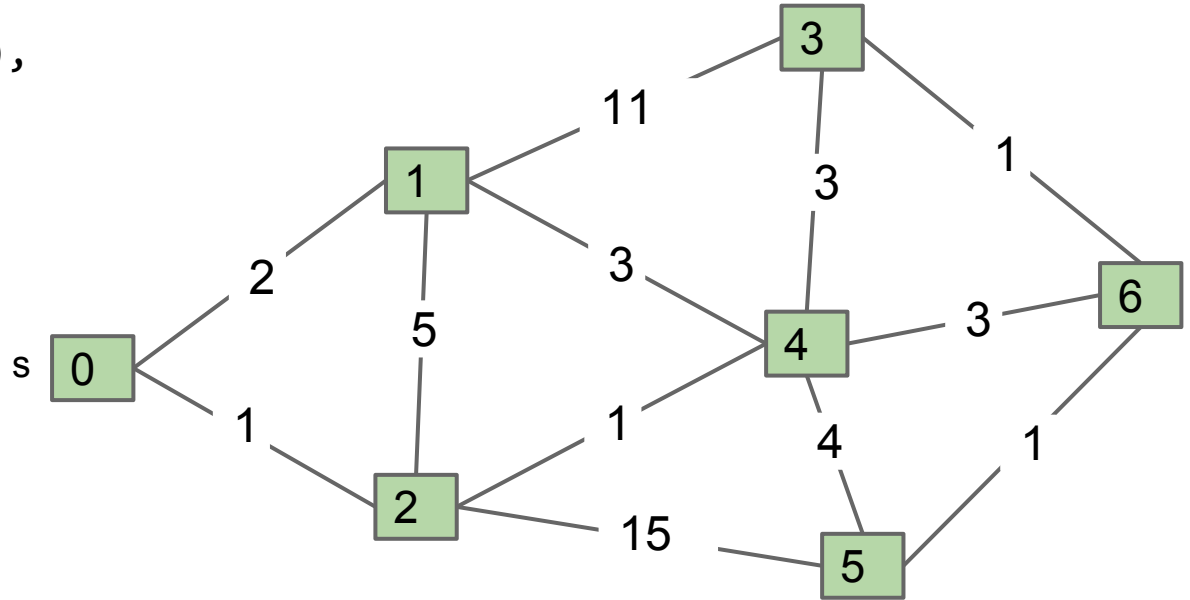


Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (0-2: 1), (2-4: 1),
(3-6: 1), (5-6: 1),
(0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



WQU: []

MST: []

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

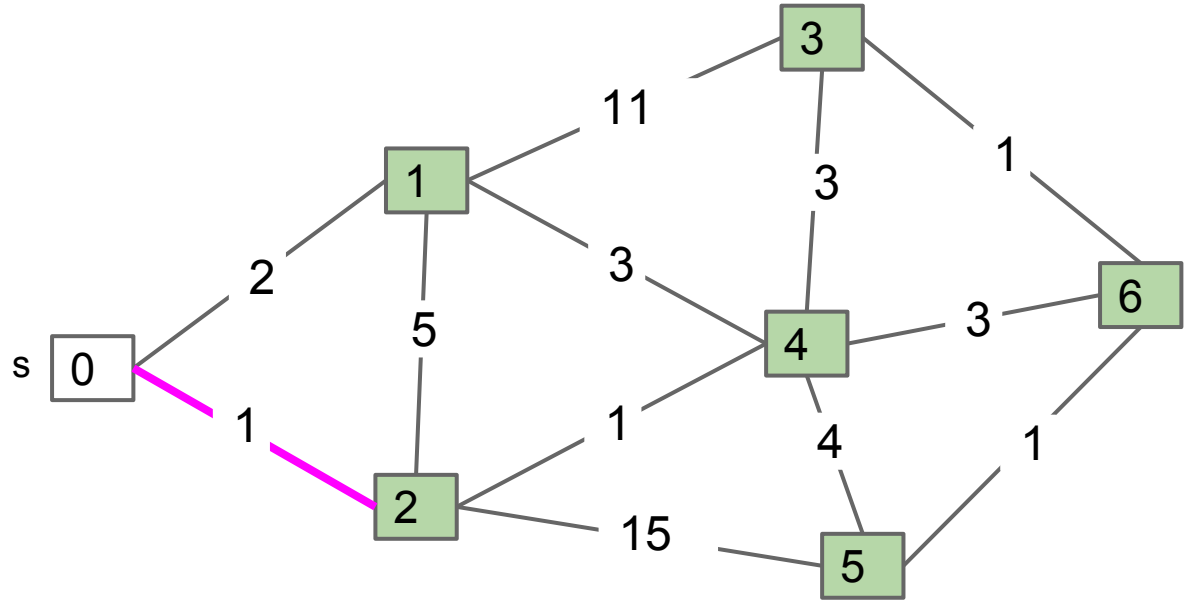
Fringe: (2-4: 1),
(3-6: 1), (5-6: 1),
(0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)

Removed edge: $e=0-2$

Cycle? `isConnected(0, 2)`

WQU: []

MST: []

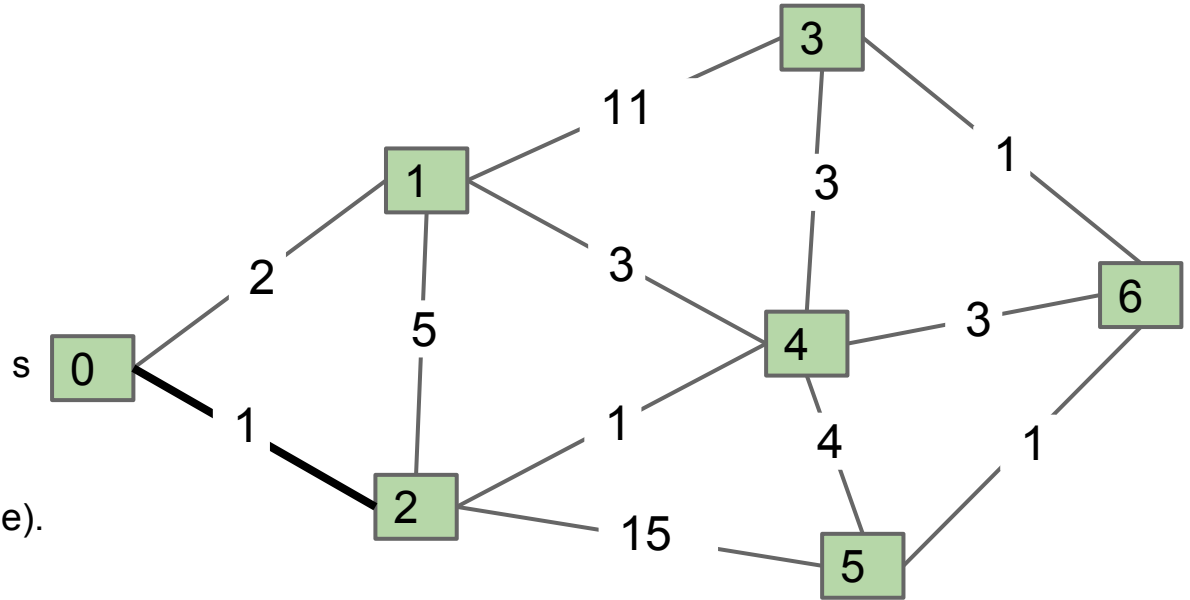


Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (2-4: 1),
(3-6: 1), (5-6: 1),
(0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=0-2$

Cycle? No. $\text{union}(0, 2)$. $\text{add}(e)$.

WQU: [0-2]

MST: [0-2]

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Removed edge: $e=2-4$

0-2]

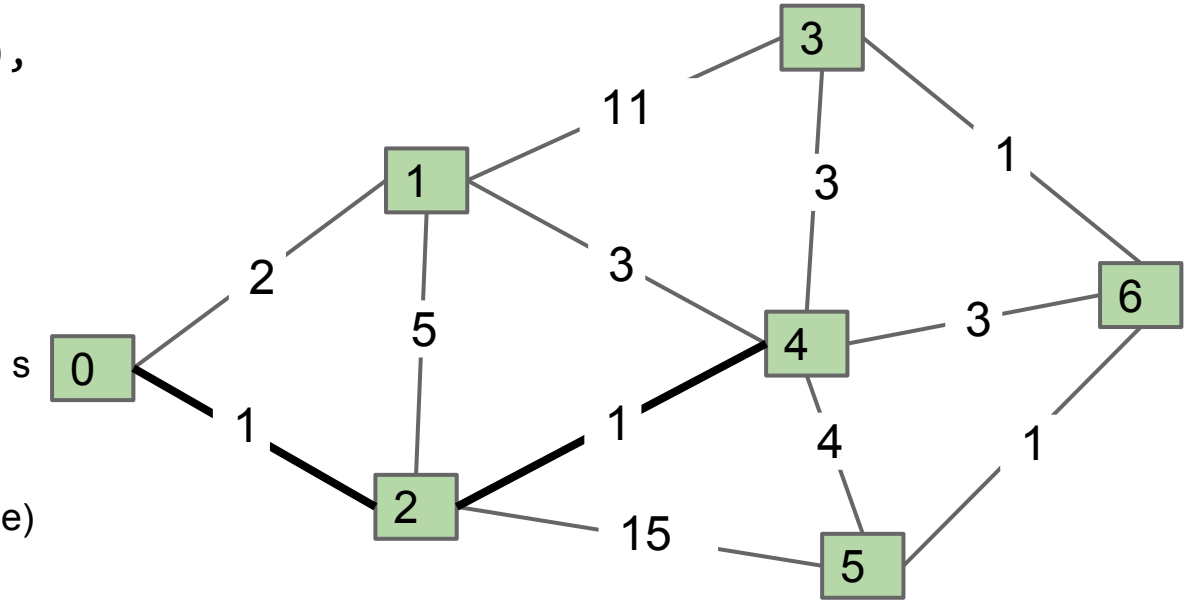
MST: [0-2]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (3-6: 1), (5-6: 1),
(0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=2-4$

Cycle? No. $\text{union}(2, 4)$. $\text{add}(e)$

WQU: [$0-2-4$]

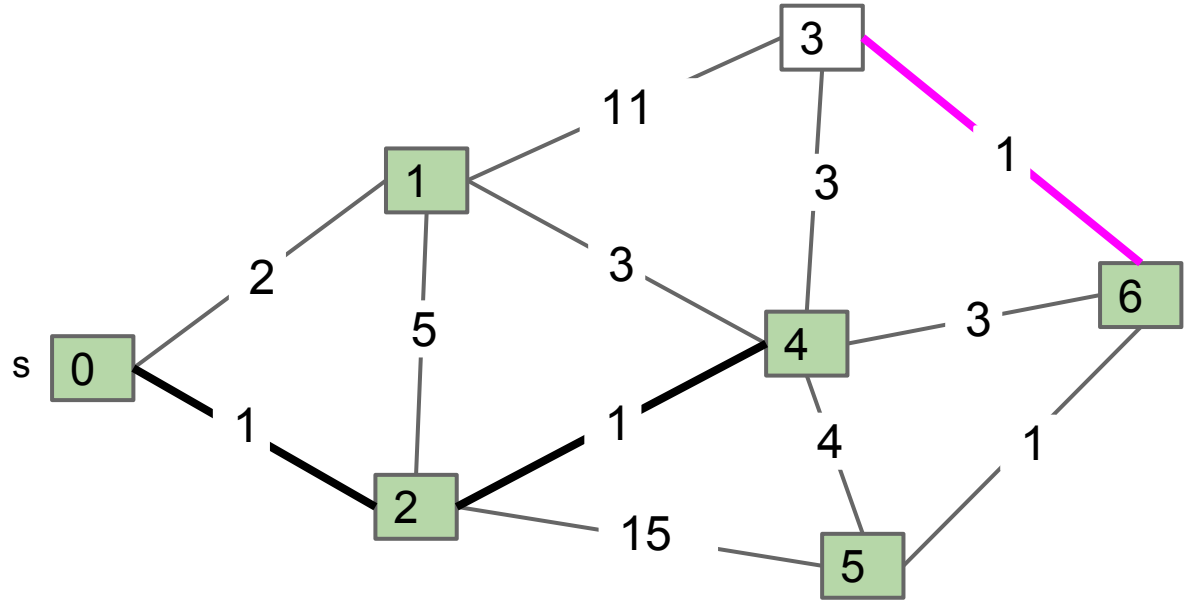
MST: [$0-2$, $2-4$]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (5-6: 1),
(0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: 3-6

Cycle? isConnected(3, 6)

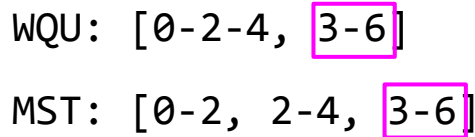
WQU: [0-2-4]

MST: [0-2, 2-4]

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Removed edge: e=3-6

Cycle? No. union(3, 6). add(e).

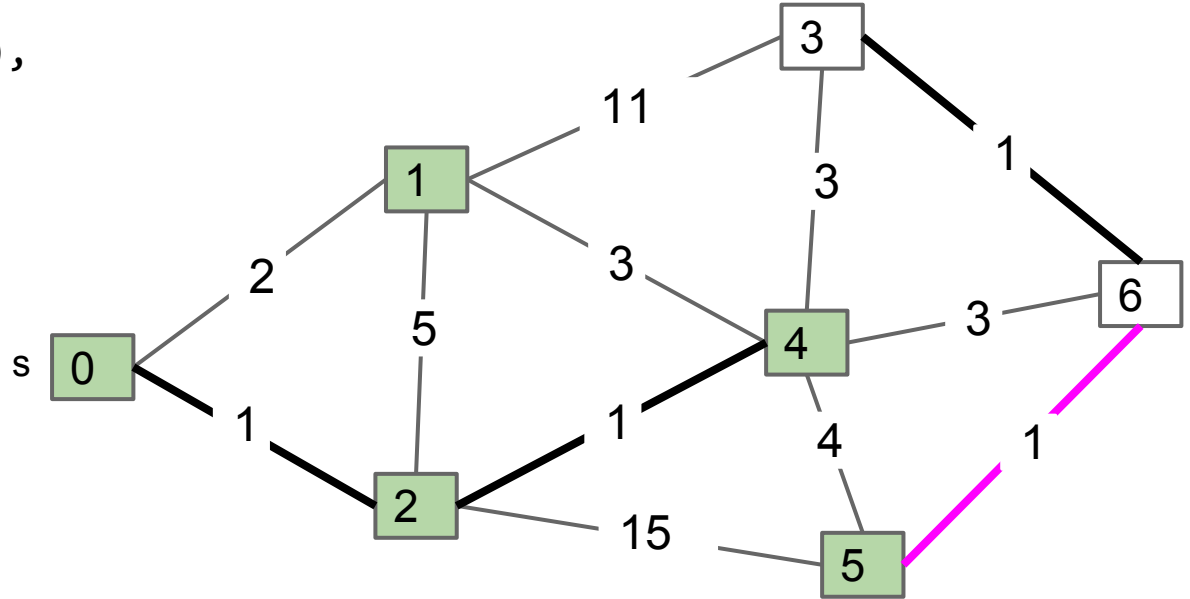


Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: e=5-6

Cycle? isConnected(5, 6)

WQU: [0-2-4, 3-6]

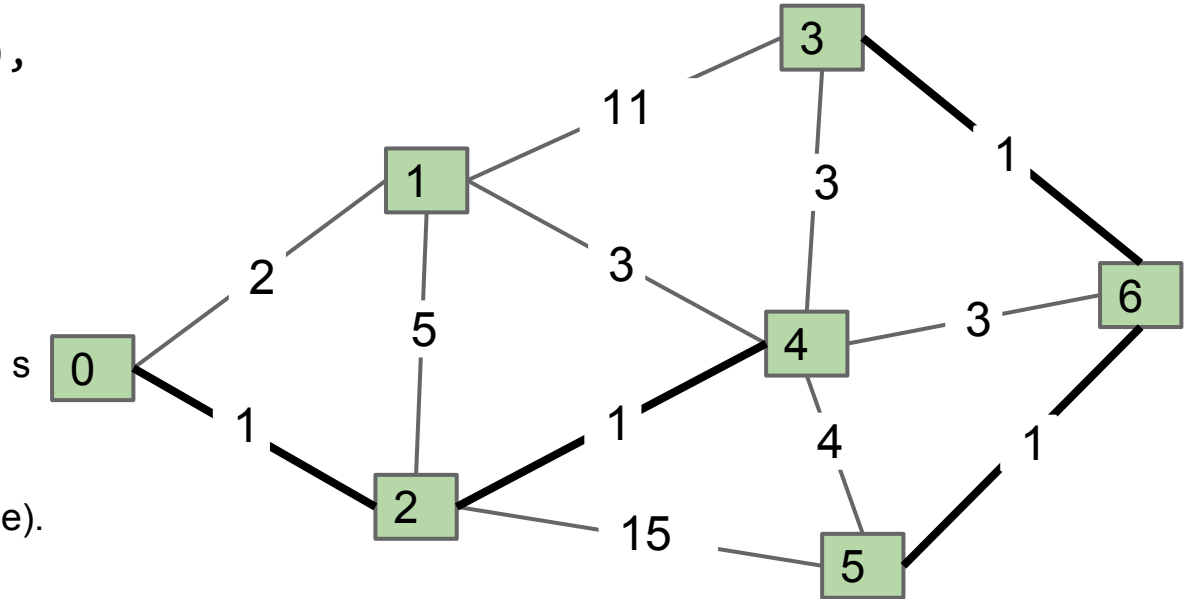
MST: [0-2, 2-4, 3-6]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (0-1: 2), (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=5-6$

Cycle? No. union(5, 6). add(e).

WQU: [0-2-4, 3-6-5]

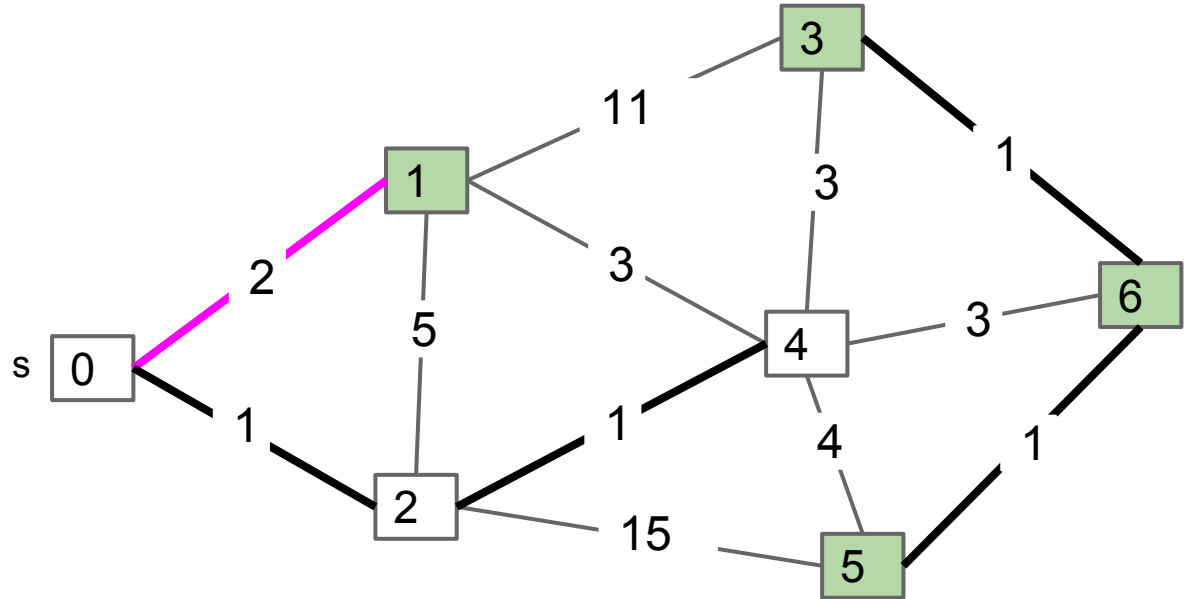
MST: [0-2, 2-4, 3-6, 5-6]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=0-1$

Cycle? `isConnected(0, 1)`

WQU: [0-2-4, 3-6-5]

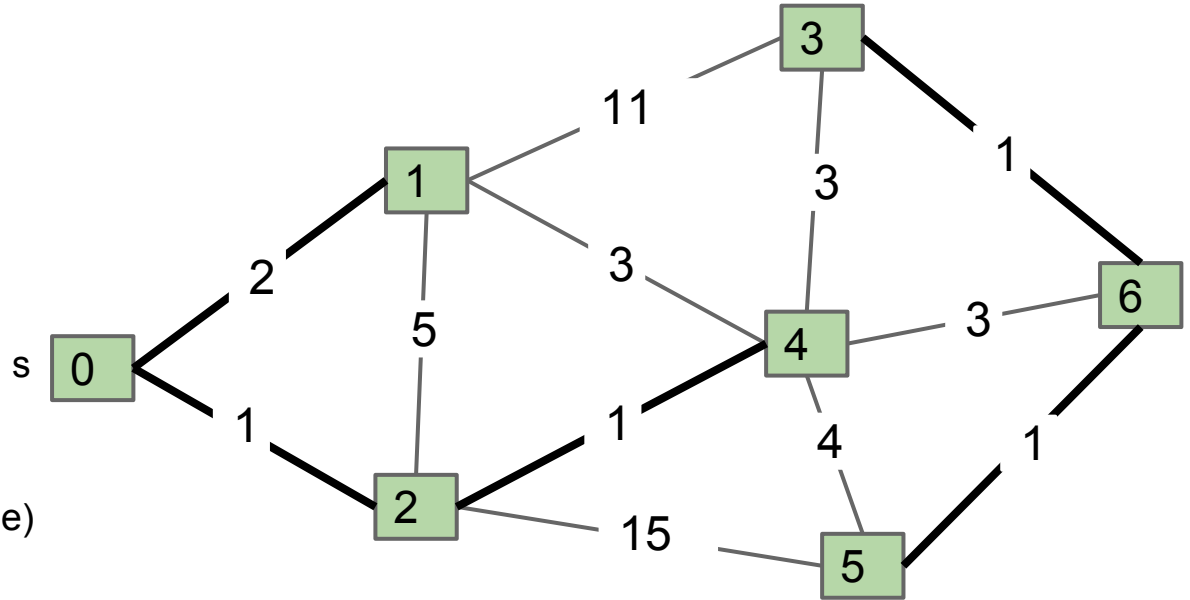
MST: [0-2, 2-4, 3-6, 5-6]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (4-1: 3),
(3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=0-1$

Cycle? No. $\text{union}(0, 1)$. $\text{add}(e)$

WQU: [$0-2$, 4-1, 3-6-5]

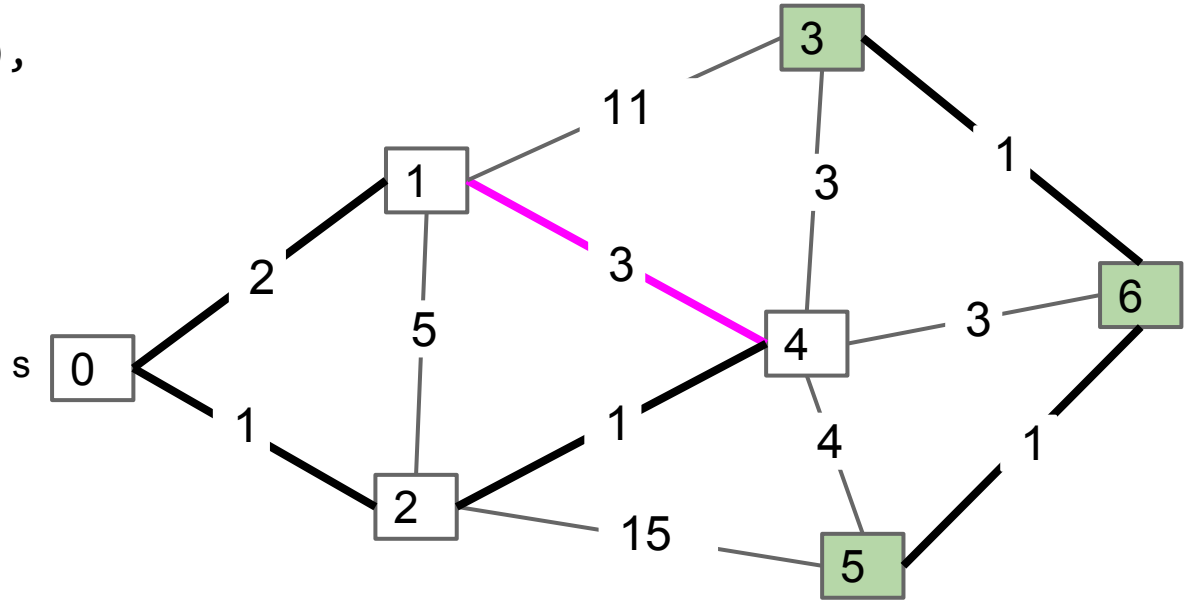
MST: [$0-2$, 2-4, 3-6, 5-6, 0-1]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=1-4$

Cycle? `isConnected(1, 4)`

WQU: $[0-2-4-1, 3-6-5]$

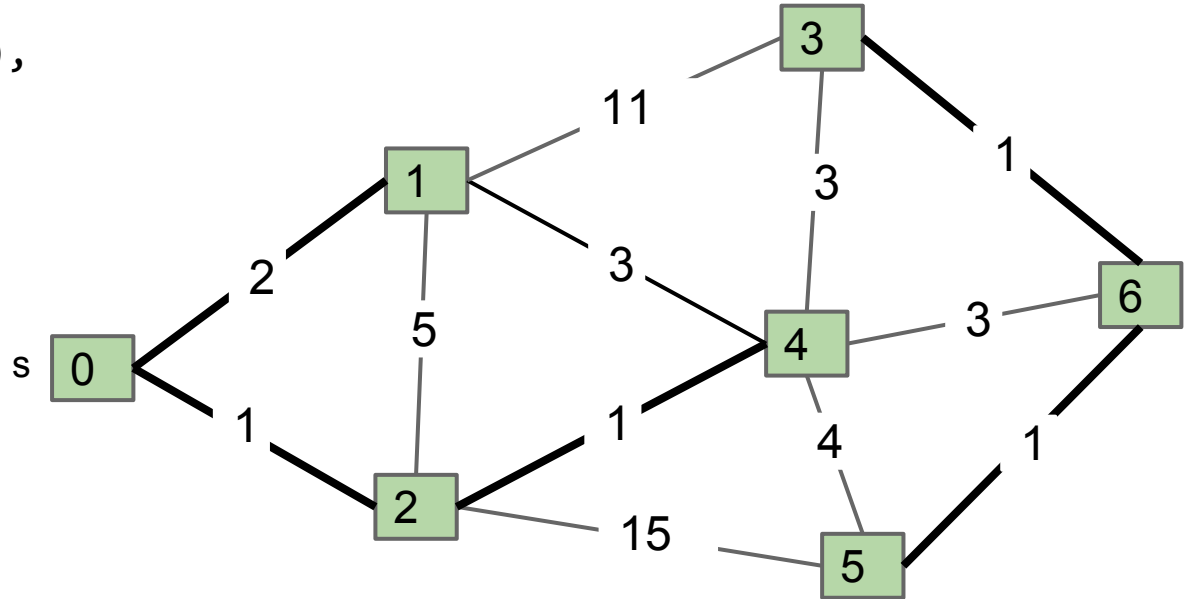
MST: $[0-2, 2-4, 3-6, 5-6, 0-1]$

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (3-4: 3), (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=1-4$

Cycle? Yes. Do nothing.

WQU: $[0-2-4-1, 3-6-5]$

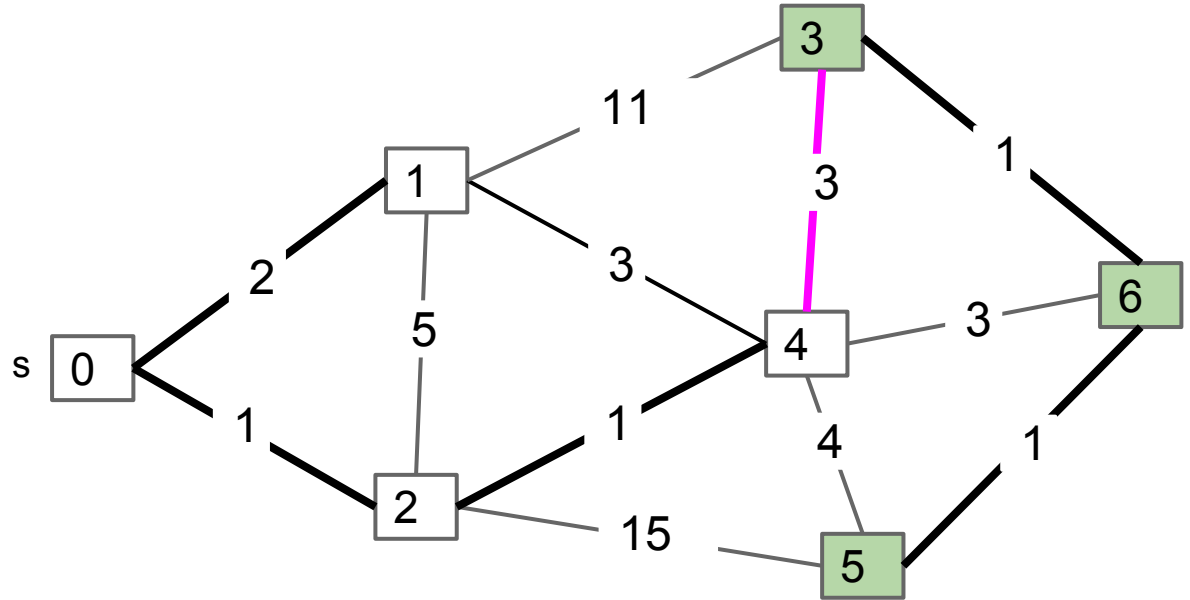
MST: $[0-2, 2-4, 3-6, 5-6, 0-1]$

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=3-4$

Cycle? `isConnected(3, 4)`

WQU: [0-2-4-1, 3-6-5]

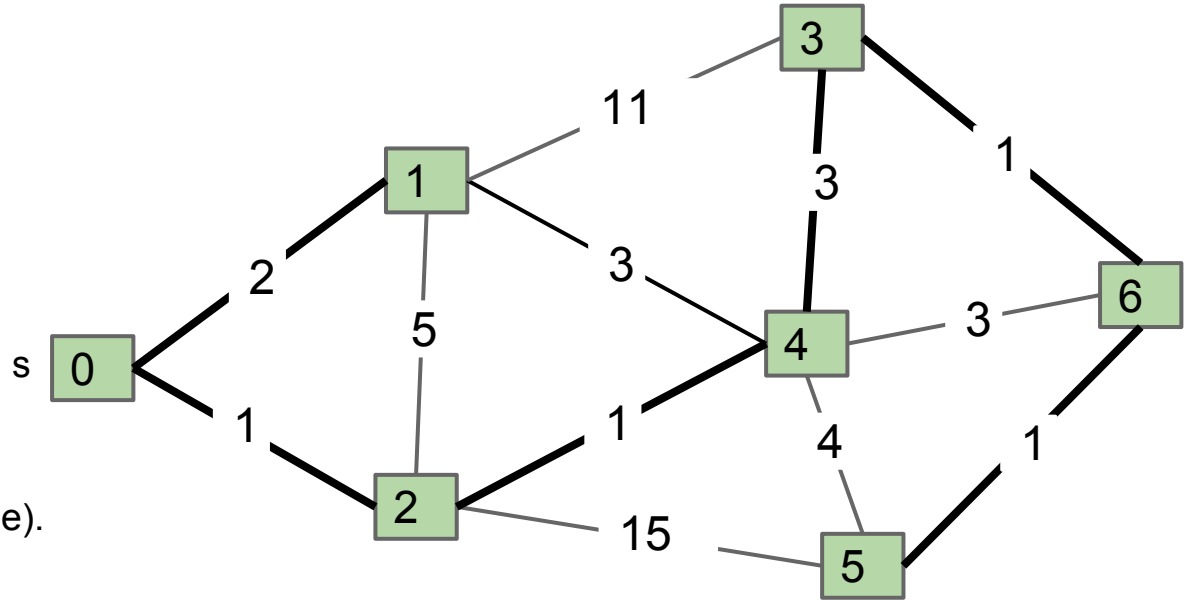
MST: [0-2, 2-4, 3-6, 5-6, 0-1]

Kruskal's Demo

Insert all edges into PQ.

Repeat: Remove smallest weight edge. Add to MST if no cycle created.

Fringe: (6-4: 3),
(4-5: 4), (1-2: 5),
(1-3: 11), (2-5: 15)



Removed edge: $e=3-4$

Cycle? No. $\text{union}(3, 4)$. $\text{add}(e)$.

WQU: $[\theta-2-4-\boxed{1-3}-6-5]$

MST: $[\theta-2, 2-4, 3-6, 5-6, \theta-1, \boxed{3-4}]$

V-1 edges, so done.