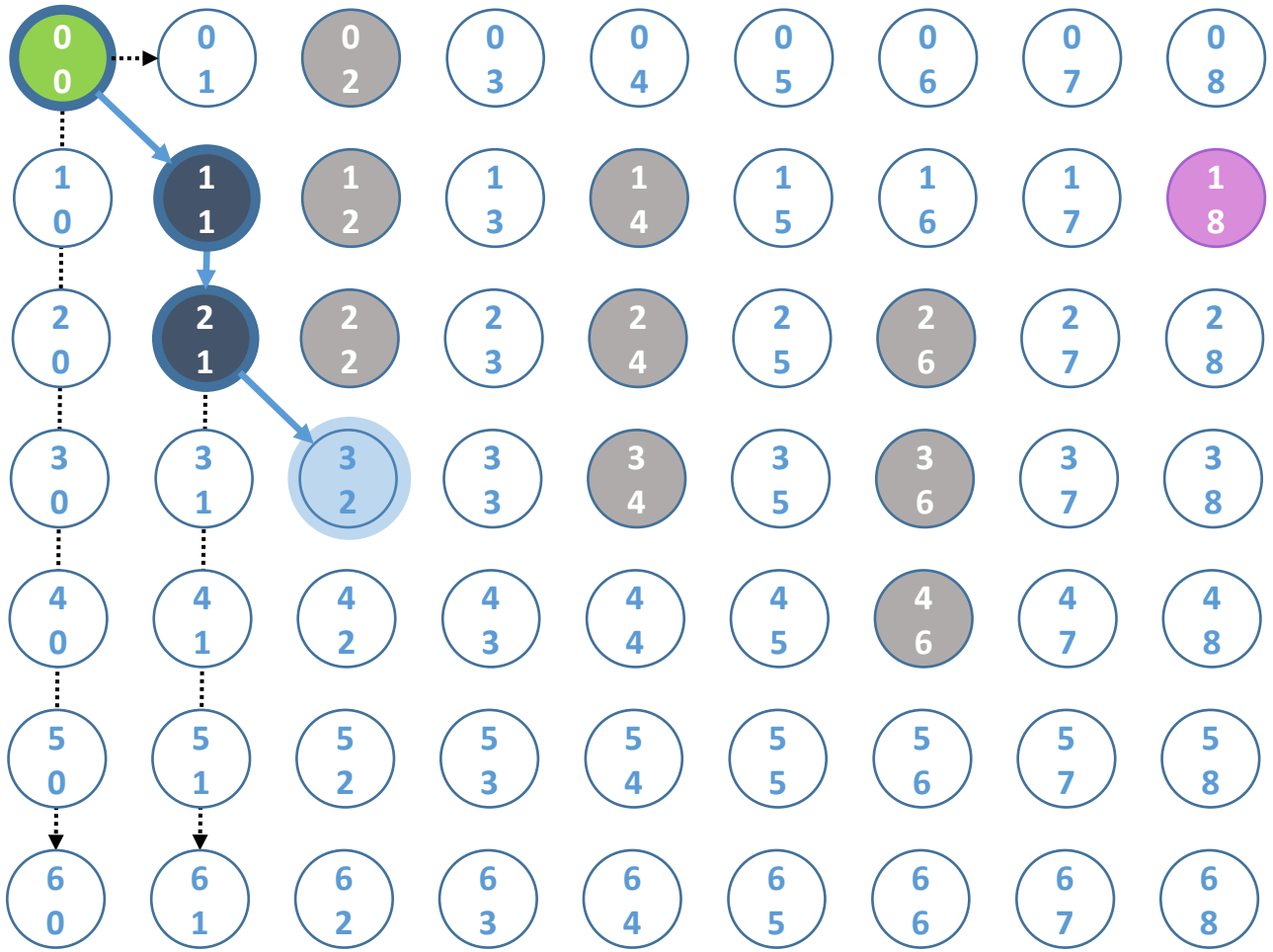

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)

Exploring vertex (0, 0)
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 42, 7)
```

# Jump Point Search Algorithm - A less simple case



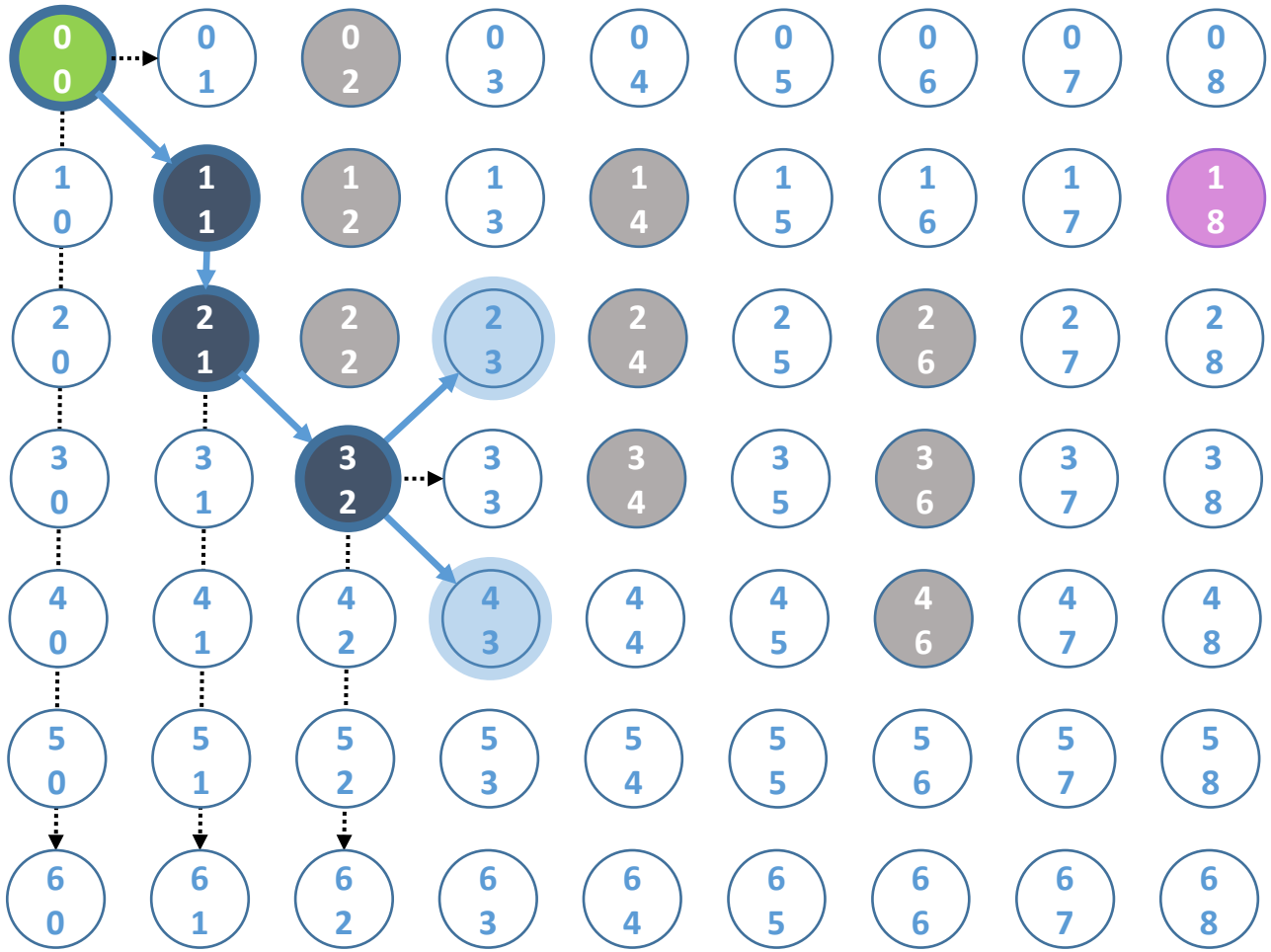

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)

Exploring vertex (0, 0)
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 42, 7)

Exploring vertex (1, 1)
Visiting/queueing vertex (2, 1).
Prioritized vertices (v, cost, dir): ((2, 1), 49, 6)
```

# Jump Point Search Algorithm - A less simple case



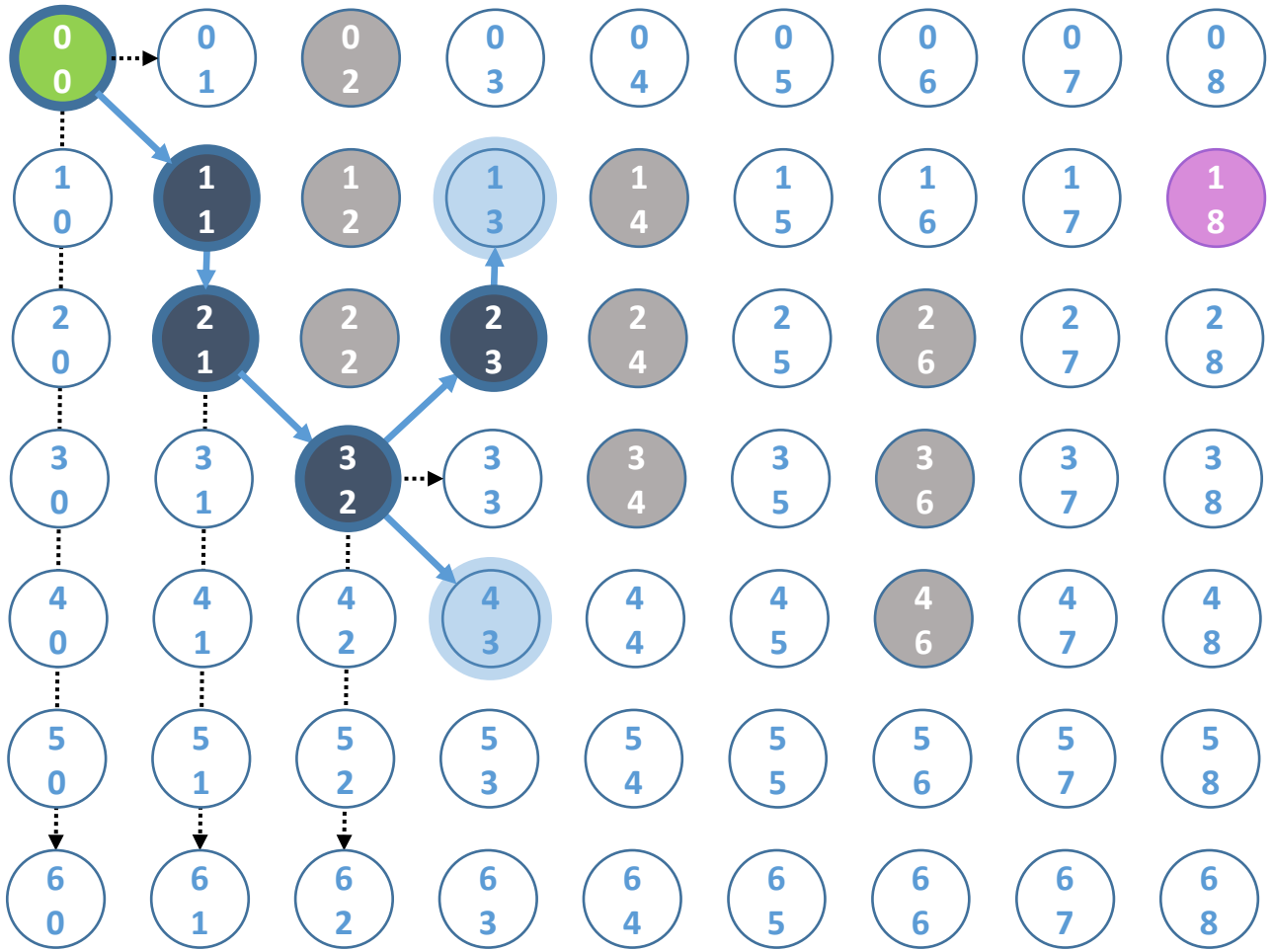

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)

Exploring vertex (0, 0)
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 42, 7)

Exploring vertex (1, 1)
Visiting/queueing vertex (2, 1).
Prioritized vertices (v, cost, dir): ((2, 1), 49, 6)

Exploring vertex (2, 1)
Visiting/queueing vertex (3, 2).
Prioritized vertices (v, cost, dir): ((3, 2), 53, 7)
```

# Jump Point Search Algorithm - A less simple case



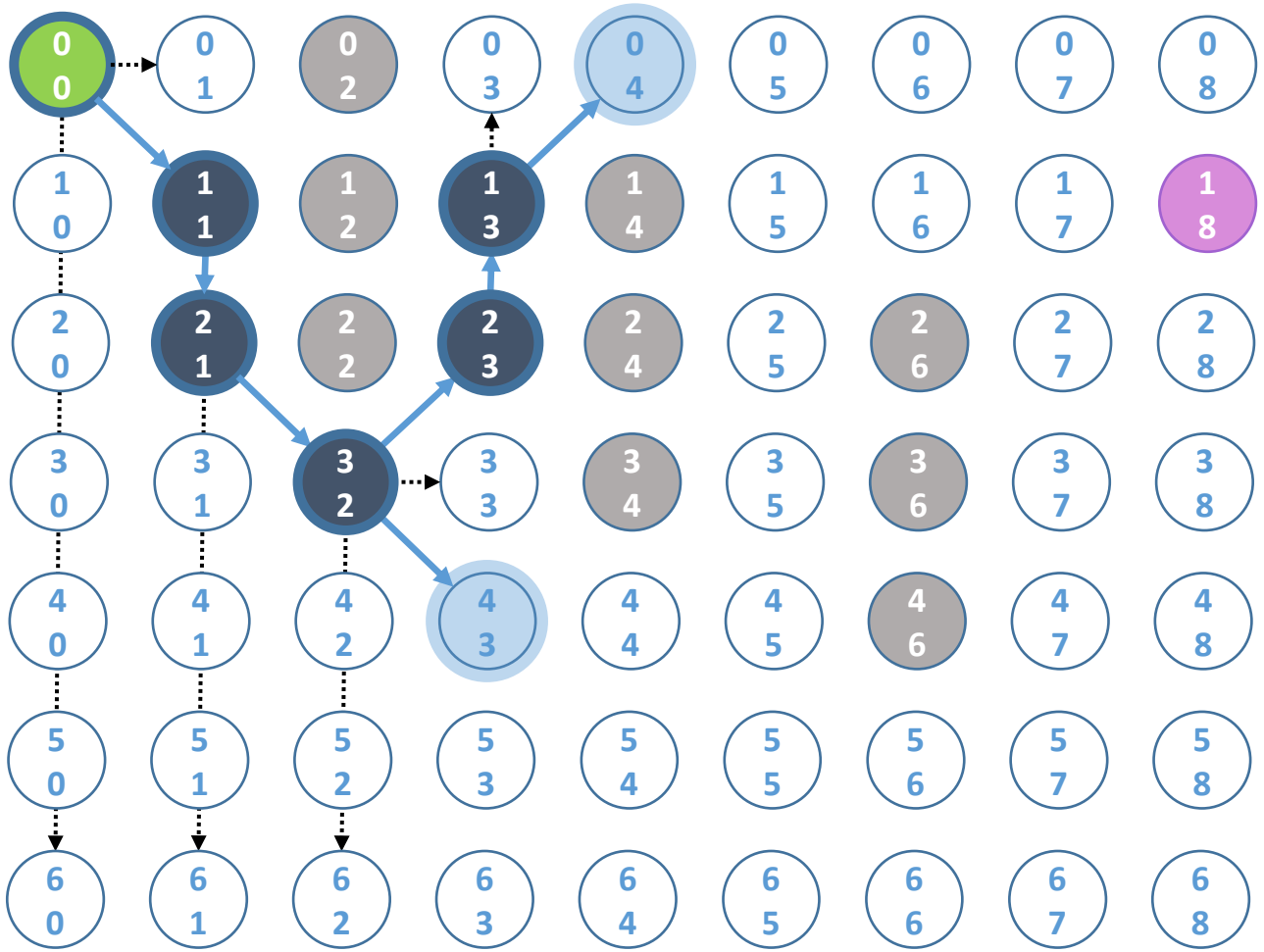

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)

Exploring vertex (0, 0)
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 42, 7)

Exploring vertex (1, 1)
Visiting/queueing vertex (2, 1).
Prioritized vertices (v, cost, dir): ((2, 1), 49, 6)

Exploring vertex (2, 1)
Visiting/queueing vertex (3, 2).
Prioritized vertices (v, cost, dir): ((3, 2), 53, 7)

Exploring vertex (3, 2)
Visiting/queueing vertex (2, 3).
Visiting/queueing vertex (4, 3).
Prioritized vertices (v, cost, dir): ((2, 3), 53, 1) ((4, 3),
57, 7)
```

# Jump Point Search Algorithm - A less simple case



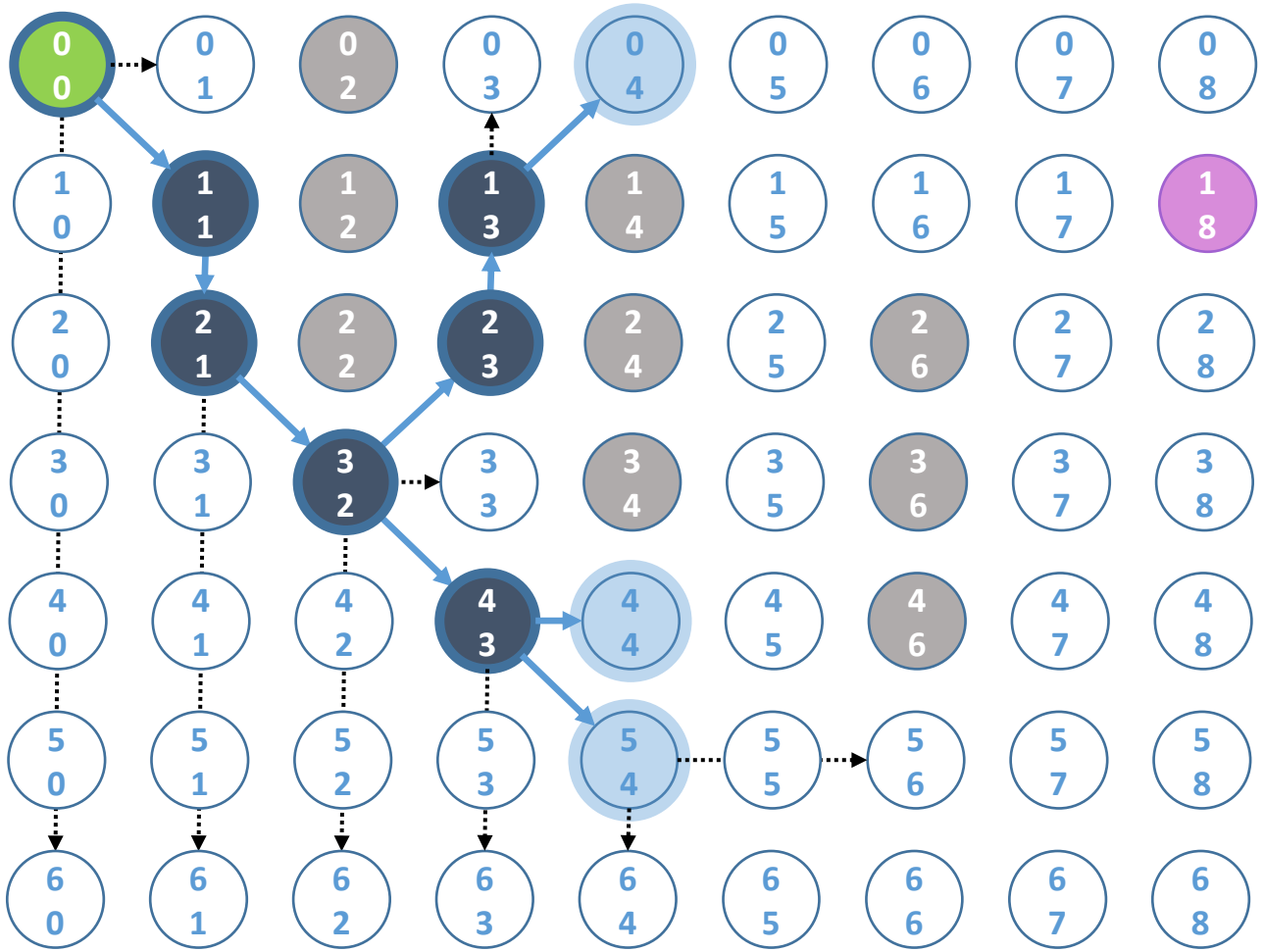

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)

Exploring vertex (0, 0)
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 42, 7)

Exploring vertex (1, 1)
Visiting/queueing vertex (2, 1).
Prioritized vertices (v, cost, dir): ((2, 1), 49, 6)

Exploring vertex (2, 1)
Visiting/queueing vertex (3, 2).
Prioritized vertices (v, cost, dir): ((3, 2), 53, 7)

Exploring vertex (3, 2)
Visiting/queueing vertex (2, 3).
Visiting/queueing vertex (4, 3).
Prioritized vertices (v, cost, dir): ((2, 3), 53, 1) ((4, 3),
57, 7)

Exploring vertex (2, 3)
Visiting/queueing vertex (1, 3).
Prioritized vertices (v, cost, dir): ((1, 3), 56, 2) ((4, 3),
57, 7)
```

# Jump Point Search Algorithm - A less simple case



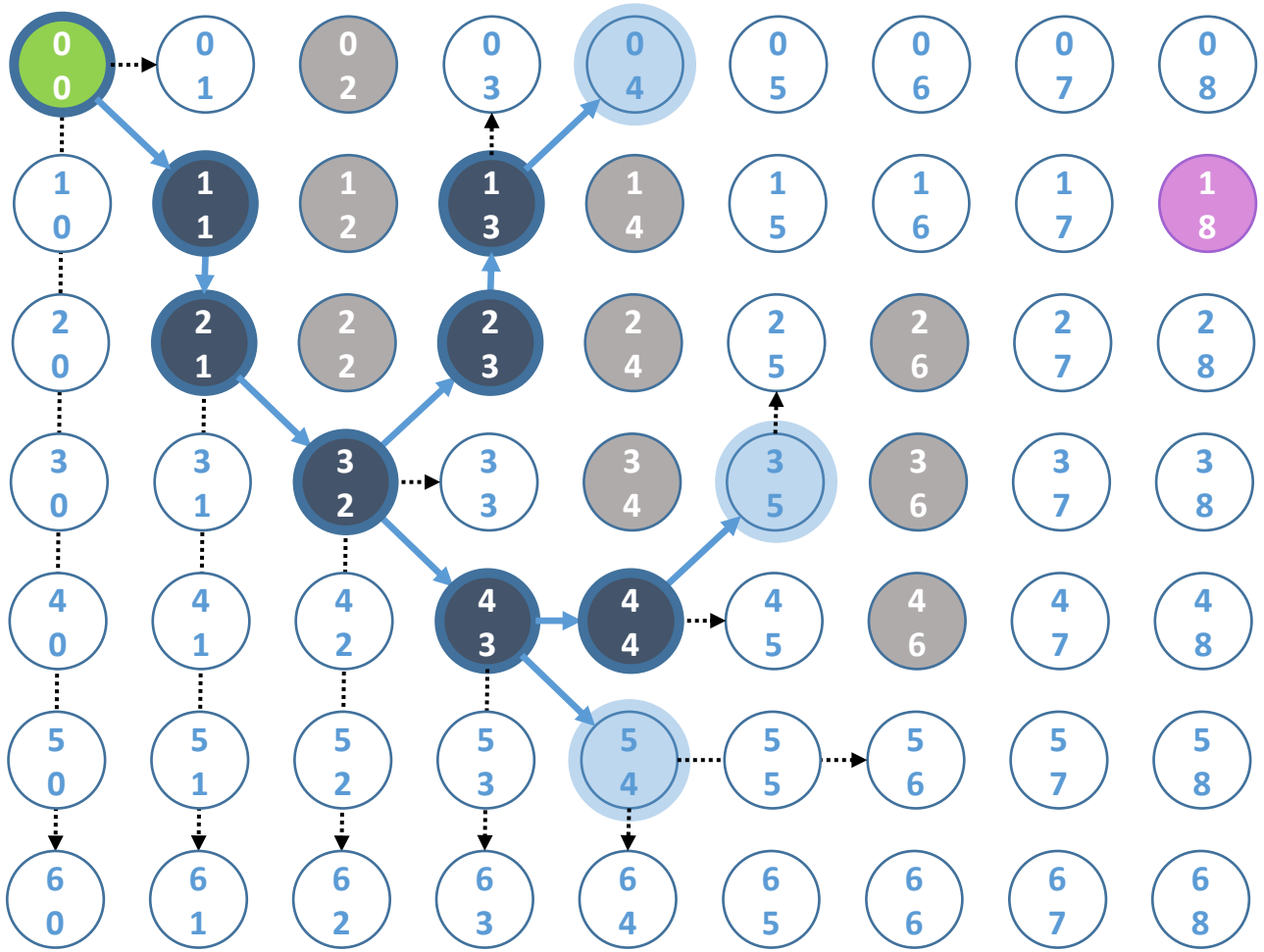

```
Visiting/queueing vertex (0, 0)
Prioritized vertices (v, cost, dir): ((0, 0), 0, None)

Exploring vertex (0, 0)
Visiting/queueing vertex (1, 1)
Prioritized vertices (v, cost, dir): ((1, 1), 42, 7)

Exploring vertex (1, 1)
Visiting/queueing vertex (2, 1).
Prioritized vertices (v, cost, dir): ((2, 1), 49, 6)

Exploring vertex (2, 1)
Visiting/queueing vertex (3, 2).
Prioritized vertices (v, cost, dir): ((3, 2), 53, 7)

Exploring vertex (3, 2)
Visiting/queueing vertex (2, 3).
Visiting/queueing vertex (4, 3).
Prioritized vertices (v, cost, dir): ((2, 3), 53, 1) ((4, 3),
57, 7)

Exploring vertex (2, 3)
Visiting/queueing vertex (1, 3).
Prioritized vertices (v, cost, dir): ((1, 3), 56, 2) ((4, 3),
57, 7)

Exploring vertex (1, 3)
Visiting/queueing vertex (0, 4).
Prioritized vertices (v, cost, dir): ((4, 3), 57, 7) ((0, 4),
60, 1)
...
```

# Jump Point Search Algorithm - A less simple case



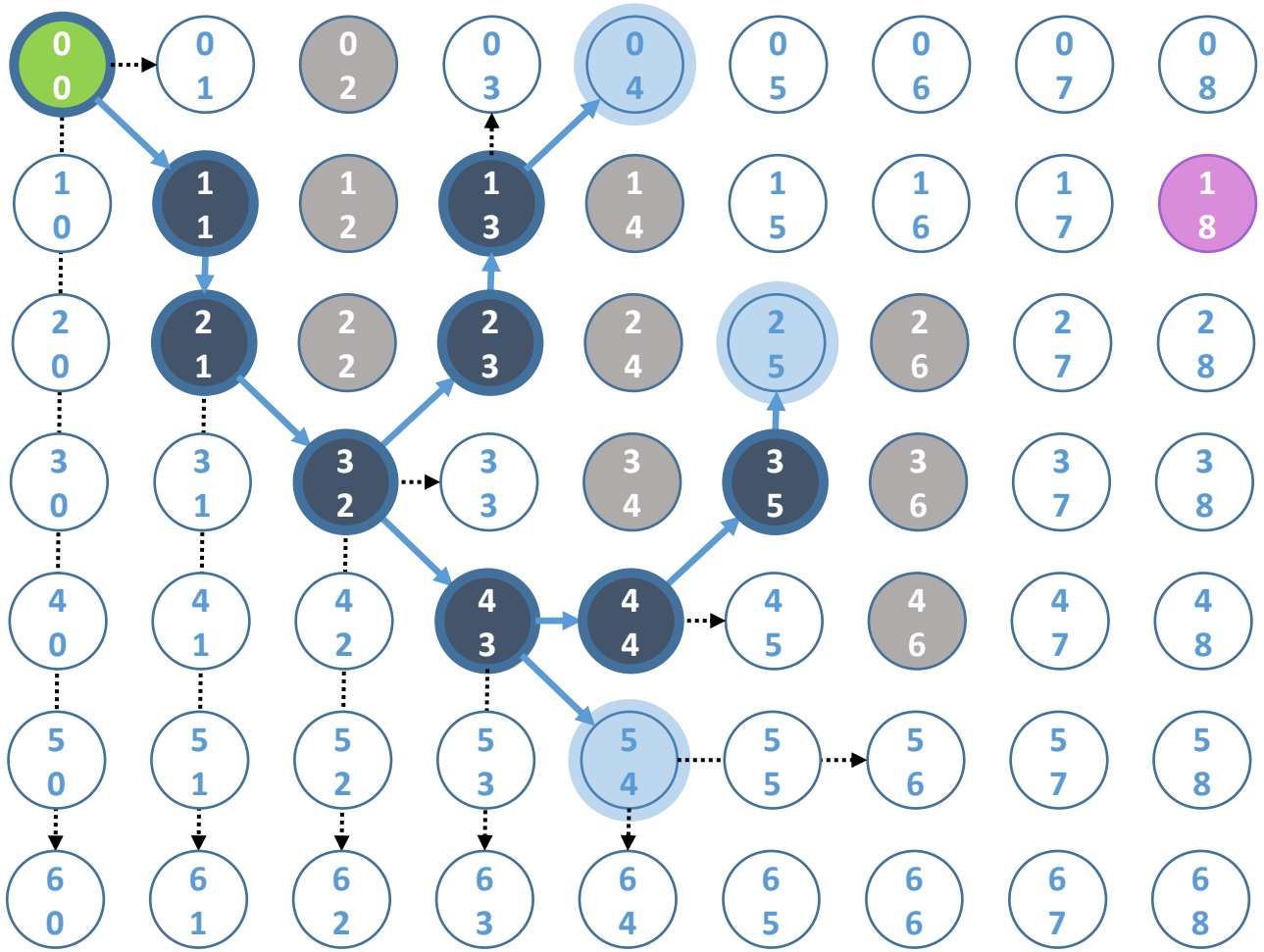

```
Exploring vertex (1, 3)
Visiting/queueing vertex (0, 4).
Prioritized vertices (v, cost, dir): ((4, 3), 57, 7) ((0, 4),
60, 1)

Exploring vertex (4, 3)
Visiting/queueing vertex (4, 4).
Visiting/queueing vertex (5, 4).
Prioritized vertices (v, cost, dir): ((4, 4), 57, 0) ((5, 4),
61, 7) ((0, 4), 60, 1)
```

# Jump Point Search Algorithm - A less simple case



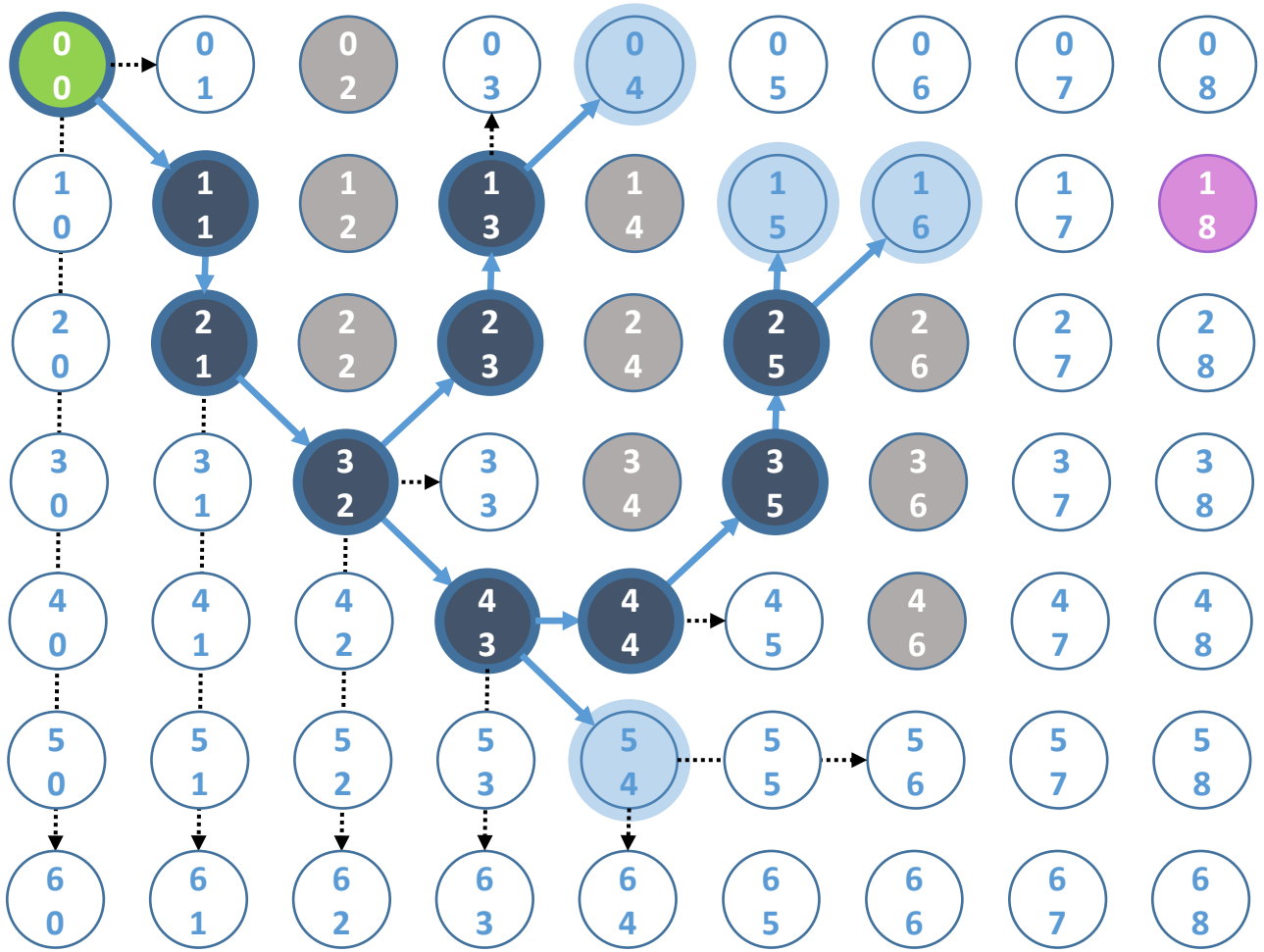

```
Exploring vertex (1, 3)
Visiting/queueing vertex (0, 4).
Prioritized vertices (v, cost, dir): ((4, 3), 57, 7) ((0, 4),
60, 1)

Exploring vertex (4, 3)
Visiting/queueing vertex (4, 4).
Visiting/queueing vertex (5, 4).
Prioritized vertices (v, cost, dir): ((4, 4), 57, 0) ((5, 4),
61, 7) ((0, 4), 60, 1)

Exploring vertex (4, 4)
Visiting/queueing vertex (3, 5).
Prioritized vertices (v, cost, dir): ((3, 5), 57, 1) ((5, 4),
61, 7) ((0, 4), 60, 1)
```

# Jump Point Search Algorithm - A less simple case



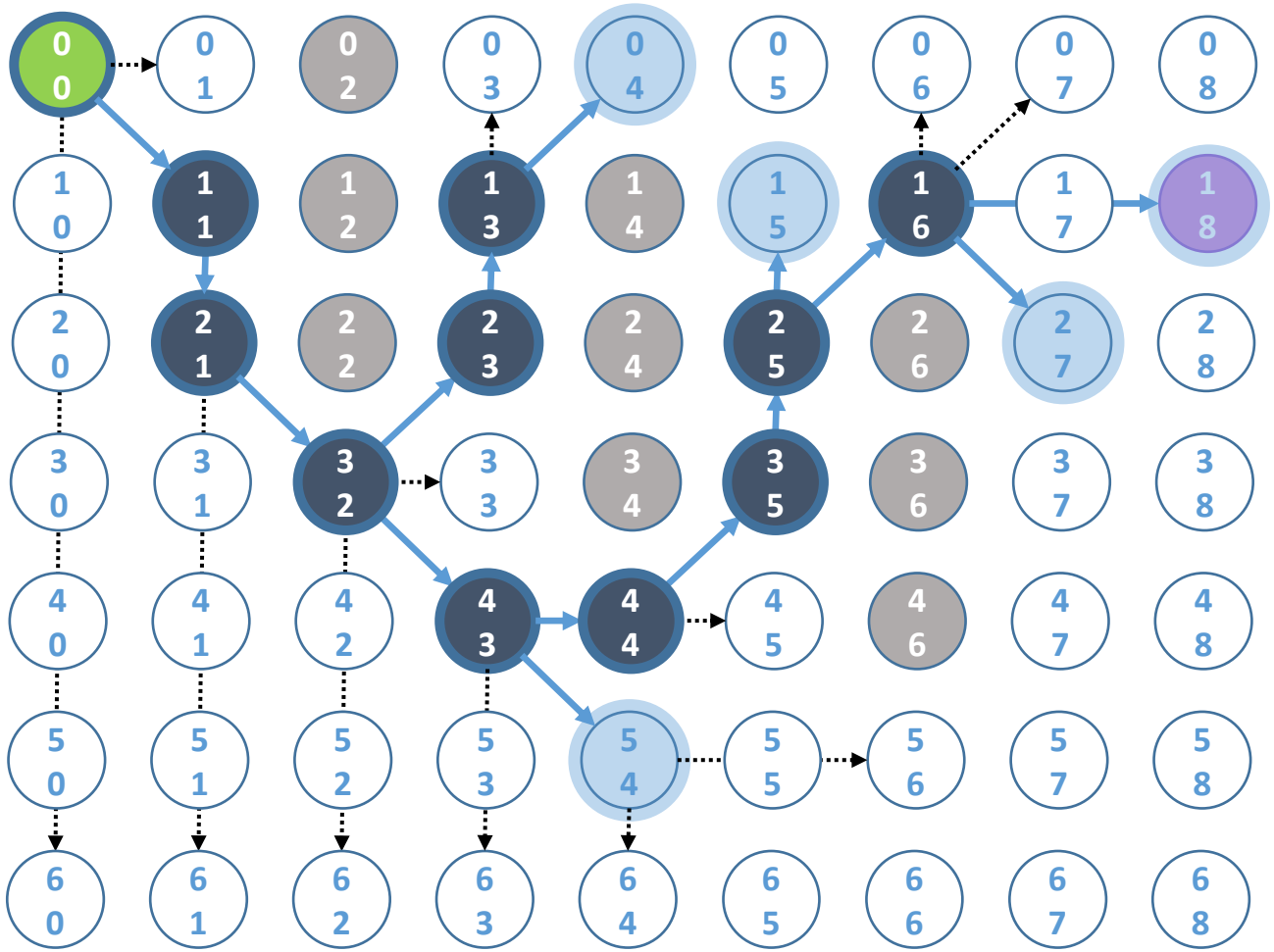

```
Exploring vertex (1, 3)
Visiting/queueing vertex (0, 4).
Prioritized vertices (v, cost, dir): ((4, 3), 57, 7) ((0, 4),
60, 1)

Exploring vertex (4, 3)
Visiting/queueing vertex (4, 4).
Visiting/queueing vertex (5, 4).
Prioritized vertices (v, cost, dir): ((4, 4), 57, 0) ((5, 4),
61, 7) ((0, 4), 60, 1)

Exploring vertex (4, 4)
Visiting/queueing vertex (3, 5).
Prioritized vertices (v, cost, dir): ((3, 5), 57, 1) ((5, 4),
61, 7) ((0, 4), 60, 1)

Exploring vertex (3, 5)
Visiting/queueing vertex (2, 5).
Prioritized vertices (v, cost, dir): ((2, 5), 60, 2) ((5, 4),
61, 7) ((0, 4), 60, 1)
```

# Jump Point Search Algorithm - A less simple case



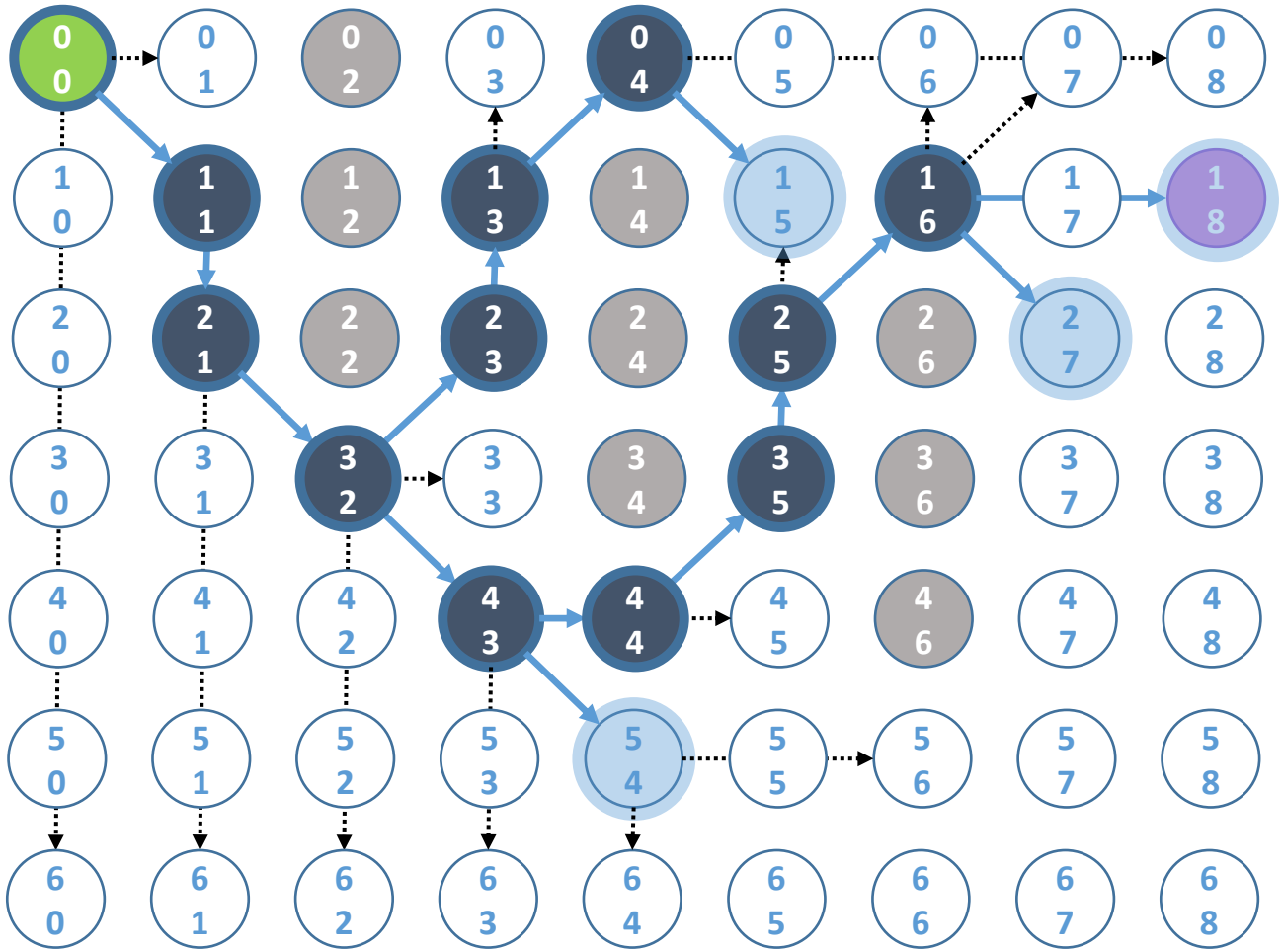

```
Exploring vertex (1, 3)
Visiting/queueing vertex (0, 4).
Prioritized vertices (v, cost, dir): ((4, 3), 57, 7) ((0, 4),
60, 1)

Exploring vertex (4, 3)
Visiting/queueing vertex (4, 4).
Visiting/queueing vertex (5, 4).
Prioritized vertices (v, cost, dir): ((4, 4), 57, 0) ((5, 4),
61, 7) ((0, 4), 60, 1)

Exploring vertex (4, 4)
Visiting/queueing vertex (3, 5).
Prioritized vertices (v, cost, dir): ((3, 5), 57, 1) ((5, 4),
61, 7) ((0, 4), 60, 1)

Exploring vertex (3, 5)
Visiting/queueing vertex (2, 5).
Prioritized vertices (v, cost, dir): ((2, 5), 60, 2) ((5, 4),
61, 7) ((0, 4), 60, 1)

Exploring vertex (2, 5)
Visiting/queueing vertex (1, 5).
Visiting/queueing vertex (1, 6).
Prioritized vertices (v, cost, dir): ((1, 6), 60, 1) ((0, 4),
60, 1) ((5, 4), 61, 7) ((1, 5), 63, 2)
...
```

# Jump Point Search Algorithm - A less simple case



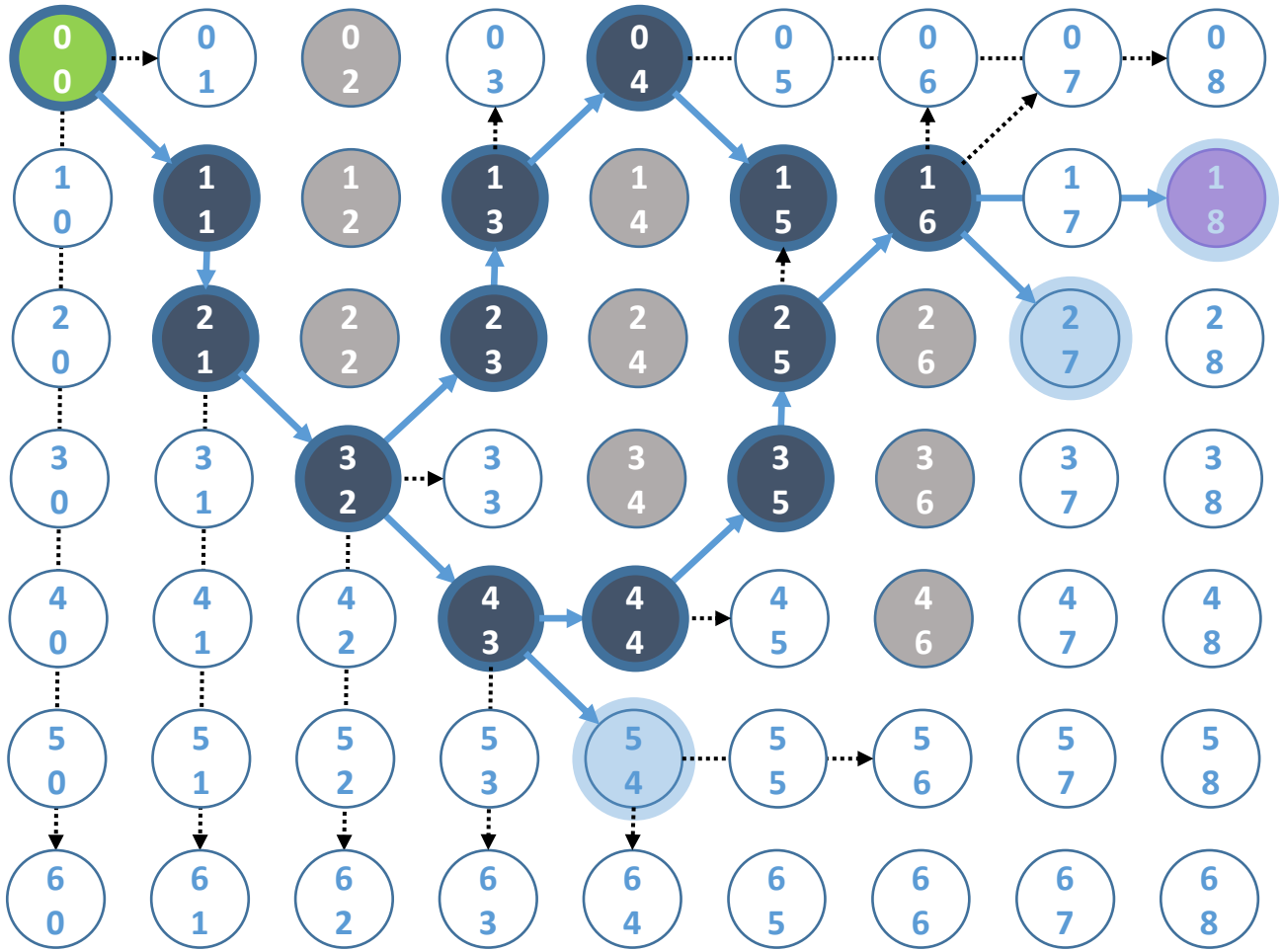

```
Exploring vertex (2, 5)
Visiting/queueing vertex (1, 5).
Visiting/queueing vertex (1, 6).
Prioritized vertices (v, cost, dir): ((1, 6), 60, 1) ((0, 4),
60, 1) ((5, 4), 61, 7) ((1, 5), 63, 2)

Exploring vertex (1, 6)
Visiting/queueing vertex (1, 8).
Visiting/queueing vertex (2, 7).
Prioritized vertices (v, cost, dir): ((0, 4), 60, 1) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7) ((1, 5), 63, 2)
```

# Jump Point Search Algorithm - A less simple case



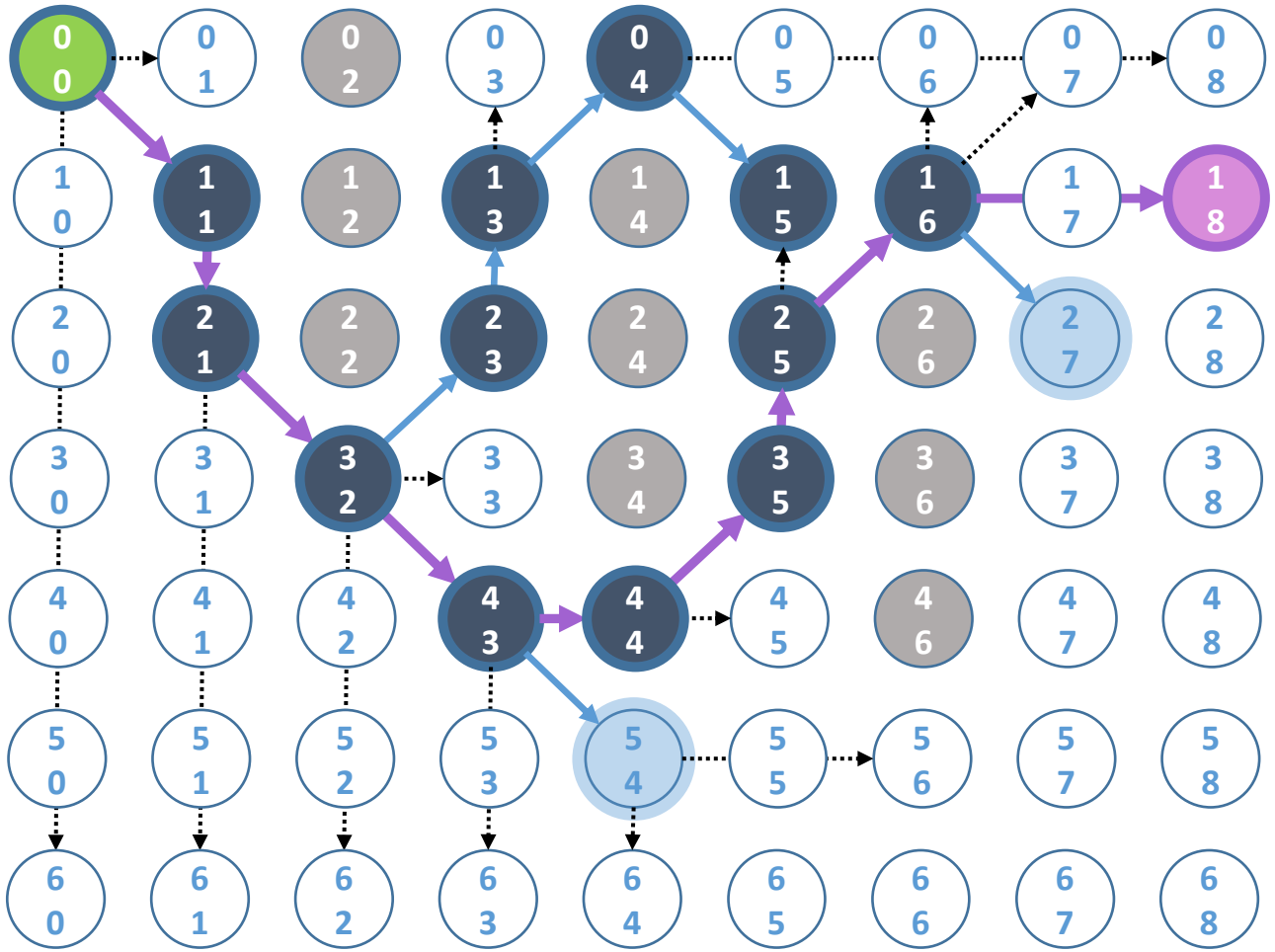

```
Exploring vertex (2, 5)
Visiting/queueing vertex (1, 5).
Visiting/queueing vertex (1, 6).
Prioritized vertices (v, cost, dir): ((1, 6), 60, 1) ((0, 4),
60, 1) ((5, 4), 61, 7) ((1, 5), 63, 2)

Exploring vertex (1, 6)
Visiting/queueing vertex (1, 8).
Visiting/queueing vertex (2, 7).
Prioritized vertices (v, cost, dir): ((0, 4), 60, 1) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7) ((1, 5), 63, 2)

Exploring vertex (0, 4)
Prioritized vertices (v, cost, dir): ((1, 5), 60, 7) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7)
```

# Jump Point Search Algorithm - A less simple case




```
Exploring vertex (2, 5)
Visiting/queueing vertex (1, 5).
Visiting/queueing vertex (1, 6).
Prioritized vertices (v, cost, dir): ((1, 6), 60, 1) ((0, 4),
60, 1) ((5, 4), 61, 7) ((1, 5), 63, 2)

Exploring vertex (1, 6)
Visiting/queueing vertex (1, 8).
Visiting/queueing vertex (2, 7).
Prioritized vertices (v, cost, dir): ((0, 4), 60, 1) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7) ((1, 5), 63, 2)

Exploring vertex (0, 4)
Prioritized vertices (v, cost, dir): ((1, 5), 60, 7) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7)

Exploring vertex (1, 5)
Prioritized vertices (v, cost, dir): ((1, 8), 60, 0) ((2, 7),
64, 7) ((5, 4), 61, 7)
```

# Jump Point Search Algorithm - A less simple case




```
Exploring vertex (2, 5)
Visiting/queueing vertex (1, 5).
Visiting/queueing vertex (1, 6).
Prioritized vertices (v, cost, dir): ((1, 6), 60, 1) ((0, 4),
60, 1) ((5, 4), 61, 7) ((1, 5), 63, 2)

Exploring vertex (1, 6)
Visiting/queueing vertex (1, 8).
Visiting/queueing vertex (2, 7).
Prioritized vertices (v, cost, dir): ((0, 4), 60, 1) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7) ((1, 5), 63, 2)

Exploring vertex (0, 4)
Prioritized vertices (v, cost, dir): ((1, 5), 60, 7) ((1, 8),
60, 0) ((5, 4), 61, 7) ((2, 7), 64, 7)

Exploring vertex (1, 5)
Prioritized vertices (v, cost, dir): ((1, 8), 60, 0) ((2, 7),
64, 7) ((5, 4), 61, 7)

Exploring vertex (1, 8)
Search path found: (0, 0) -> (1, 1) -> (2, 1) -> (3, 2) ->
(4, 3) -> (4, 4) -> (3, 5) -> (2, 5) -> (1, 6) -> (1, 8)
```