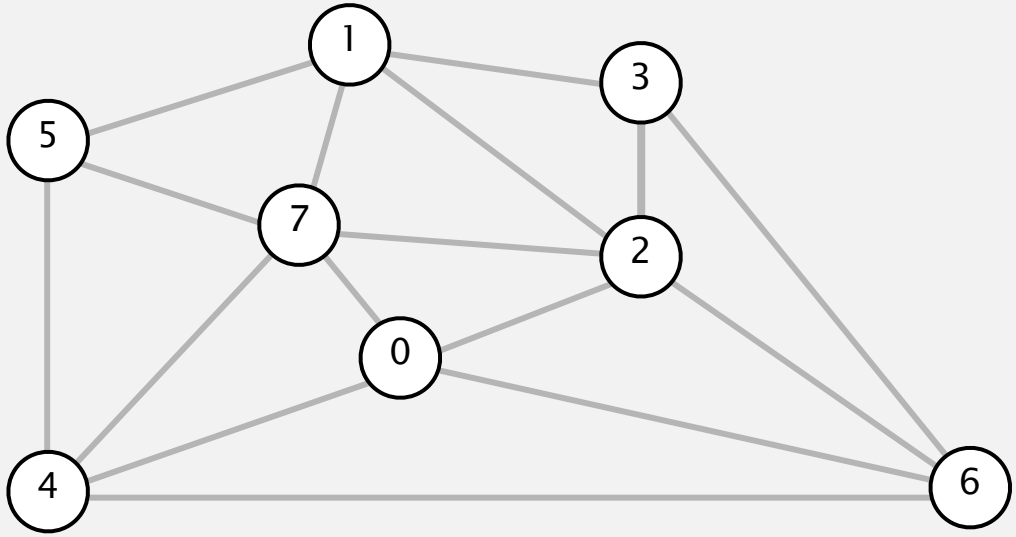
4.3 Kruskal's Algorithm Demo

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



an edge-weighted graph

graph edges
sorted by weight

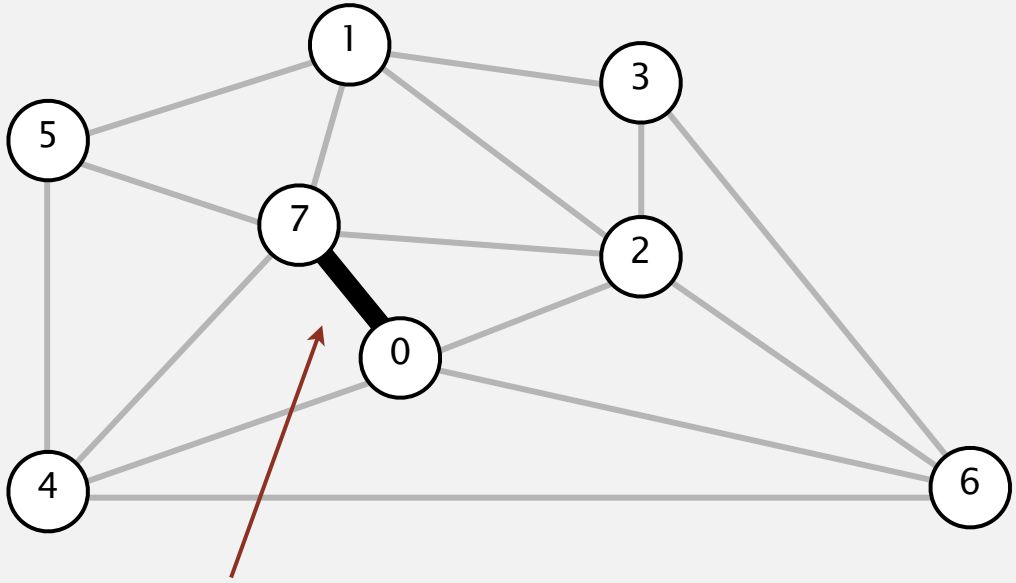
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.

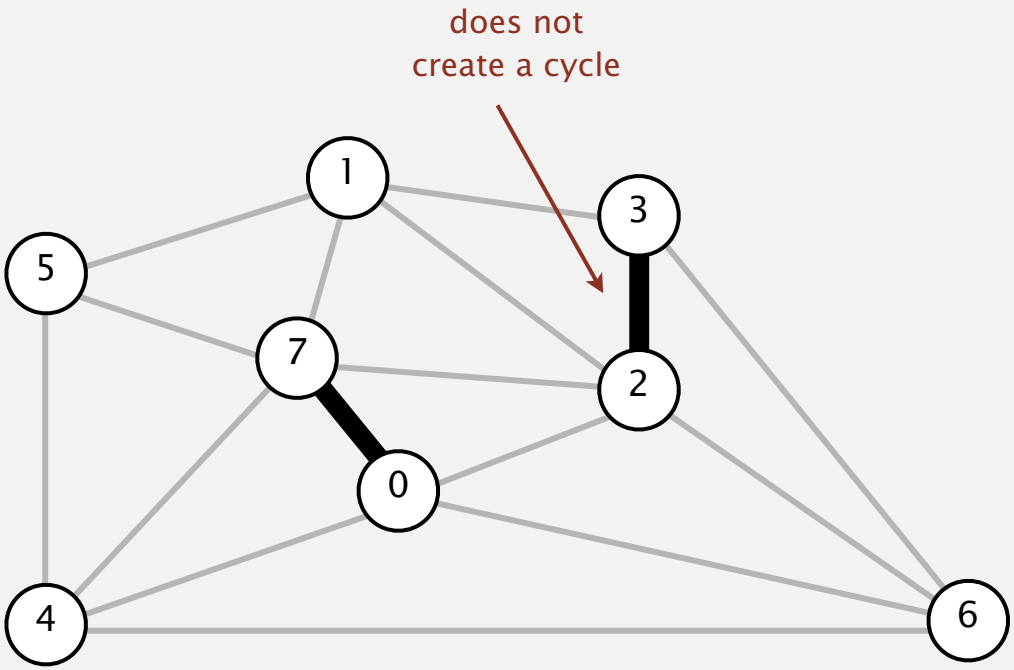
in MST ⟶ `0-7  0.16`



Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



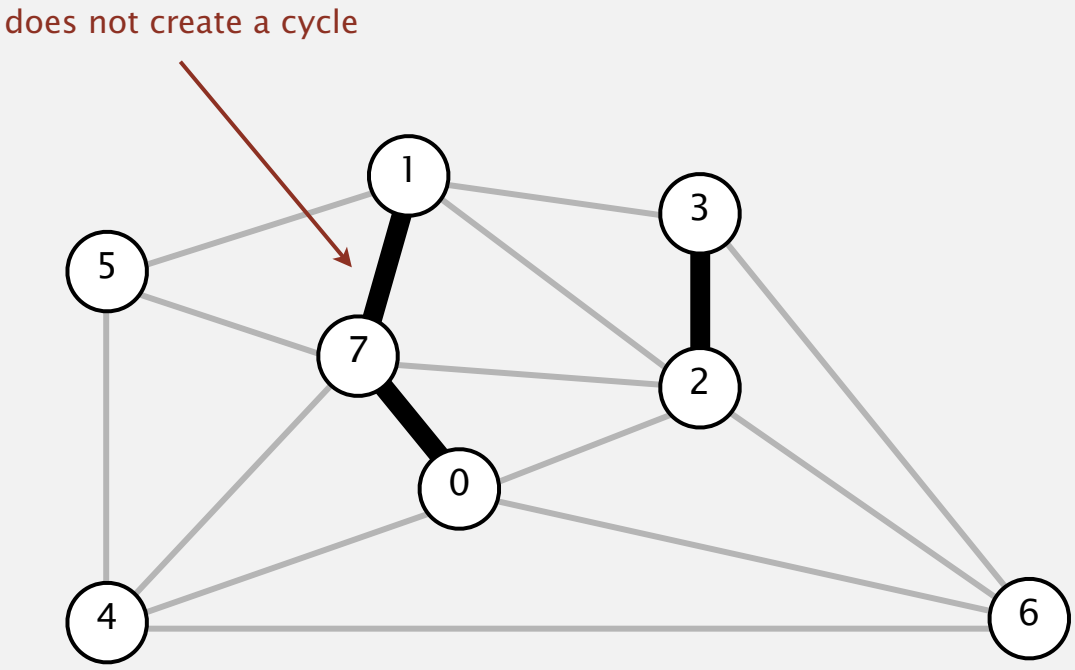
0-7 0.16

in MST → 2-3 0.17

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



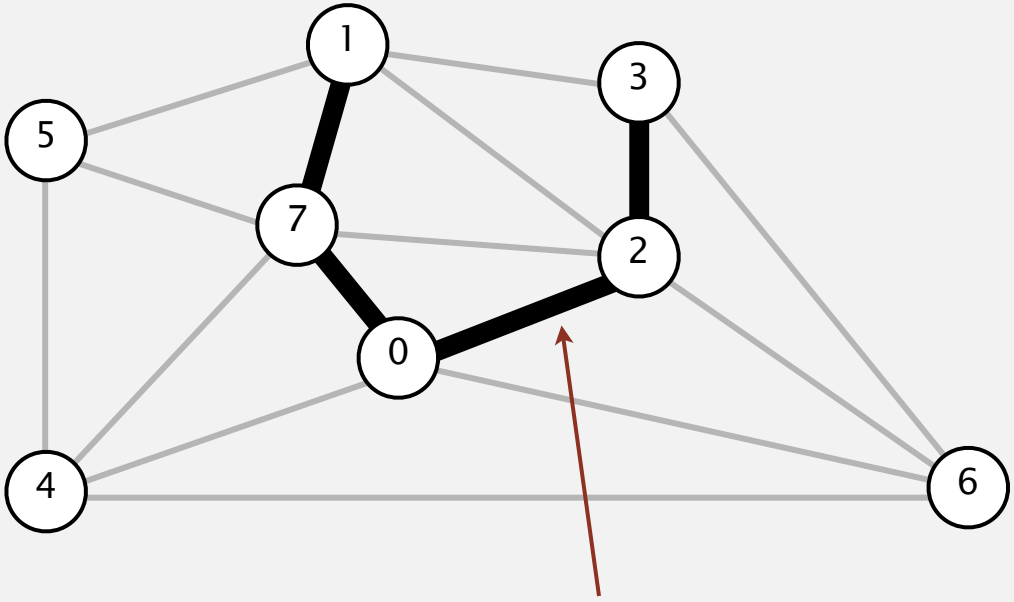

```
0-7  0.16
2-3  0.17
1-7  0.19
```

in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



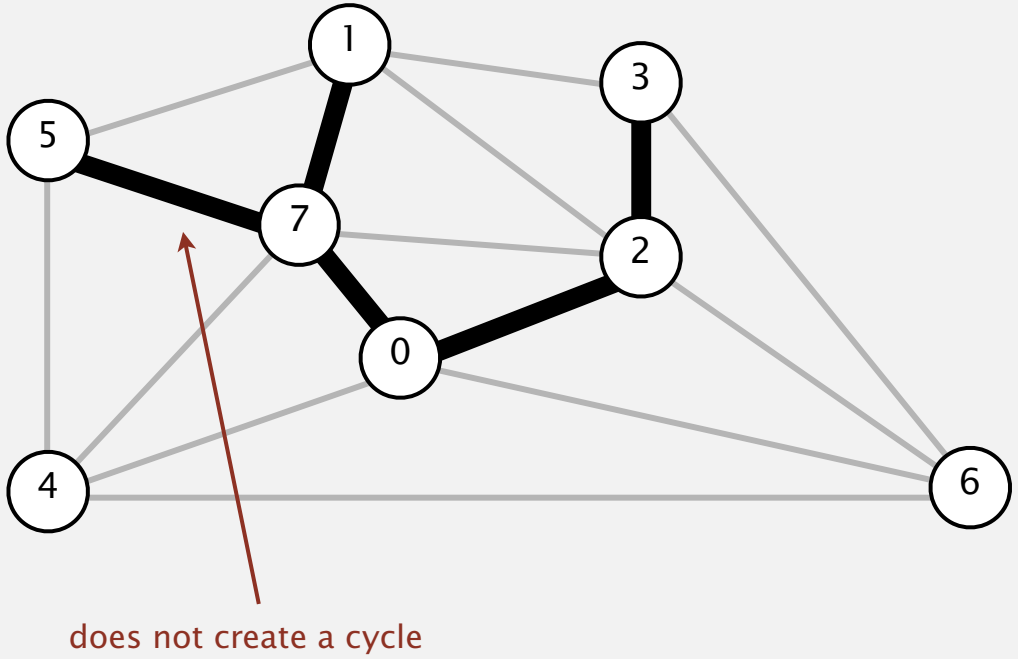

```
0-7  0.16
2-3  0.17
1-7  0.19
0-2  0.26
```

in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.

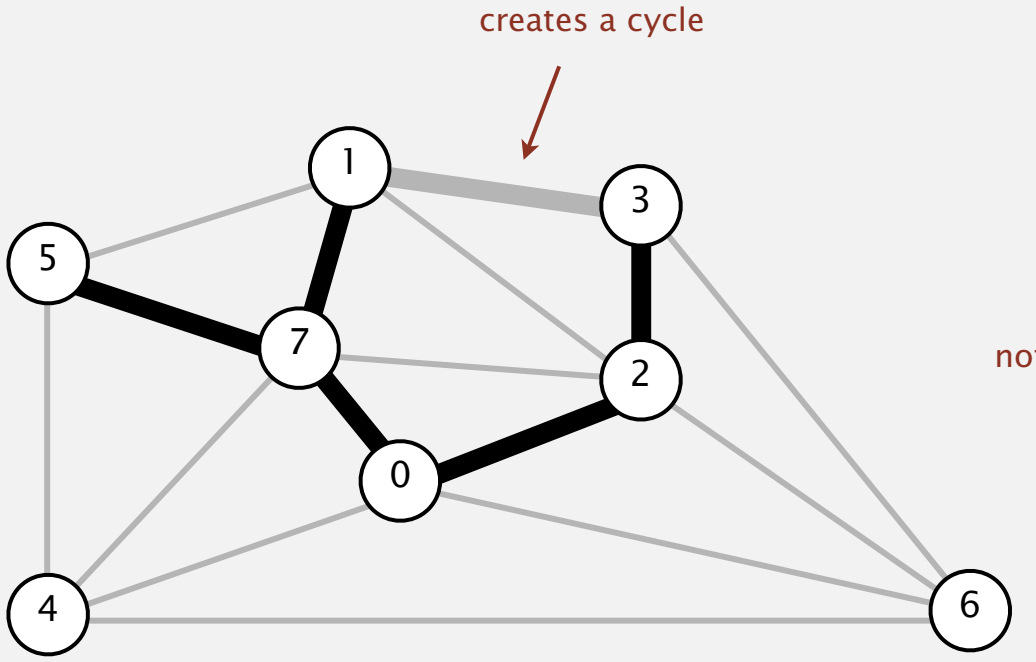


	0-7	0.16
	2-3	0.17
	1-7	0.19
	0-2	0.26
in MST →	5-7	0.28

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.

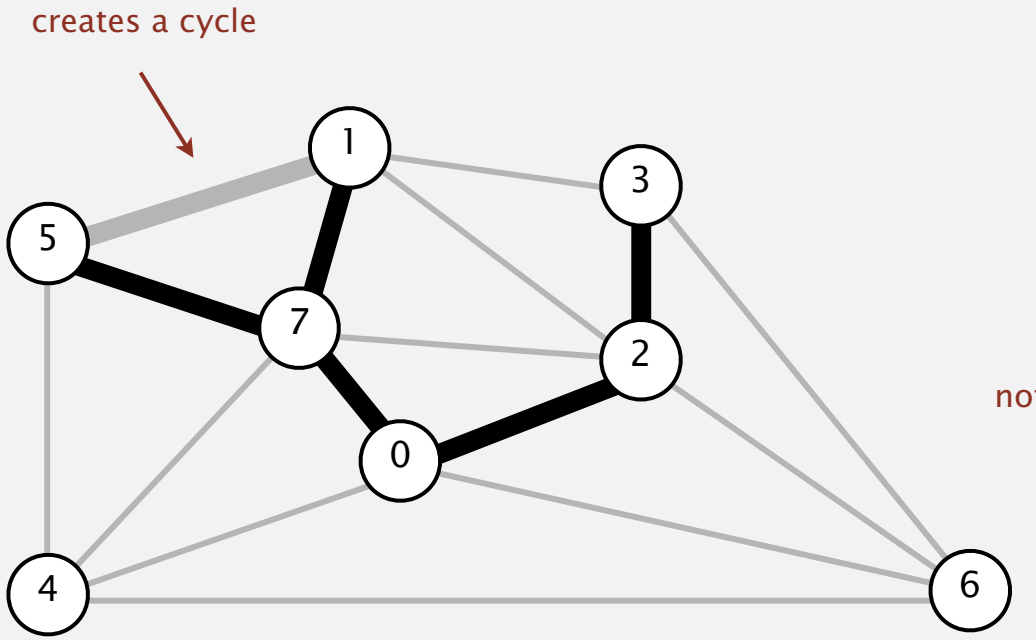


	0-7	0.16
	2-3	0.17
	1-7	0.19
	0-2	0.26
	5-7	0.28
not in MST →	1-3	0.29

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.

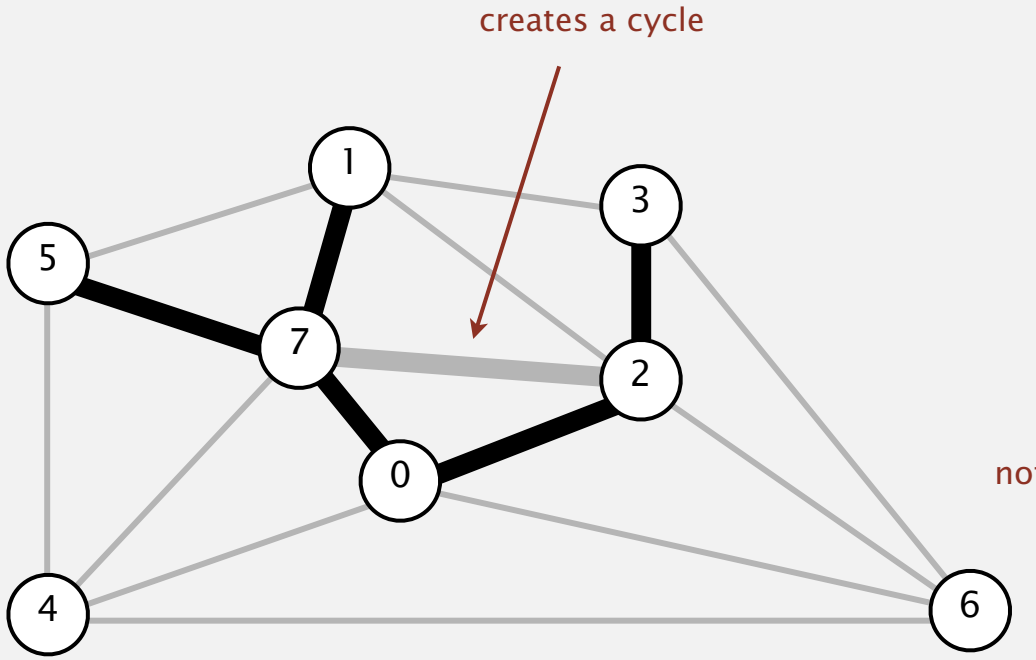


	0-7	0.16
	2-3	0.17
	1-7	0.19
	0-2	0.26
	5-7	0.28
	1-3	0.29
not in MST →	1-5	0.32

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.

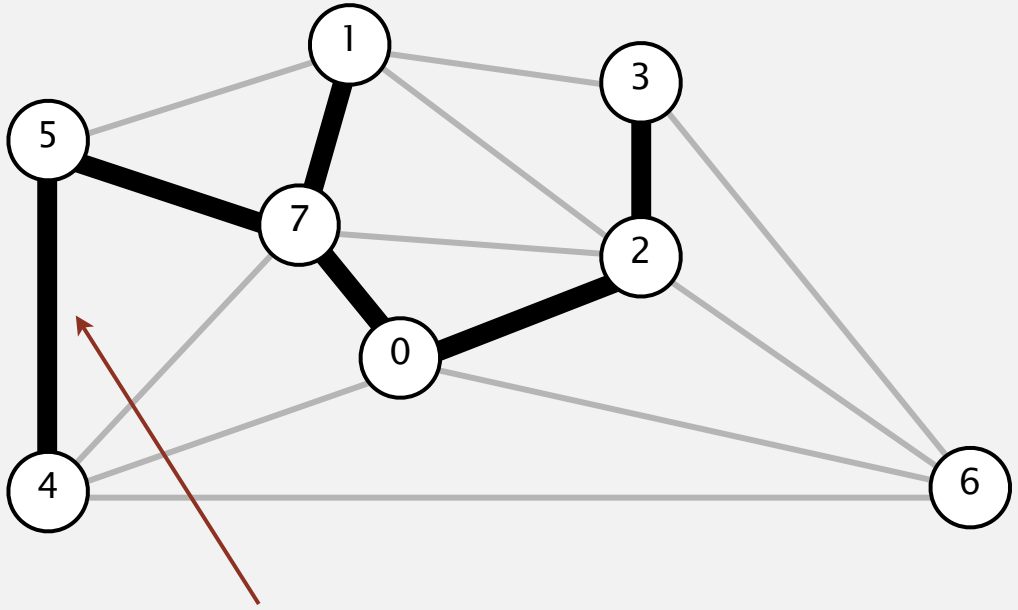


0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
not in MST → 2-7	0.34

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



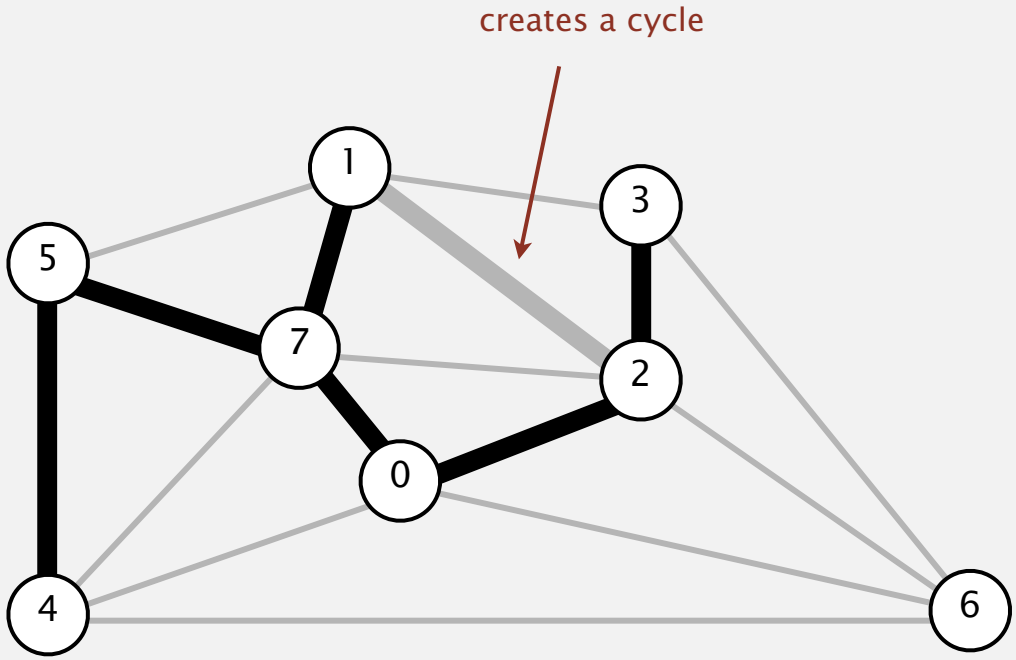
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	**0.35**

in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



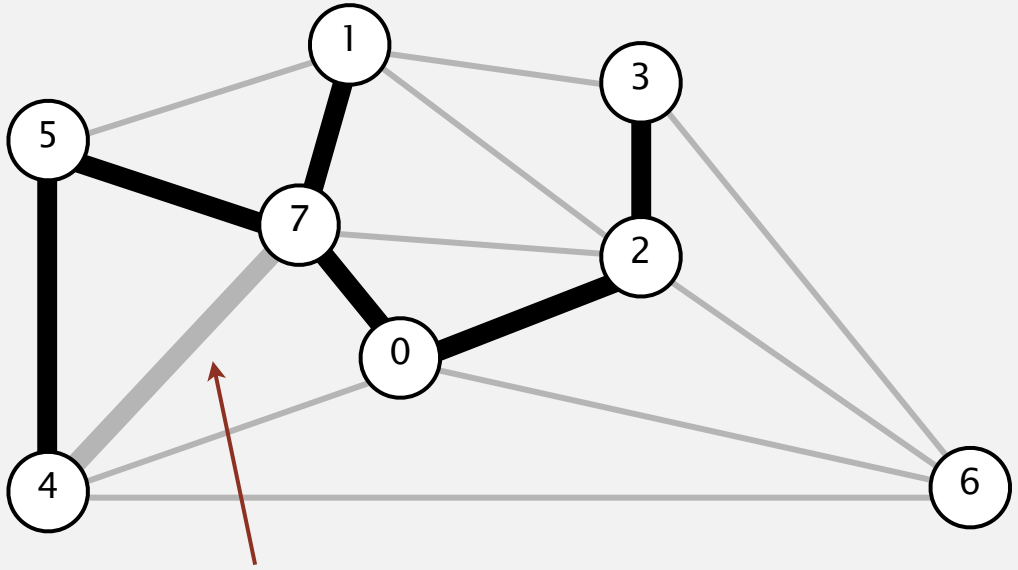
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36

not in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



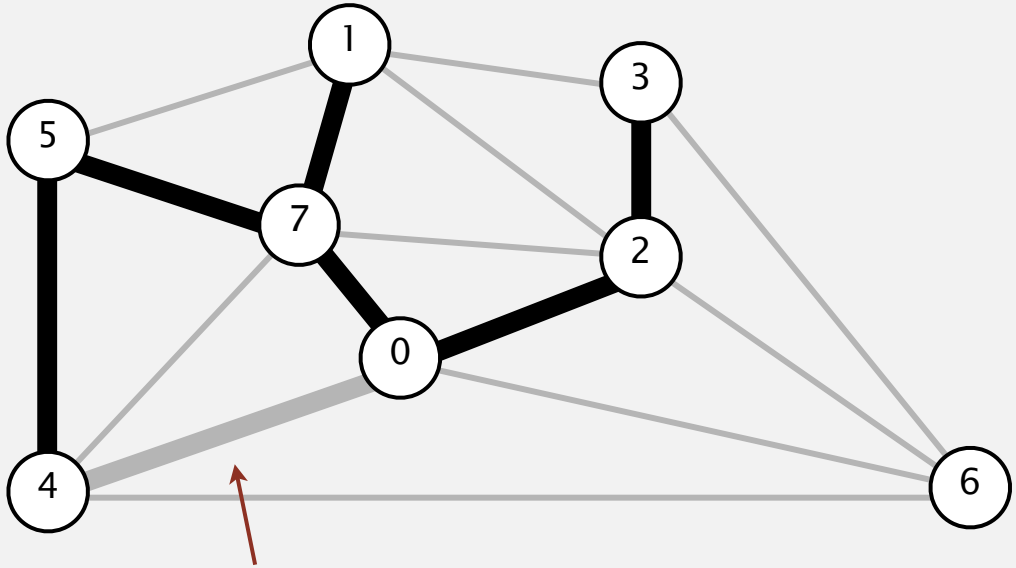
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37

not in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



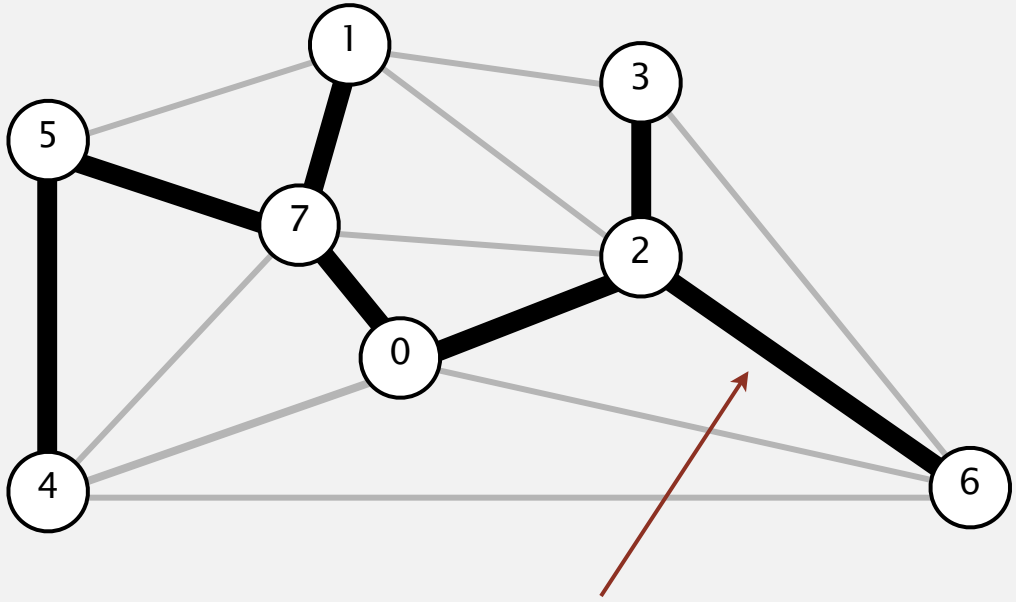
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38

not in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



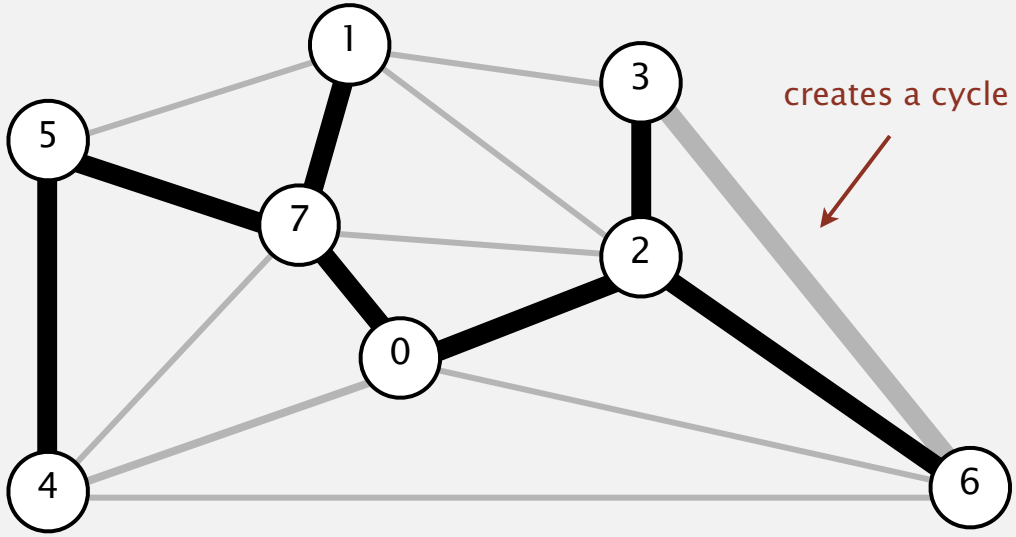
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40

in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



creates a cycle

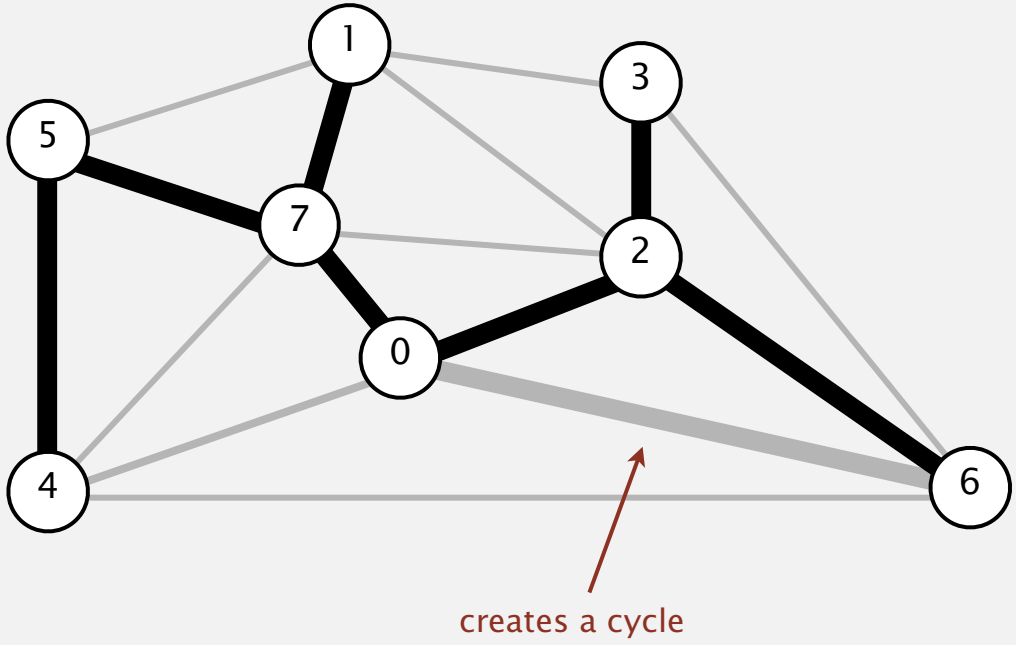
0-7	**0.16**
2-3	**0.17**
1-7	**0.19**
0-2	**0.26**
5-7	**0.28**
1-3	0.29
1-5	0.32
2-7	0.34
4-5	**0.35**
1-2	0.36
4-7	0.37
0-4	0.38
6-2	**0.40**
3-6	0.52

not in MST

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.

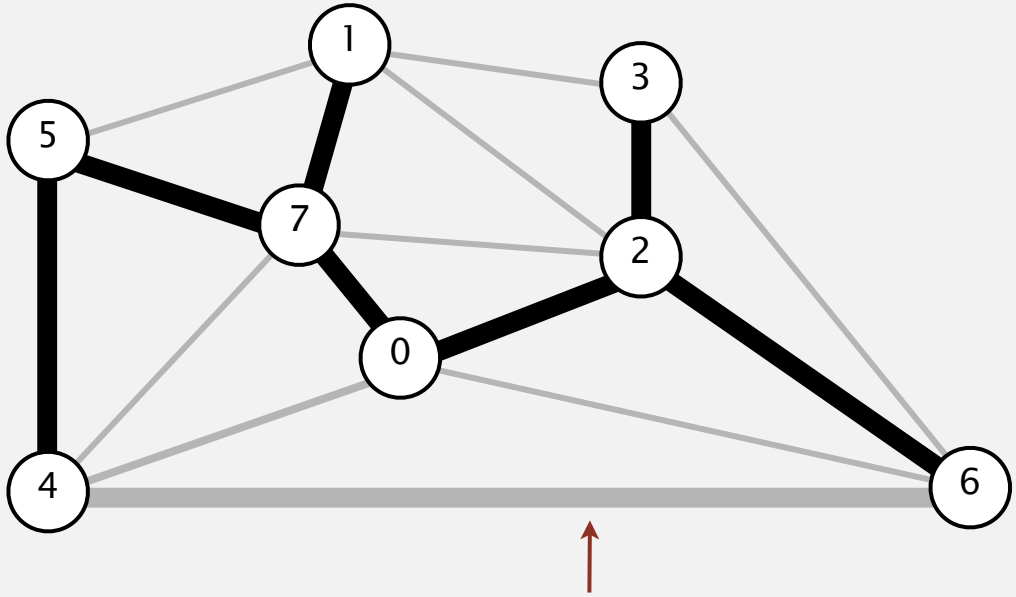


0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
not in MST → 6-0	0.58

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



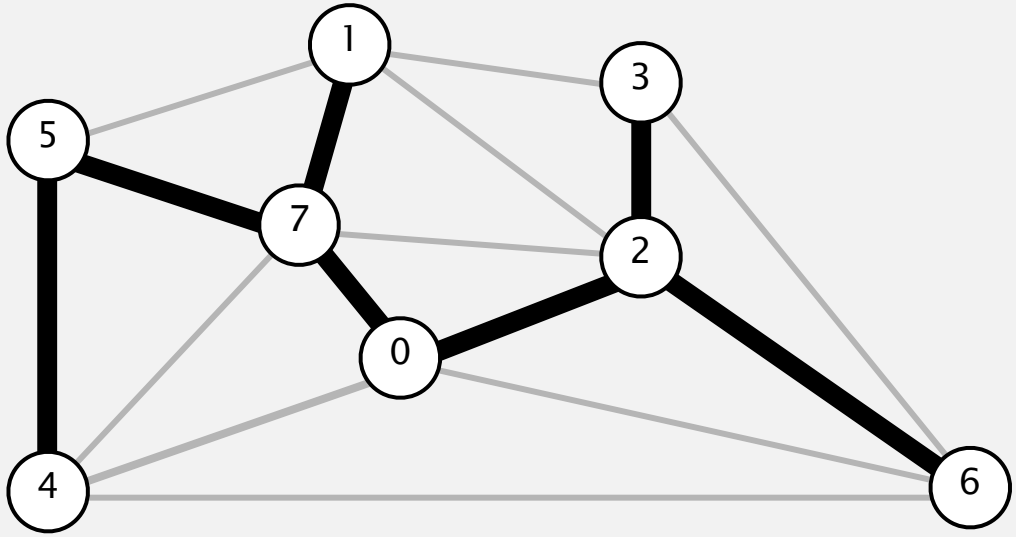
0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93

not in MST →

Kruskal's algorithm

Consider edges in ascending order of weight.

- Add next edge to tree T unless doing so would create a cycle.



a minimum spanning tree

0-7	0.16
2-3	0.17
1-7	0.19
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93