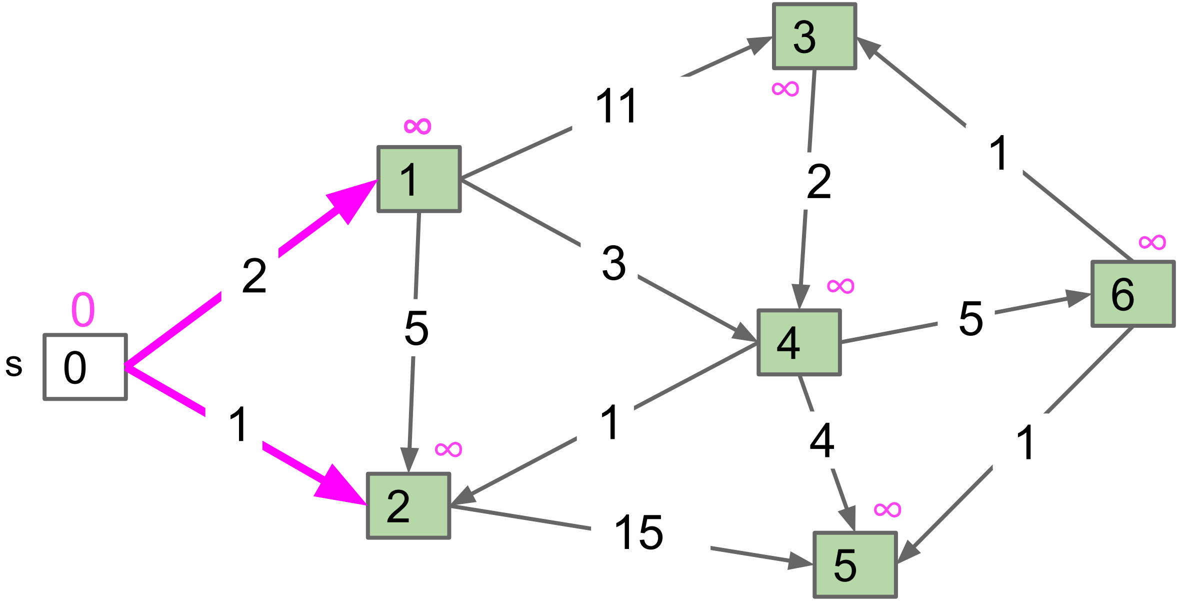
Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	∞	-
2	∞	-
3	∞	-
4	∞	-
5	∞	-
6	∞	-



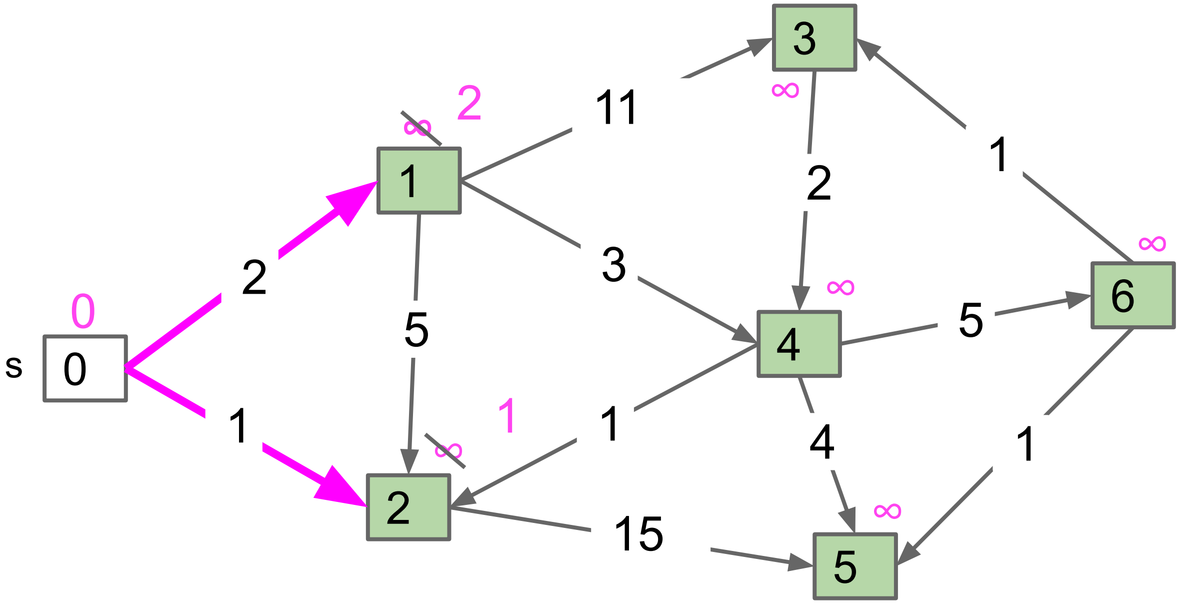
Fringe: [(1: ∞), (2: ∞), (3: ∞), (4: ∞), (5: ∞), (6: ∞)]

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	∞	-
4	∞	-
5	∞	-
6	∞	-



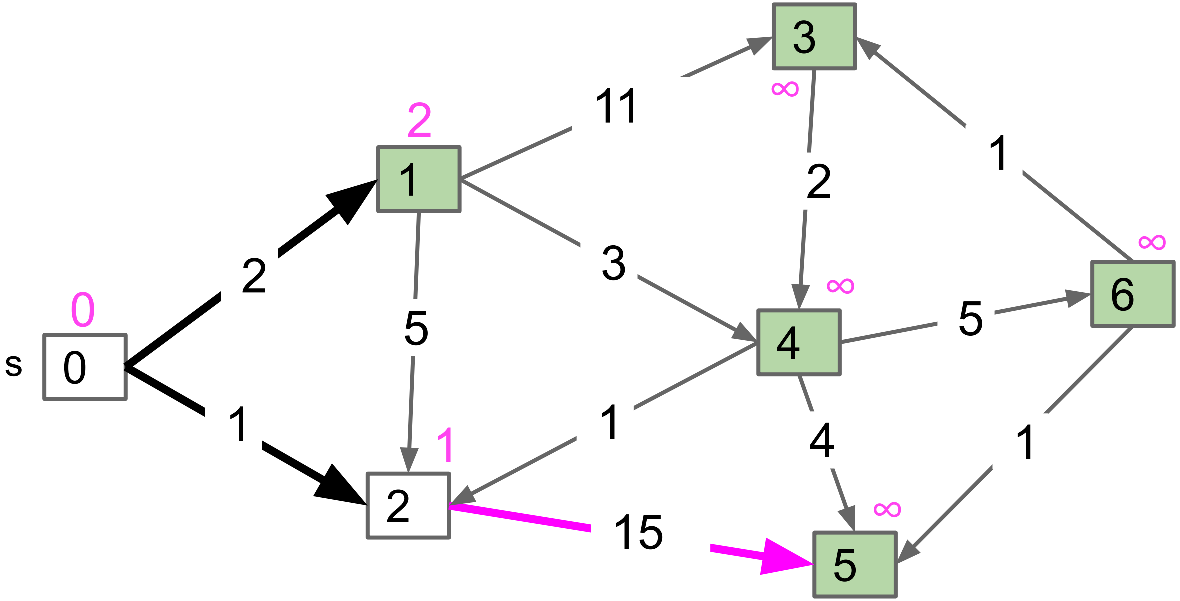
Fringe: [(2: 1), (1: 2), (3: ∞), (4: ∞), (5: ∞), (6: ∞)]

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	∞	-
4	∞	-
5	∞	-
6	∞	-



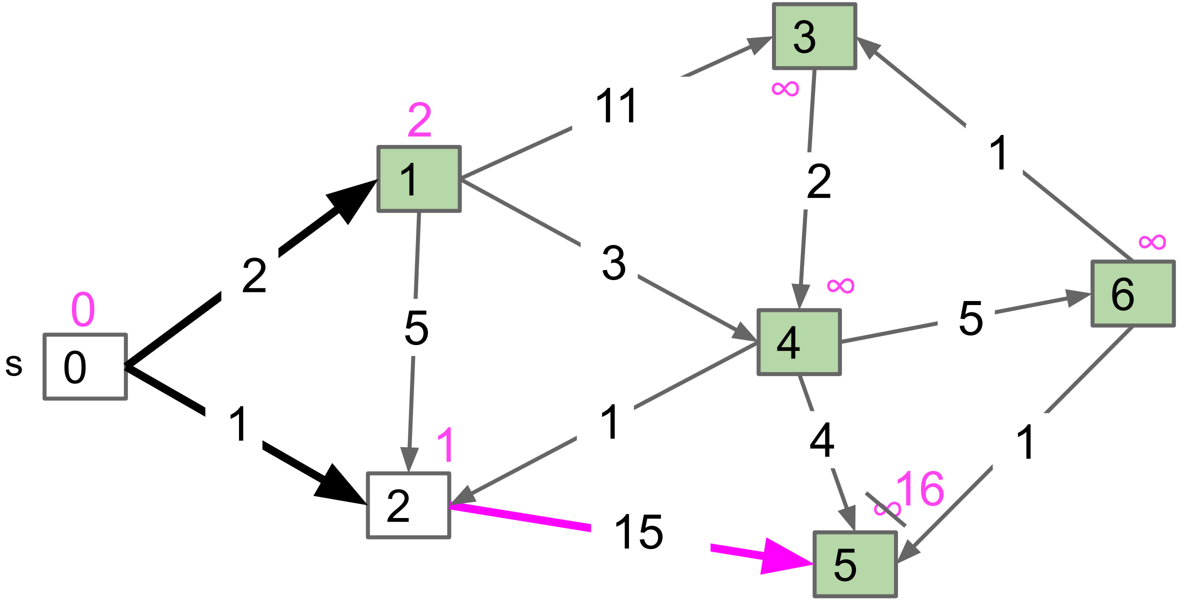
```
Fringe: [(1: 2), (3: ∞), (4: ∞), (5: ∞), (6: ∞)]
```

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	∞	-
4	∞	-
5	16	2
6	∞	-



```
Fringe: [(1: 2), (5: 16), (3: ∞), (4: ∞), (6: ∞)]
```

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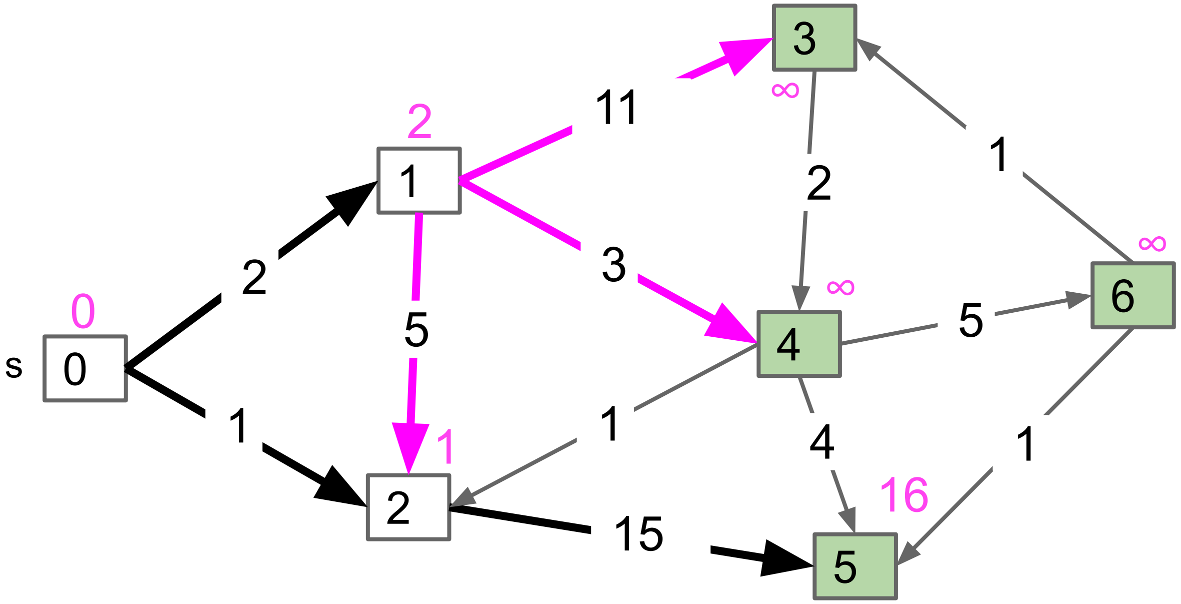
Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	∞	-
4	∞	-
5	16	2
6	∞	-



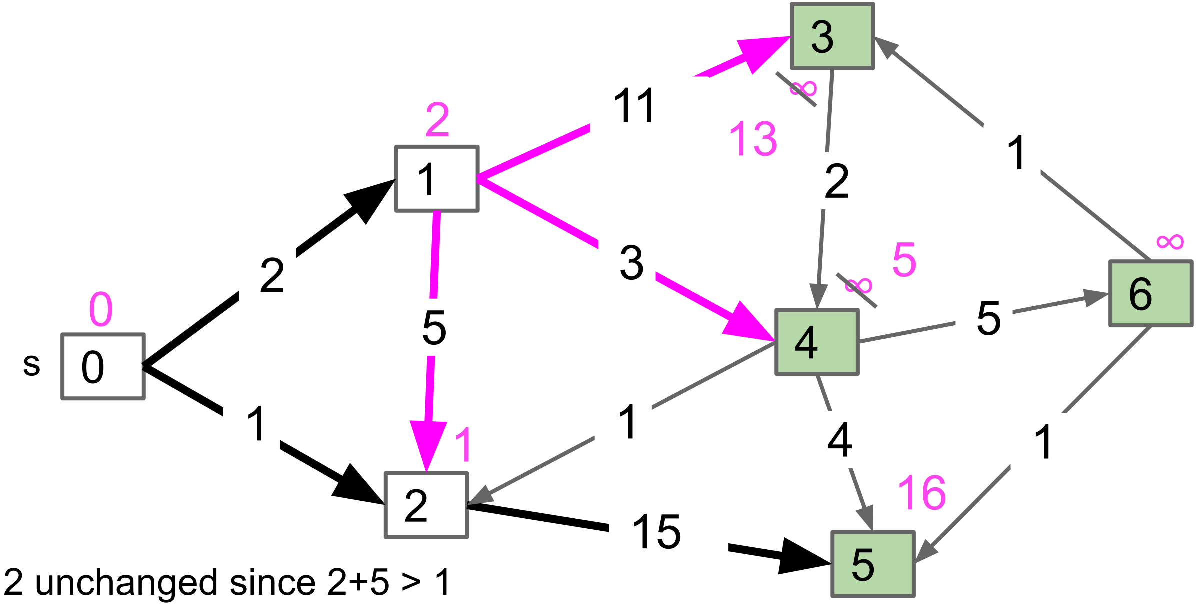
```
Fringe: [(5: 16), (3: ∞), (4: ∞), (6: ∞)]
```

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	13	1
4	5	1
5	16	2
6	∞	-



Vertex 2 unchanged since 2+5 > 1

Fringe: [(4: 5), (3: 13), (5: 16), (6: ∞)]

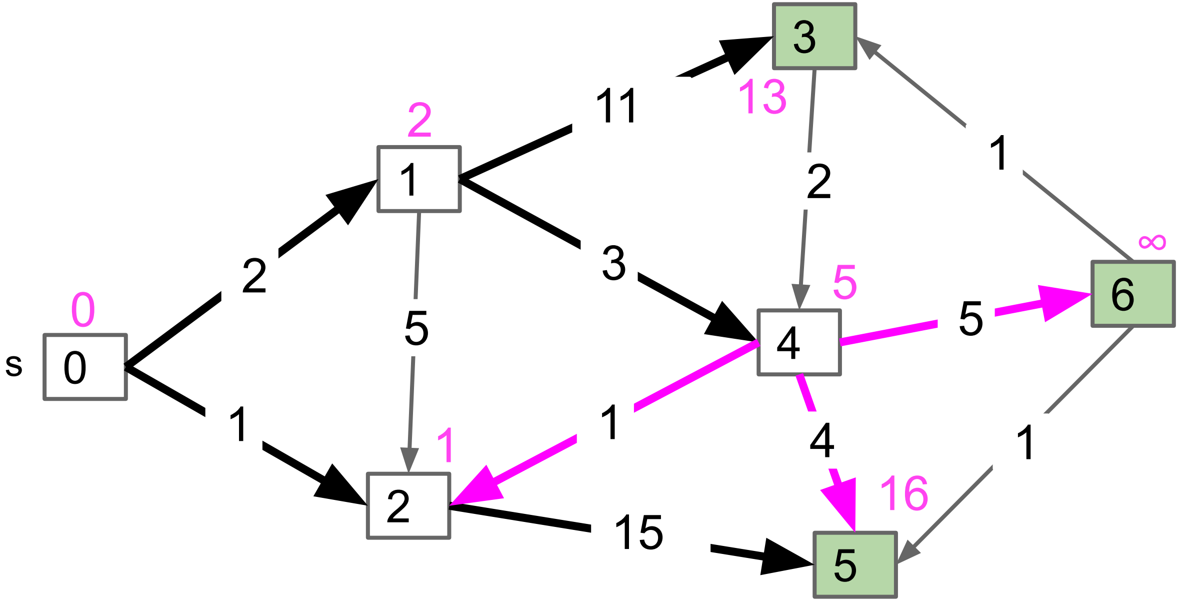
Which vertex is removed next?

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	13	1
4	5	1
5	16	2
6	∞	-



Fringe: [(3: 13), (5: 16), (6: ∞)]

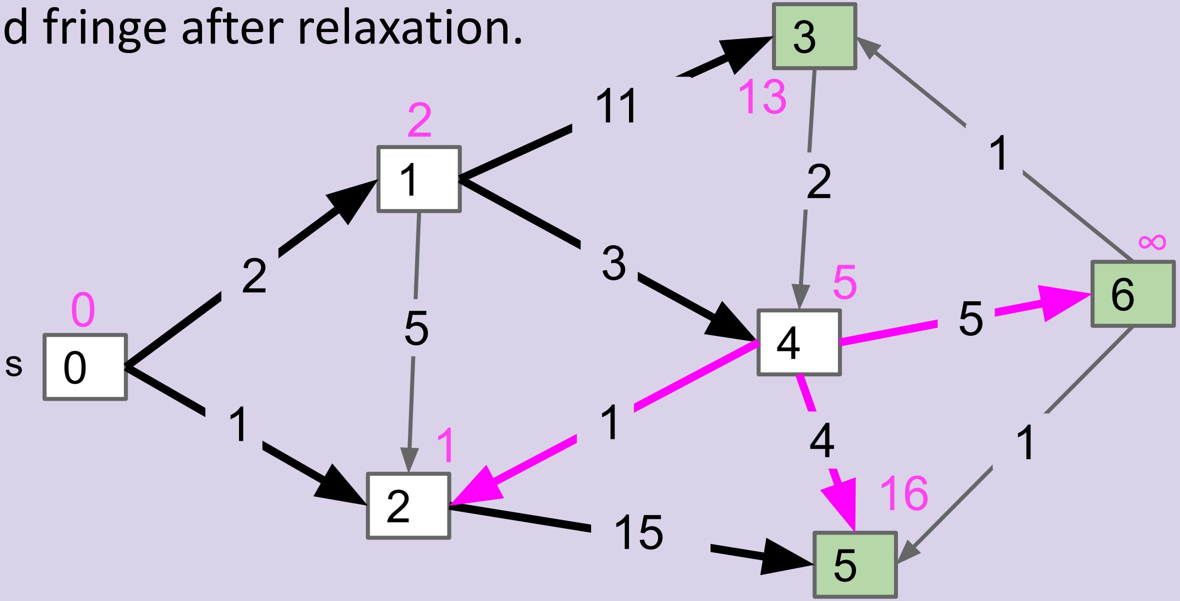
Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

- Show distTo, edgeTo, and fringe after relaxation.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	13	1
4	5	1
5	16	2
6	∞	-



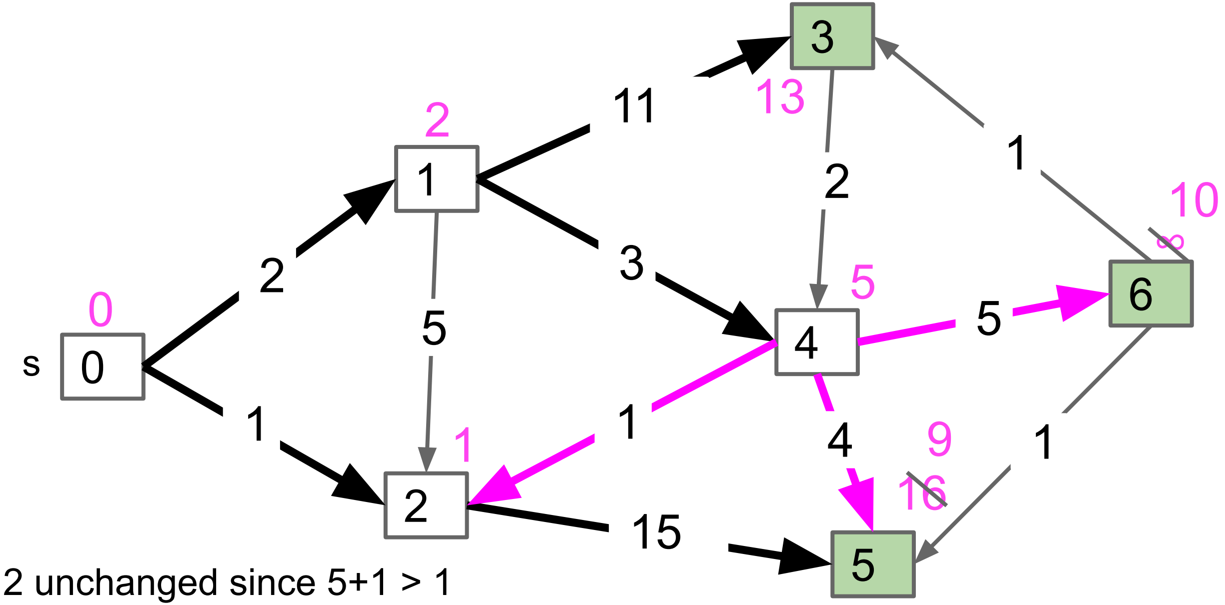
Fringe: [(3: 13), (5: 16), (6: ∞)]

Dijkstra's Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	13	1
4	5	1
5	9	4
6	10	4



Vertex 2 unchanged since 5+1 > 1

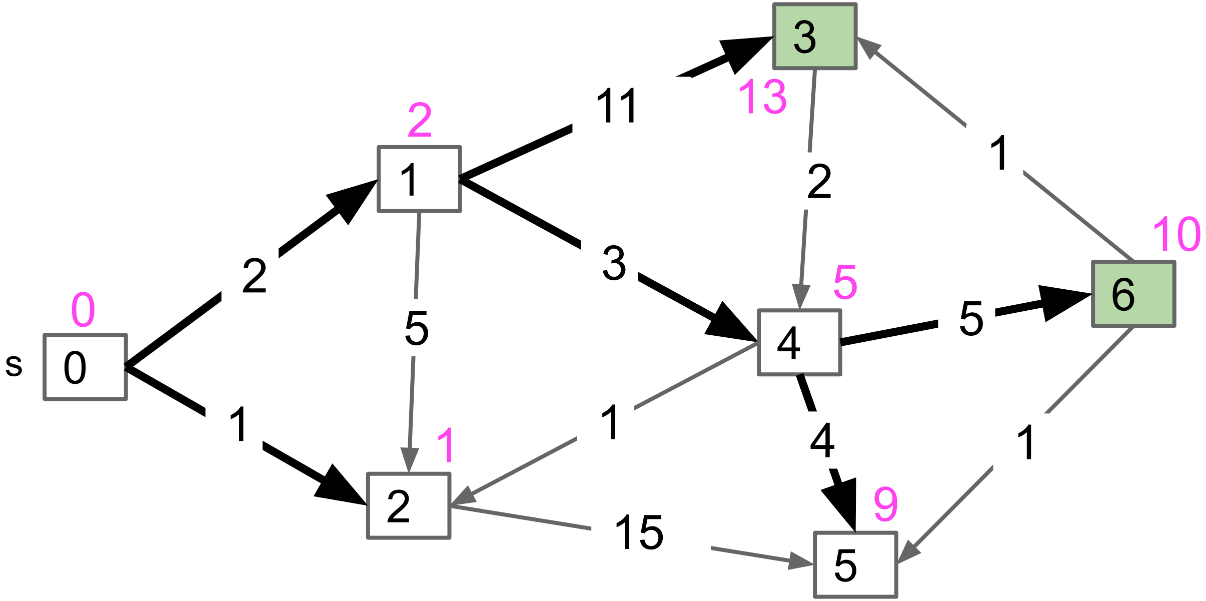
```
Fringe: [(5: 9), (6: 10), (3: 13)]
```

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	13	1
4	5	1
5	9	4
6	10	4



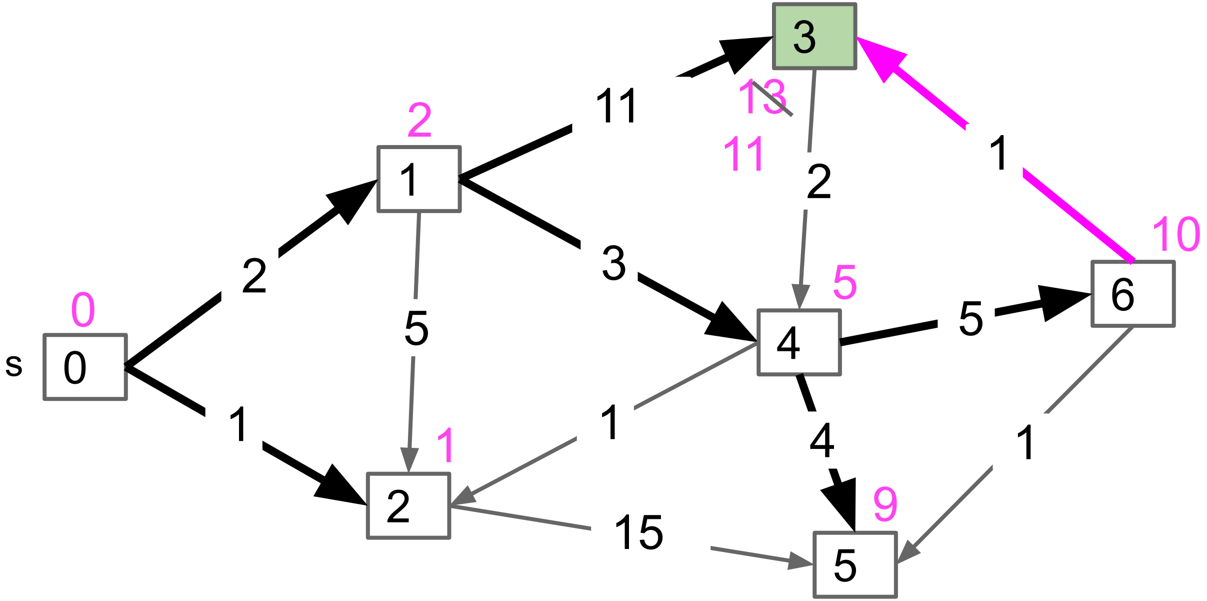
```
Fringe: [(6: 10), (3: 13)]
```

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	11	6
4	5	1
5	9	4
6	10	4



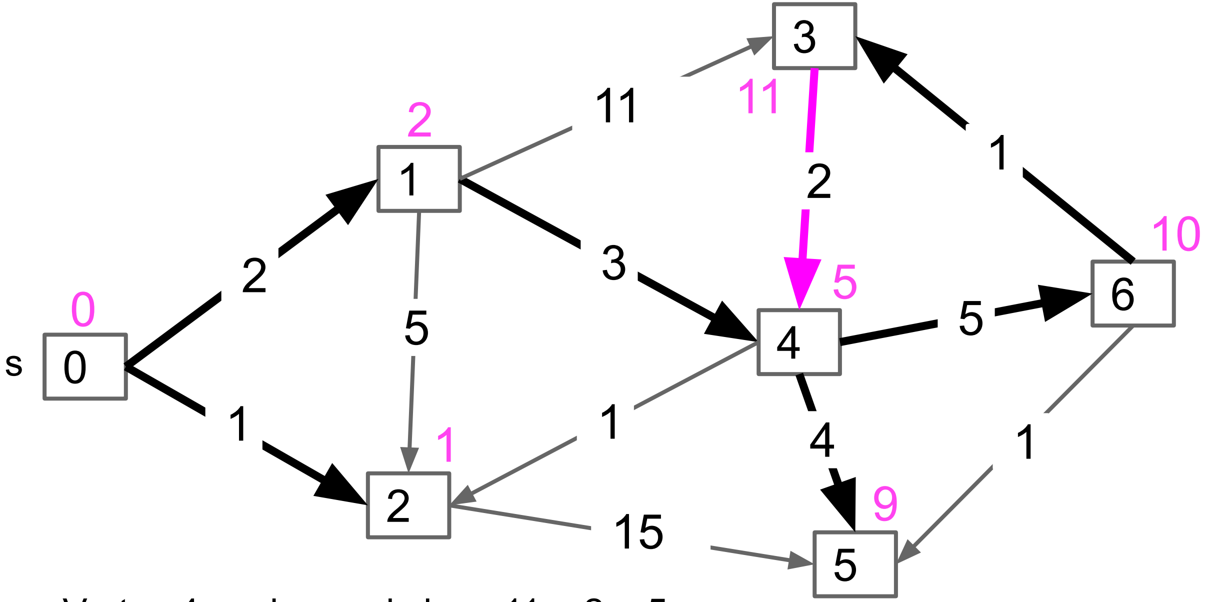
Fringe: [(3: 11)]

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	11	6
4	5	1
5	9	4
6	10	4



Fringe: []

Vertex 4 unchanged since 11 + 2 > 5

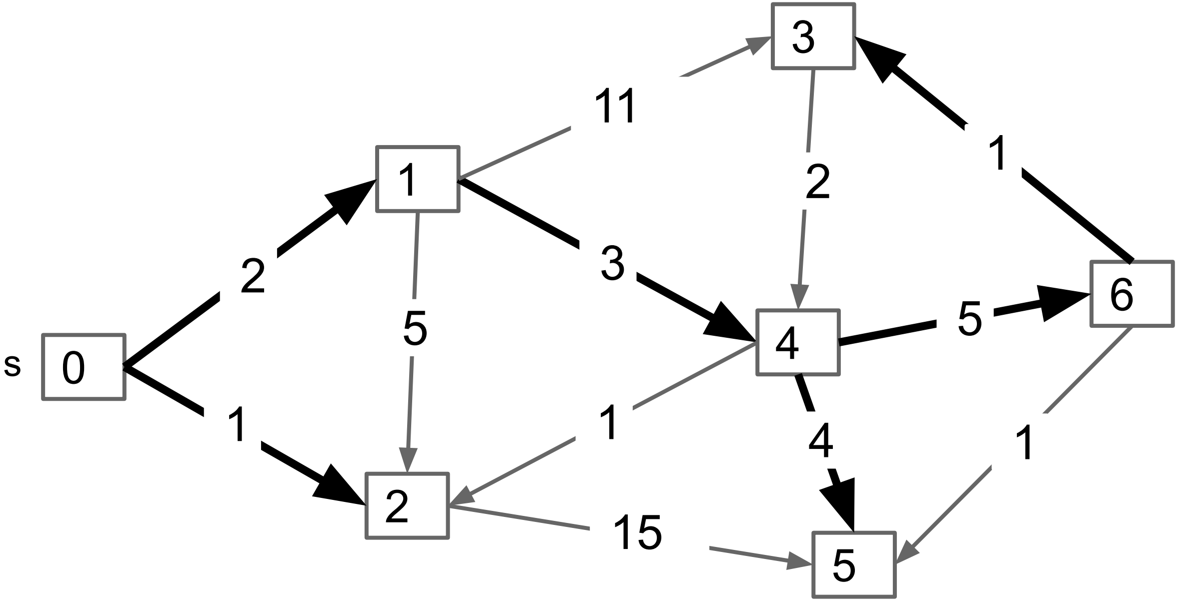
Note: If non-negative weights, **impossible for any inactive vertex** (white, not on fringe) **to be improved**!

Dijkstra’s Demo

Insert all vertices into fringe PQ, storing vertices in order of distance from source.

Repeat: Remove (closest) vertex v from PQ, and relax all edges pointing from v.

#	distTo	edgeTo
0	0	-
1	2	0
2	1	0
3	11	6
4	5	1
5	9	4
6	10	4



Fringe: []