‣ **Prim's algorithm**
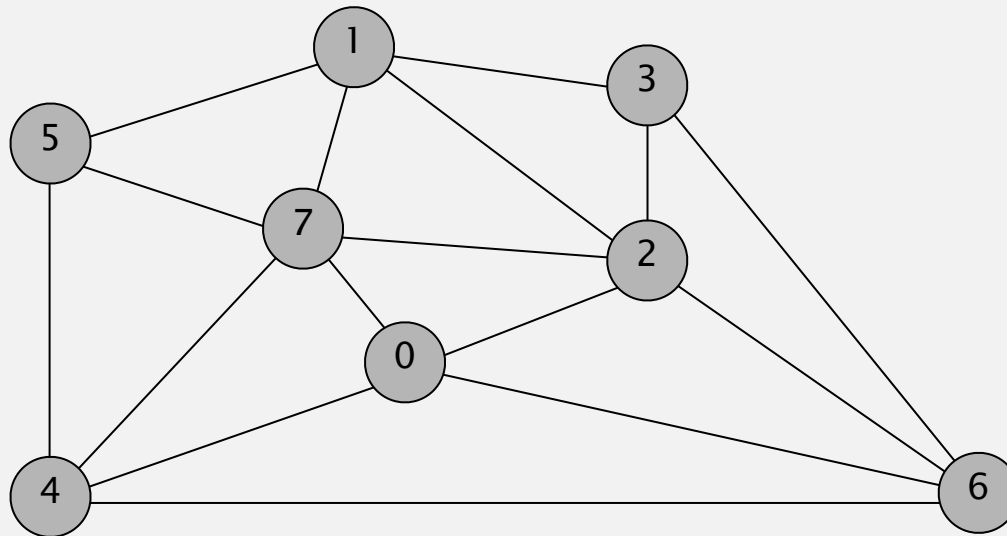‣ **lazy Prim**
‣ **eager Prim**

▸ **Prim's algorithm**

▸ lazy implementation

▸ eager implementation

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

an edge-weighted graph

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

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
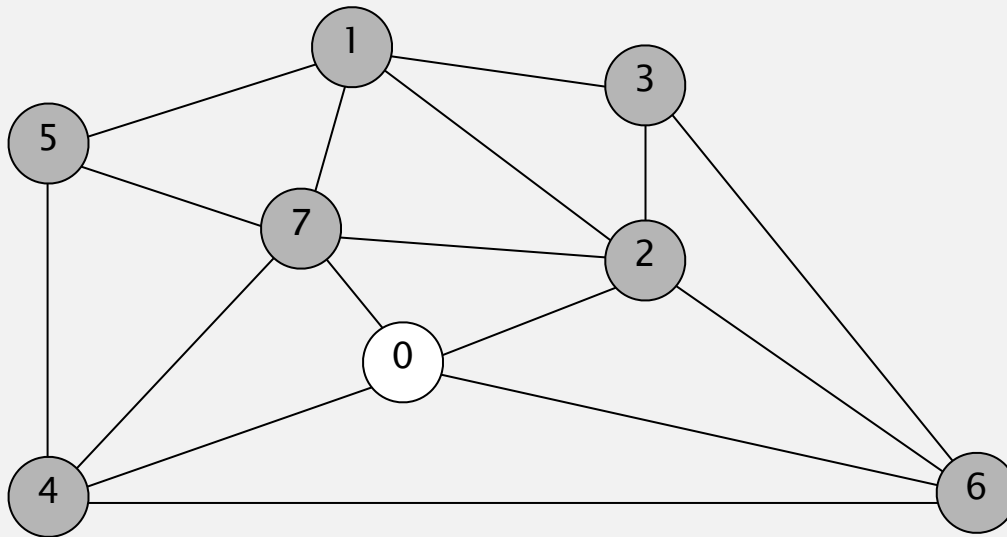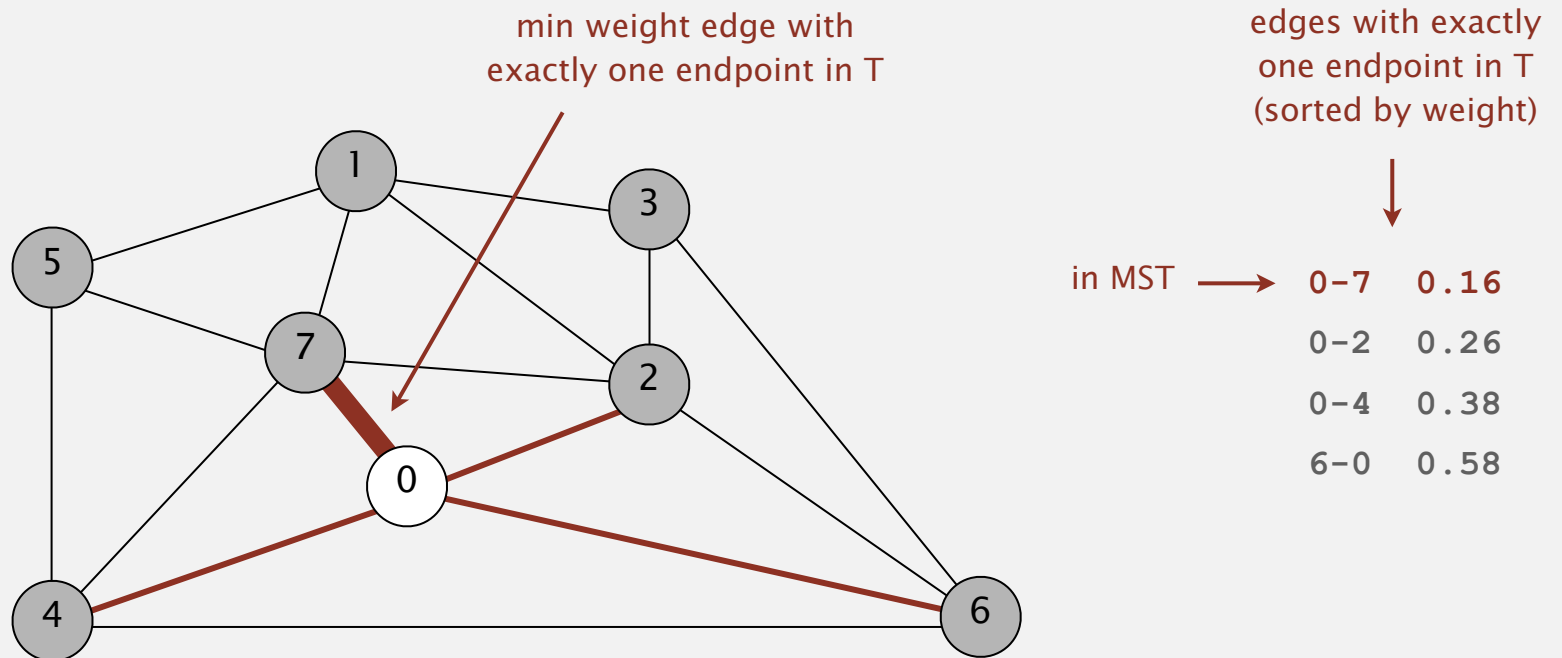
Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

min weight edge with
exactly one endpoint in T

edges with exactly
one endpoint in T
(sorted by weight)

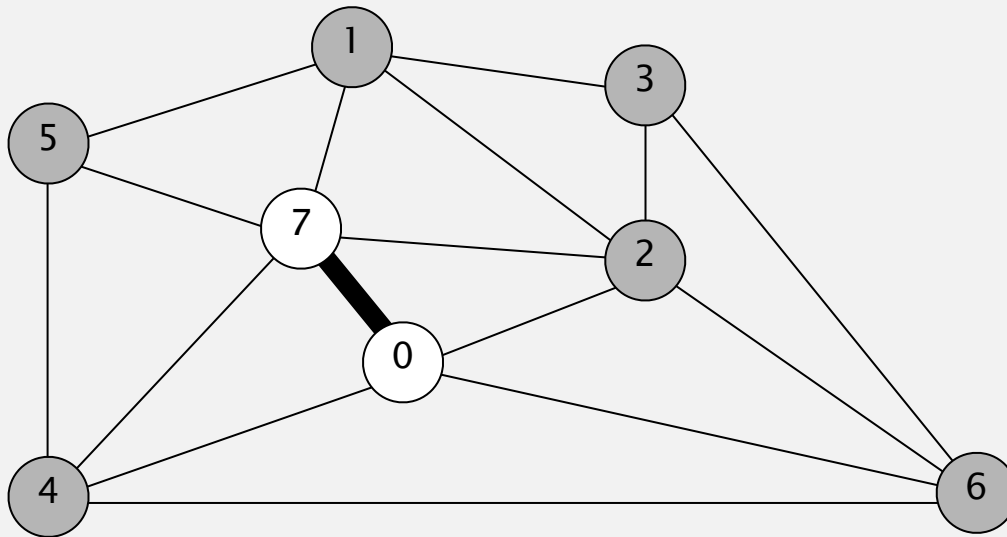| in MST	0-7	0.16
	0-2	0.26
	0-4	0.38
	6-0	0.58

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
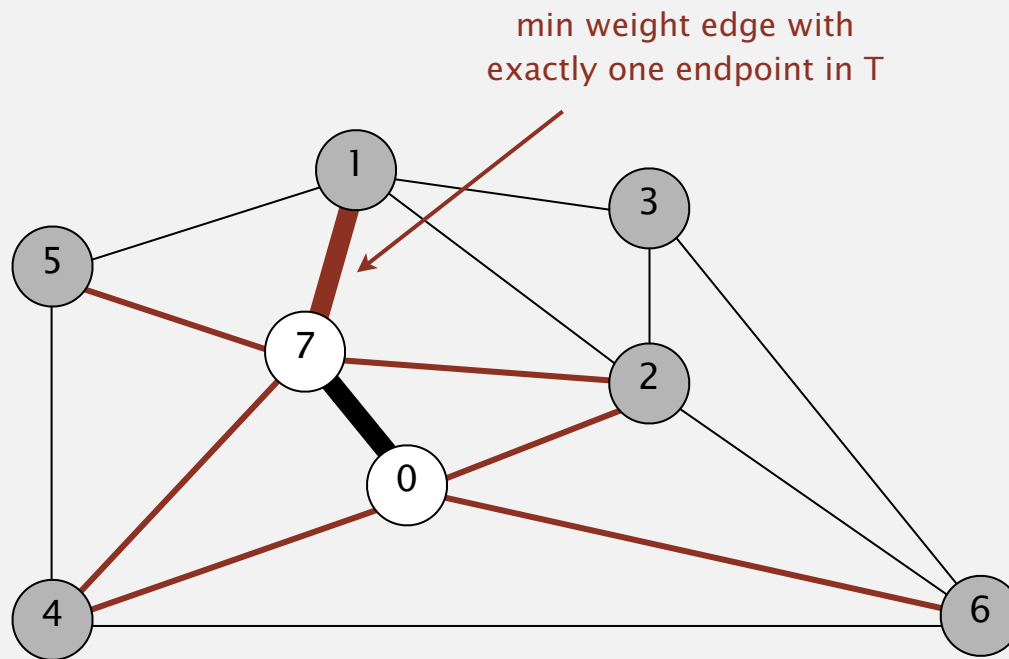
min weight edge with
exactly one endpoint in T

edges with exactly
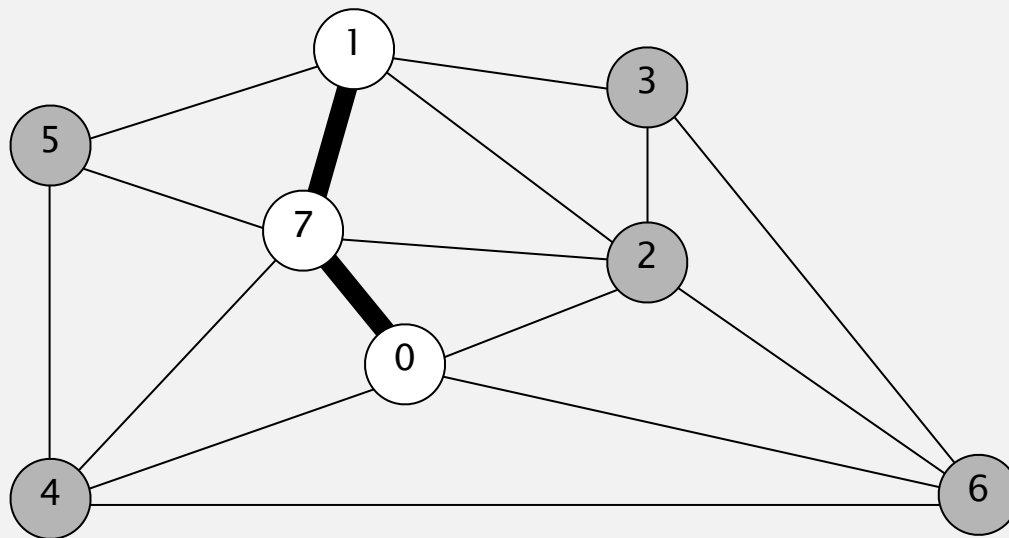one endpoint in T
(sorted by weight)

in MST ⟶ 1-7   0.19

0-2   0.26

5-7   0.28

2-7   0.34

4-7   0.37

0-4   0.38

6-0   0.58

MST edges

0-7

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0-7   1-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

min weight edge with
exactly one endpoint in T

edges with exactly
one endpoint in T
(sorted by weight)

in MST →	0-2	0.26
	5-7	0.28
	1-3	0.29
	1-5	0.32
	2-7	0.34
	1-2	0.36
	4-7	0.37
	0-4	0.38
	6-0	0.58

MST edges

0-7   1-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
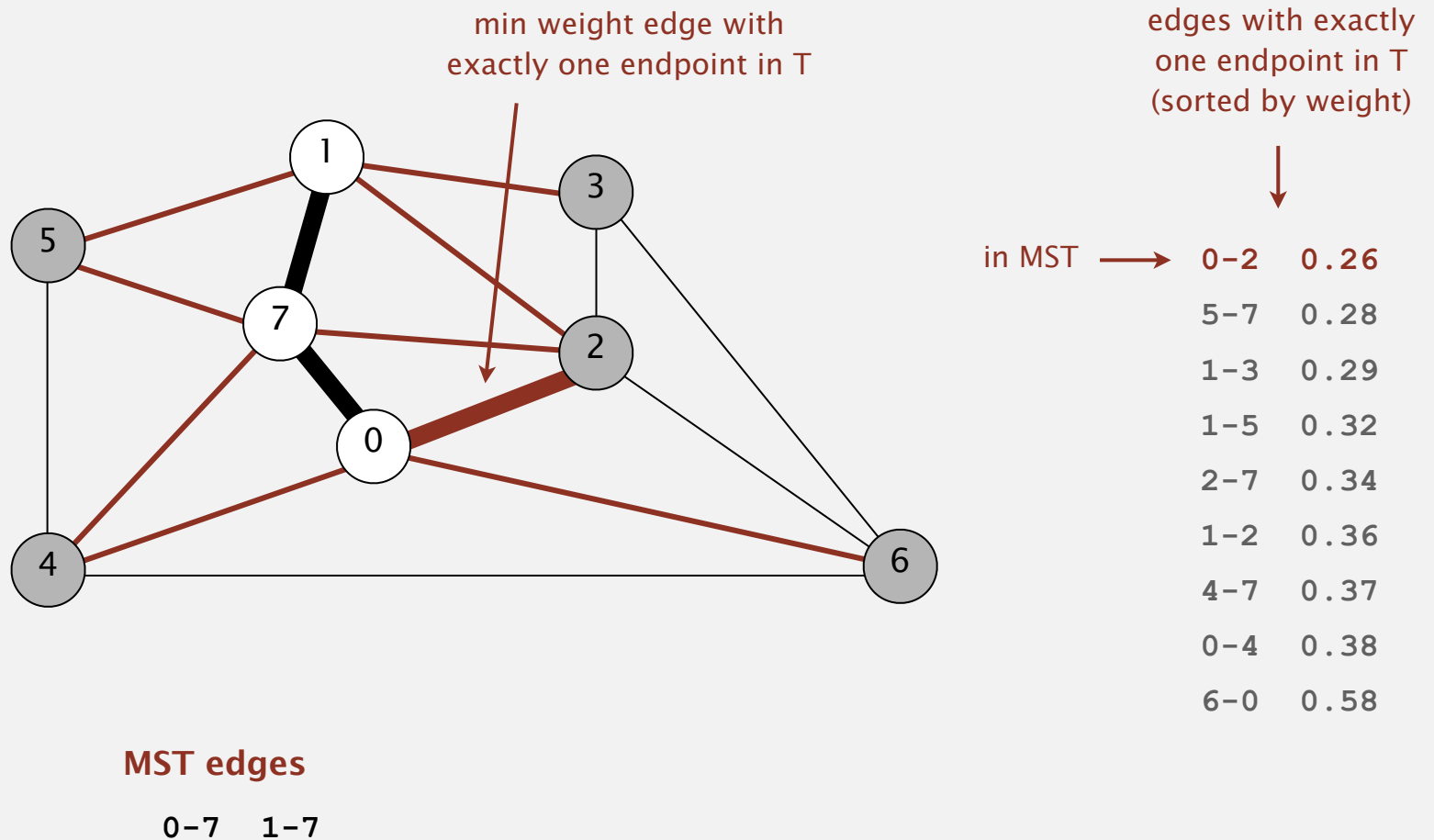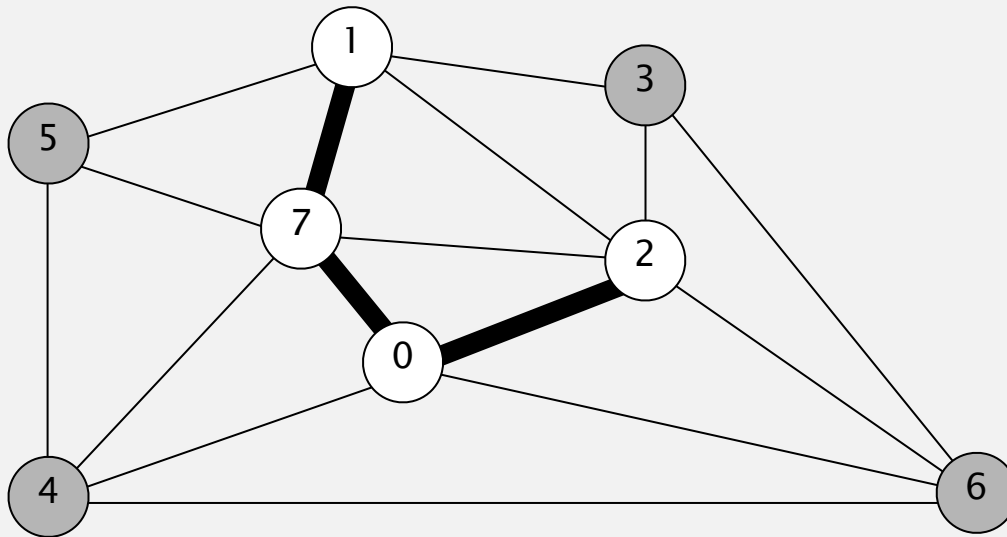- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0-7   1-7   0-2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
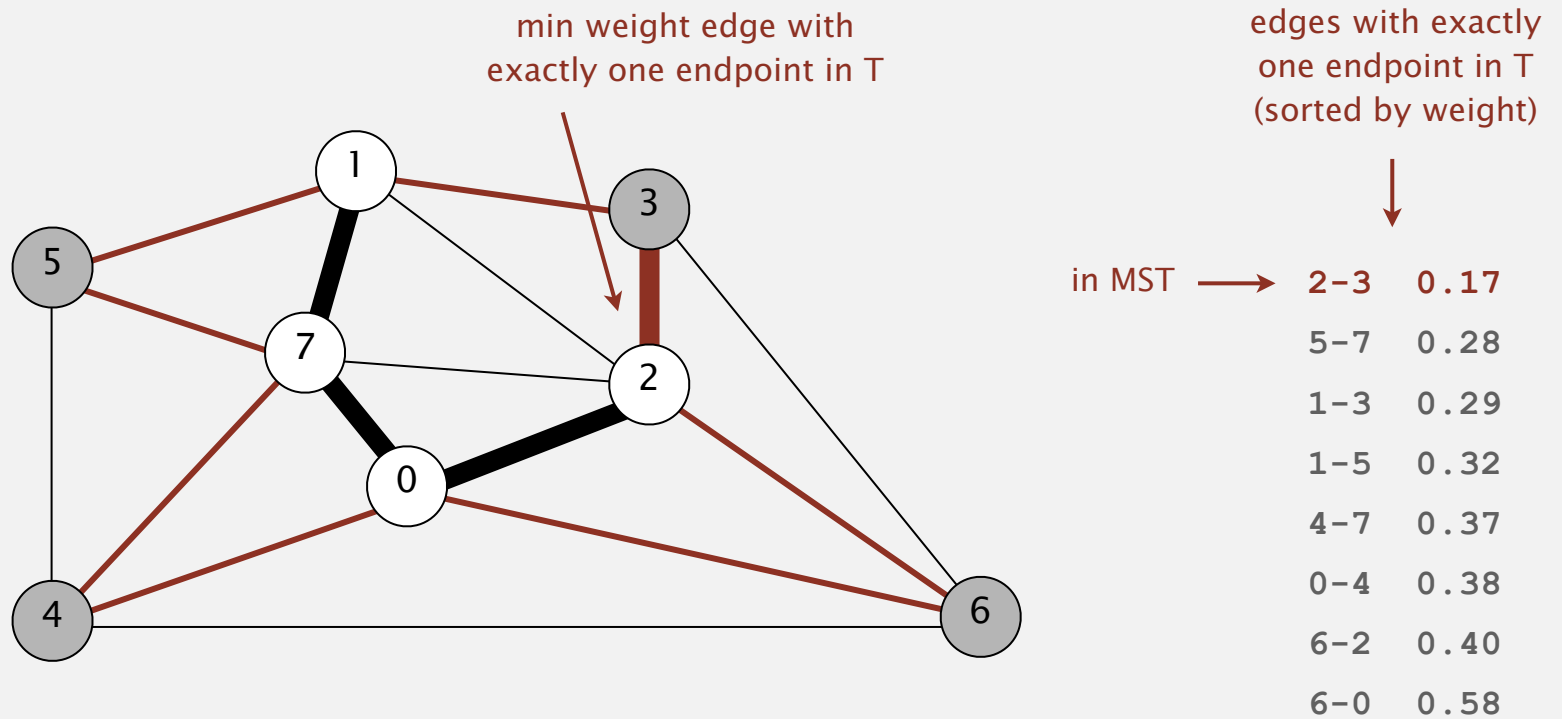- At each step, add to T the min weight edge with exactly one endpoint in T.

min weight edge with
exactly one endpoint in T

edges with exactly
one endpoint in T
(sorted by weight)

in MST ⟶	2-3	0.17
	5-7	0.28
	1-3	0.29
	1-5	0.32
	4-7	0.37
	0-4	0.38
	6-2	0.40
	6-0	0.58

MST edges

0-7   1-7   0-2

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0–7   1–7   0–2   2–3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
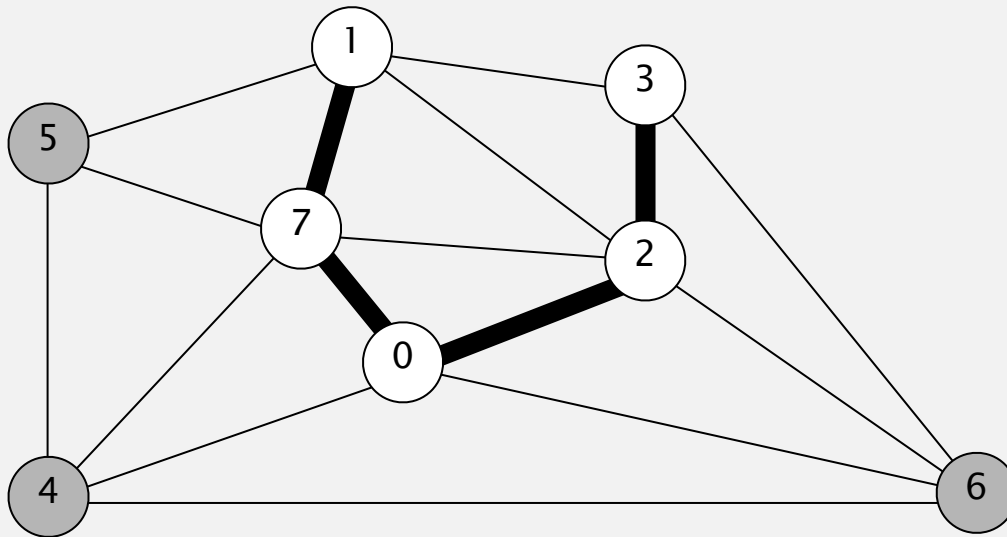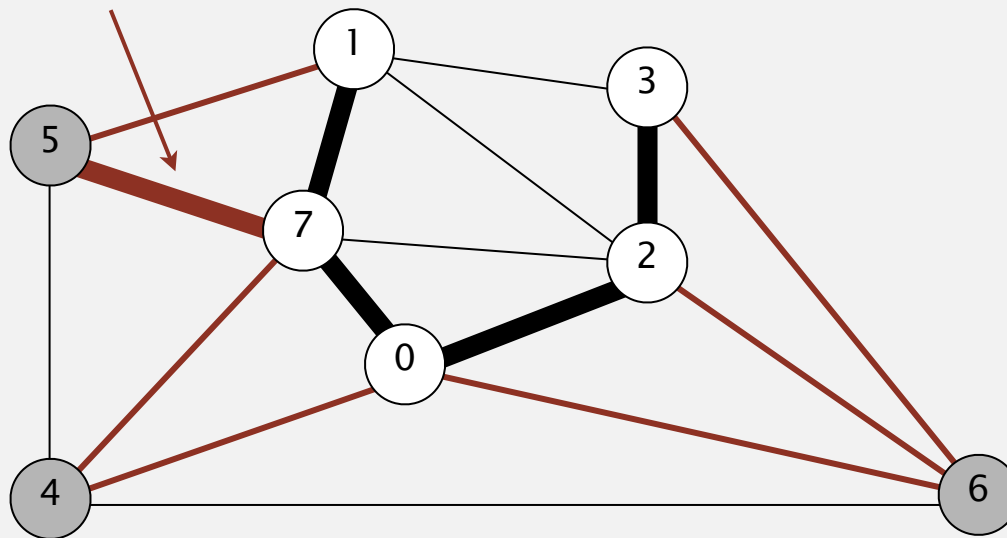
min weight edge with
exactly one endpoint in T
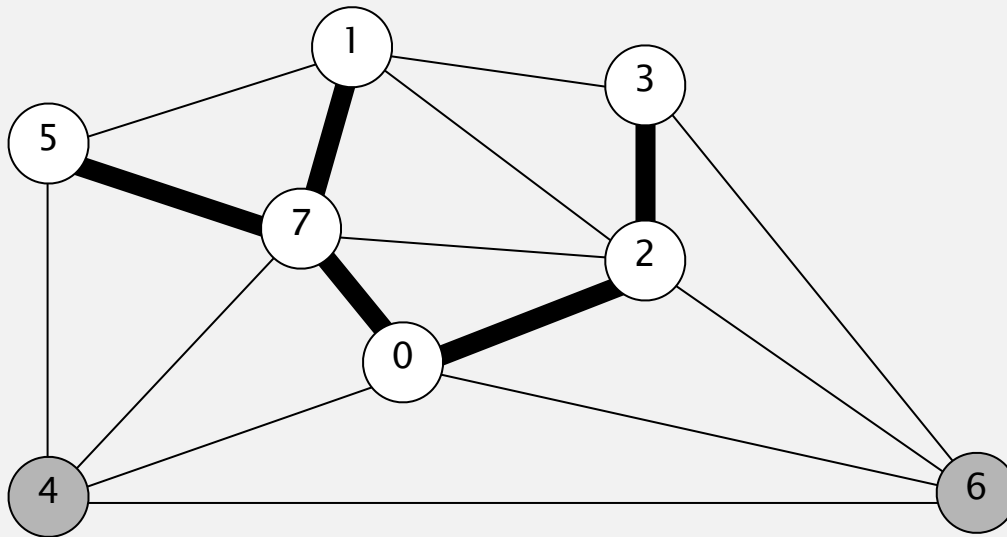
edges with exactly
one endpoint in T
(sorted by weight)

in MST →	5-7	0.28
	1-5	0.32
	4-7	0.37
	0-4	0.38
	6-2	0.40
	3-6	0.52
	6-0	0.58

MST edges

0-7   1-7   0-2   2-3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0–7   1–7   0–2   2–3   5–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
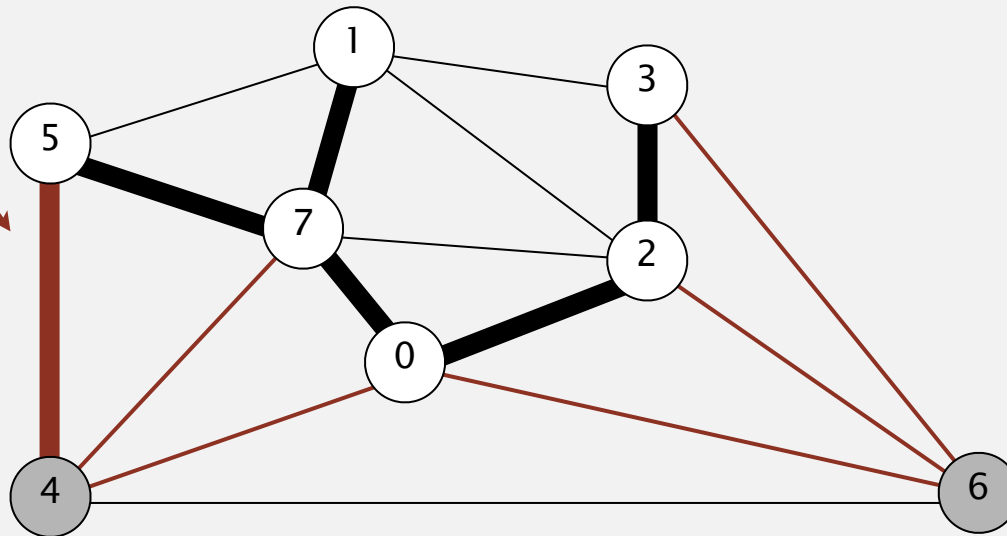- At each step, add to T the min weight edge with exactly one endpoint in T.

min weight edge with
exactly one endpoint in T

edges with exactly
one endpoint in T
(sorted by weight)

in MST	4-5	0.35
	4-7	0.37
	0-4	0.38
	6-2	0.40
	3-6	0.52
	6-0	0.58

MST edges

0-7   1-7   0-2   2-3   5-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

min weight edge with
exactly one endpoint in T

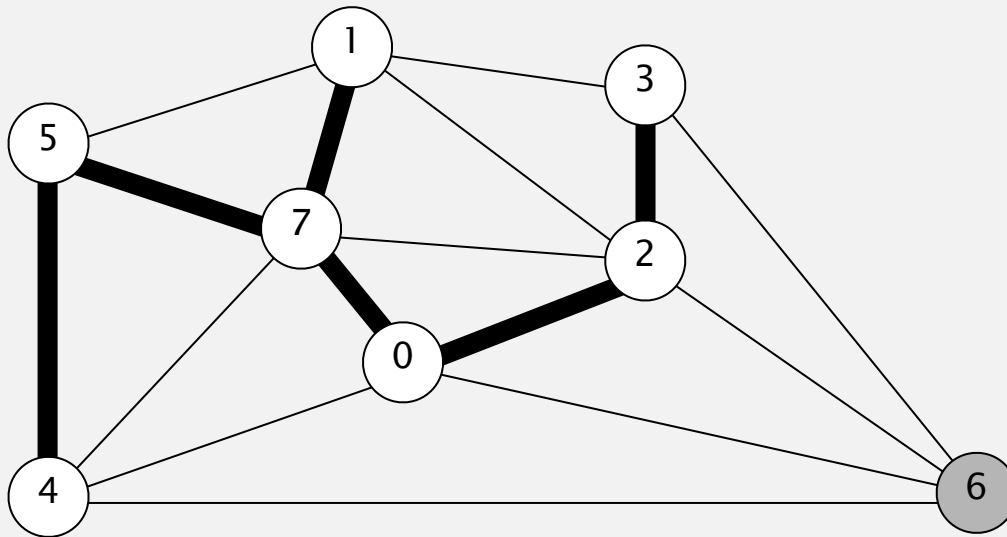edges with exactly
one endpoint in T
(sorted by weight)

in MST		
	6-2	0.40
	3-6	0.52
	6-0	0.58
	6-4	0.93

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
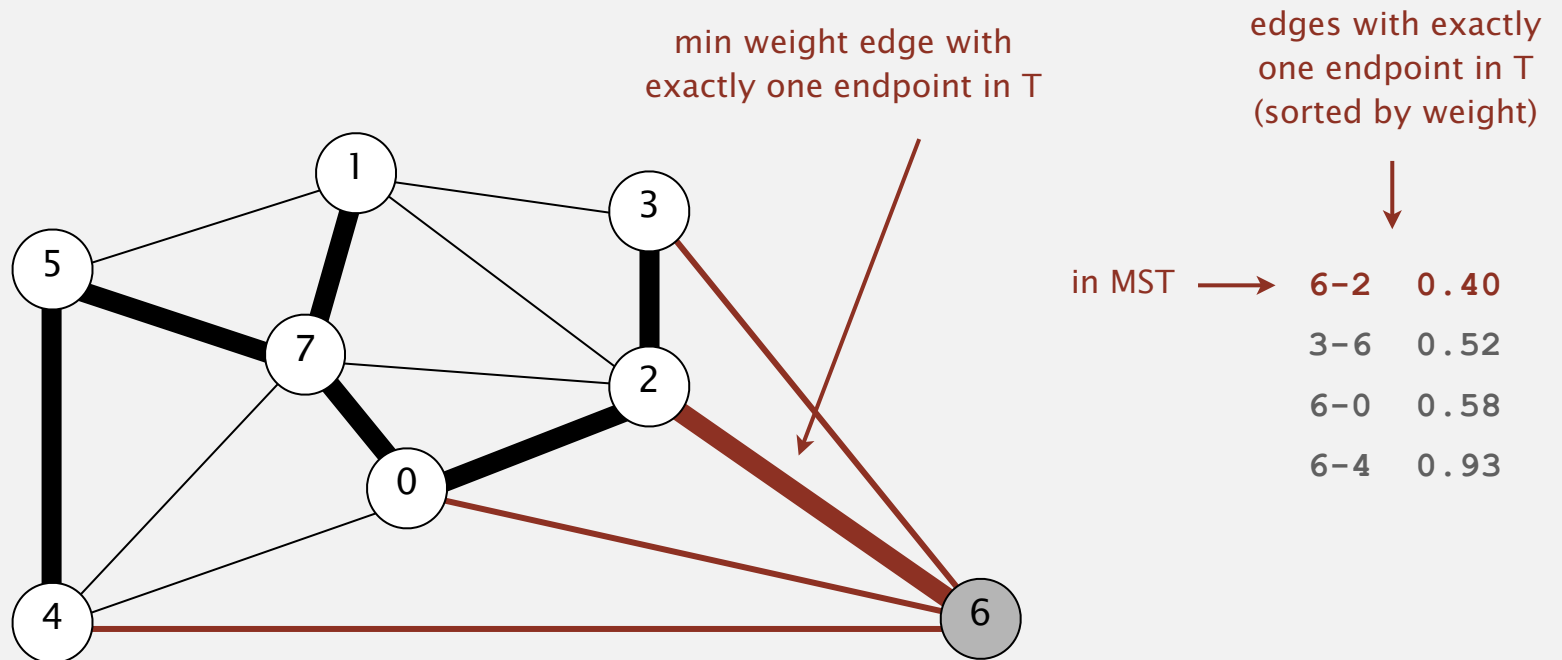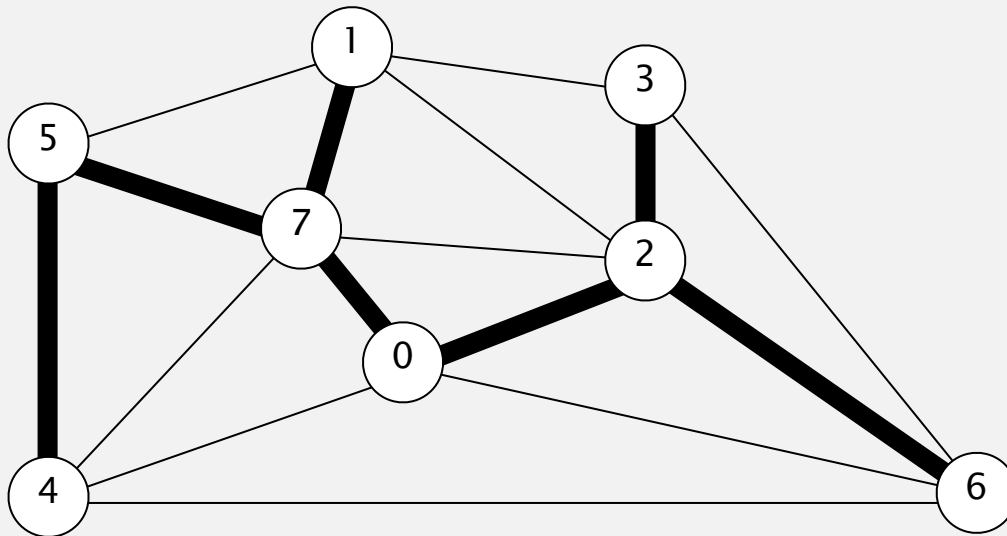- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0-7   1-7   0-2   2-3   5-7   4-5   6-2

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

an edge-weighted graph

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

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
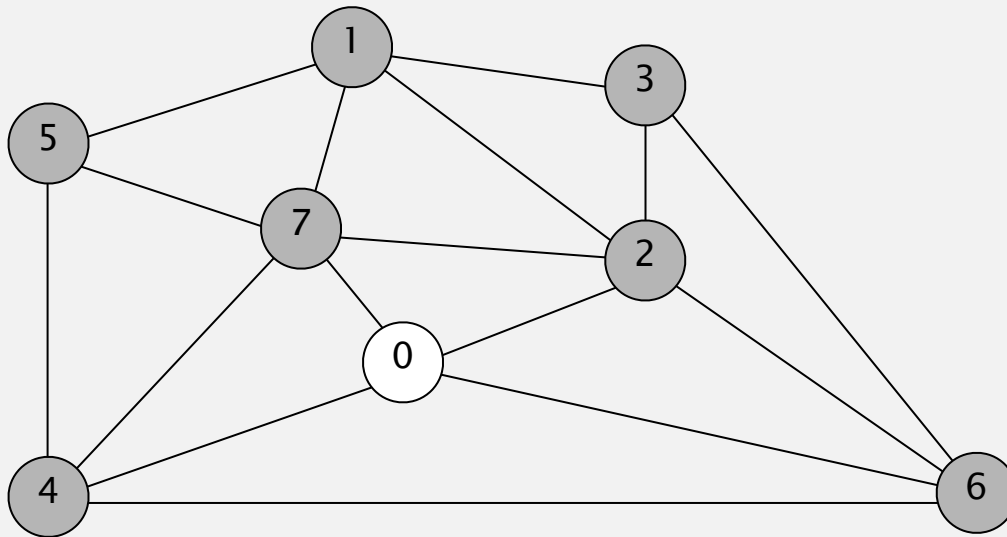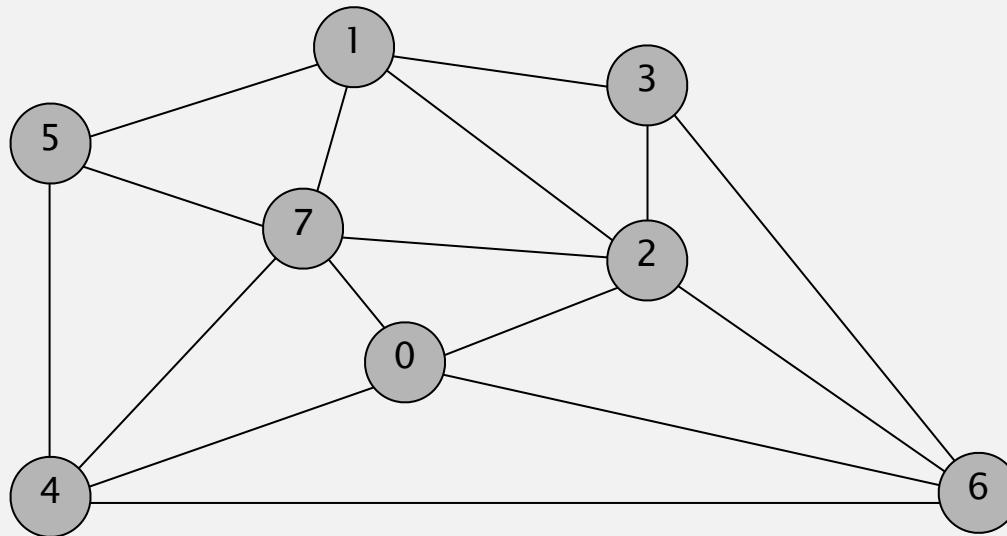- At each step, add to T the min weight edge with exactly one endpoint in T.

add to PQ all edges incident to 0

edges on PQ
(sorted by weight)

* 0-7   0.16
* 0-2   0.26
* 0-4   0.38
* 6-0   0.58

Prim's algorithm

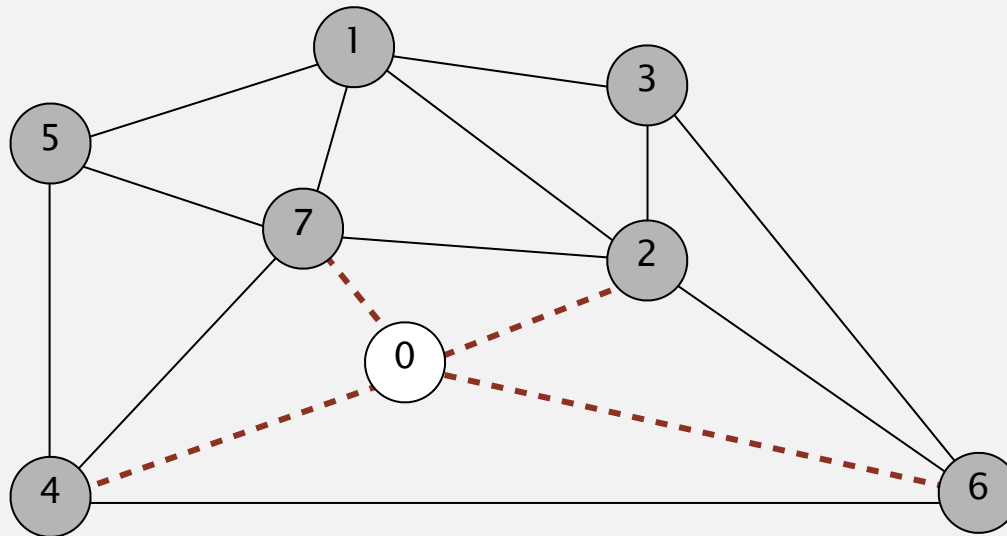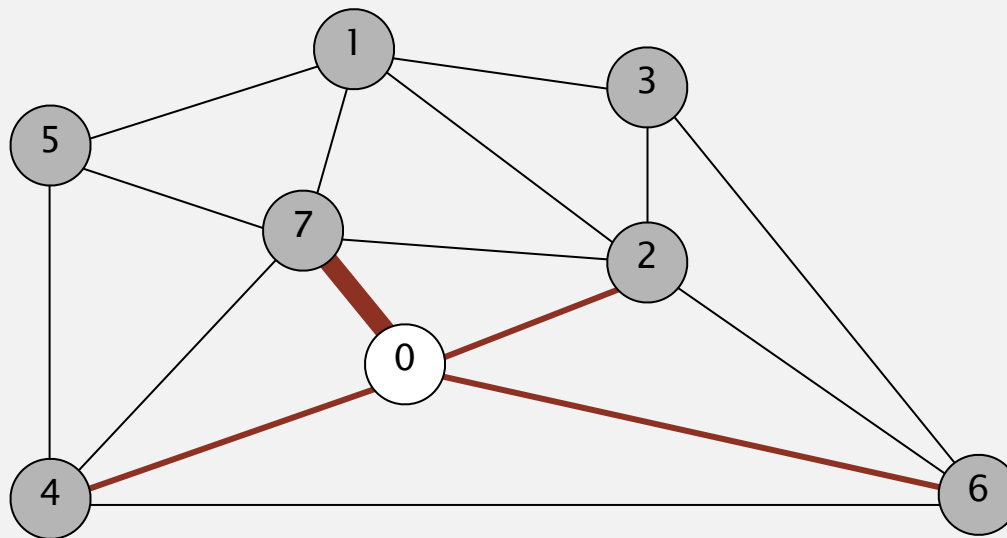- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 0-7 and add to MST

edges on PQ
(sorted by weight)

0-7	0.16
0-2	0.26
0-4	0.38
6-0	0.58

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

edges on PQ
(sorted by weight)

0–2	0.26
0–4	0.38
6–0	0.58

MST edges

0–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

add to PQ all edges incident to 7

edges on PQ
(sorted by weight)

```
*  1-7   0.19
   0-2   0.26
*  5-7   0.28
*  2-7   0.34
*  4-7   0.37
   0-4   0.38
   6-0   0.58
```

MST edges

```
0-7
```

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
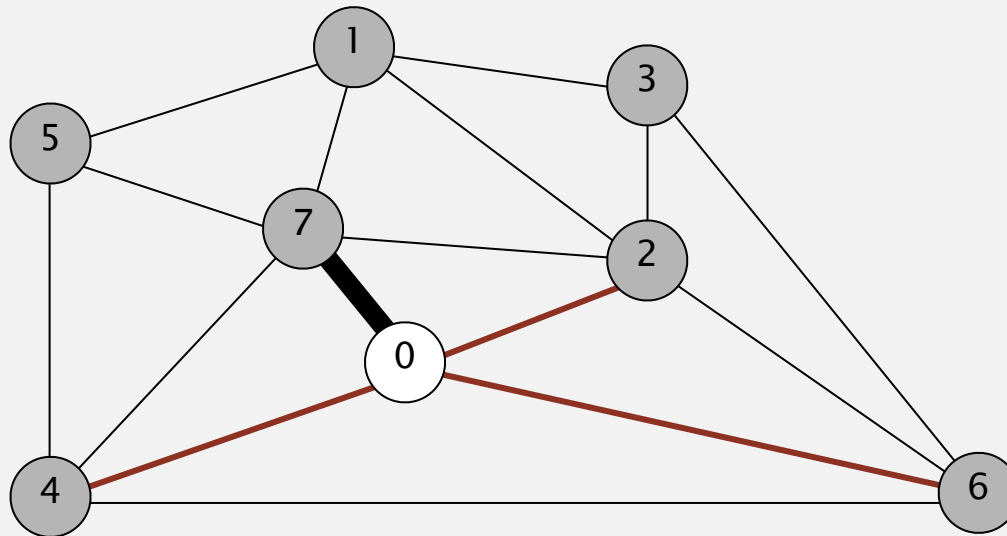
delete 1–7 and add to MST

edges on PQ
(sorted by weight)

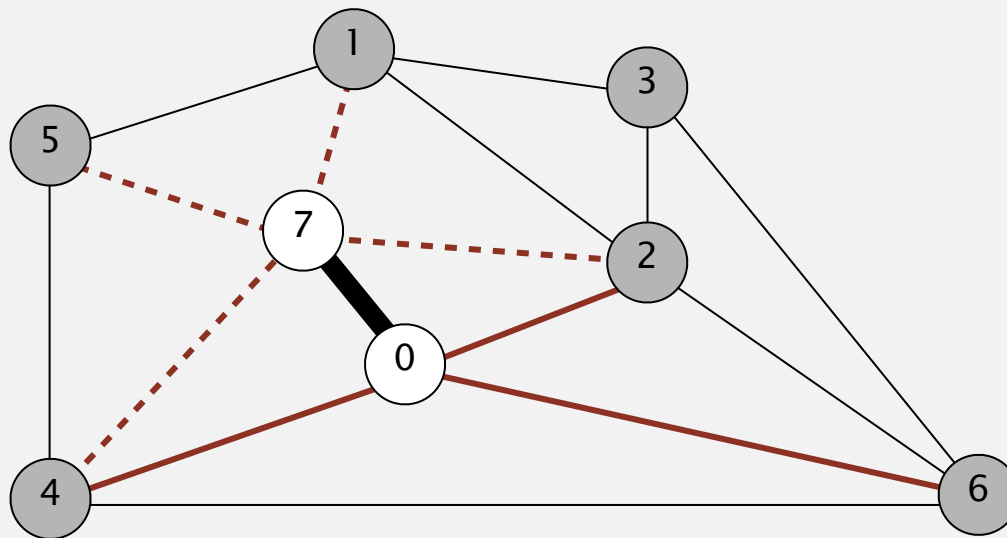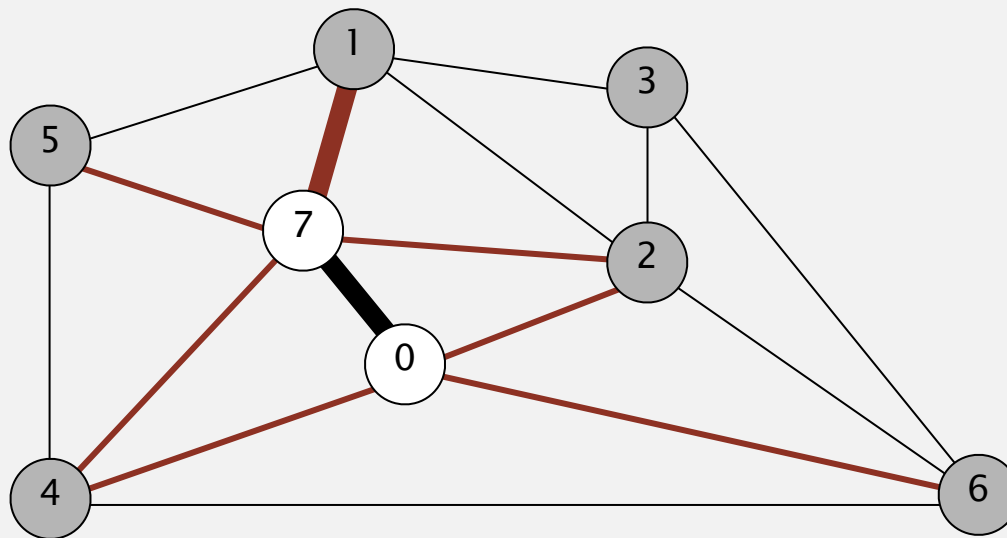|	
1-7	0.19
0-2	0.26
5-7	0.28
2-7	0.34
4-7	0.37
0-4	0.38
6-0	0.58

MST edges

0-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

edges on PQ
(sorted by weight)

0-2	0.26
5-7	0.28
2-7	0.34
4-7	0.37
0-4	0.38
6-0	0.58

MST edges

0-7   1-7

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

add to PQ all edges incident to 1

edges on PQ
(sorted by weight)

0-2	0.26
5-7	0.28
* 1-3	0.29
* 1-5	0.32
2-7	0.34
* 1-2	0.36
4-7	0.37
0-4	0.38
6-0	0.58

MST edges

0-7   1-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

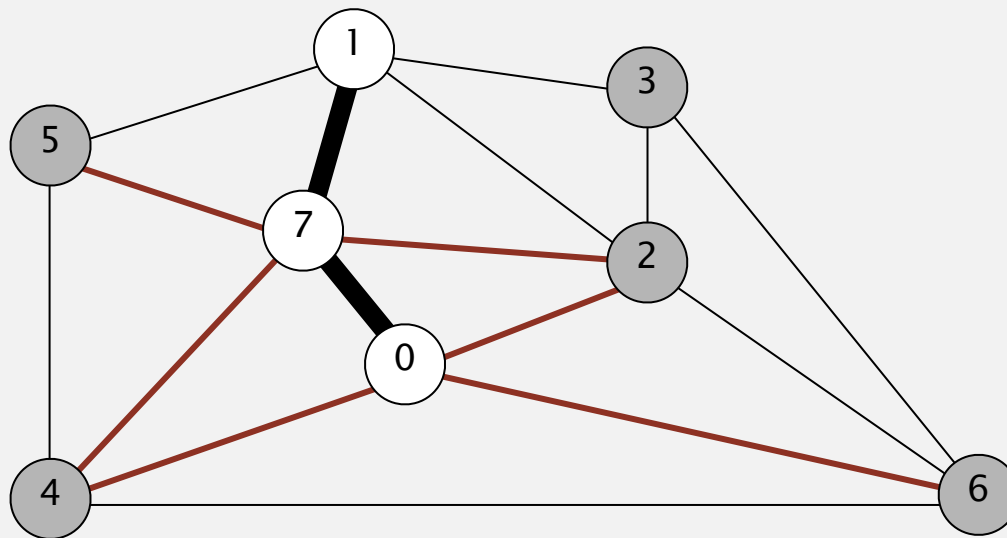**delete edge 0-2 and add to MST**
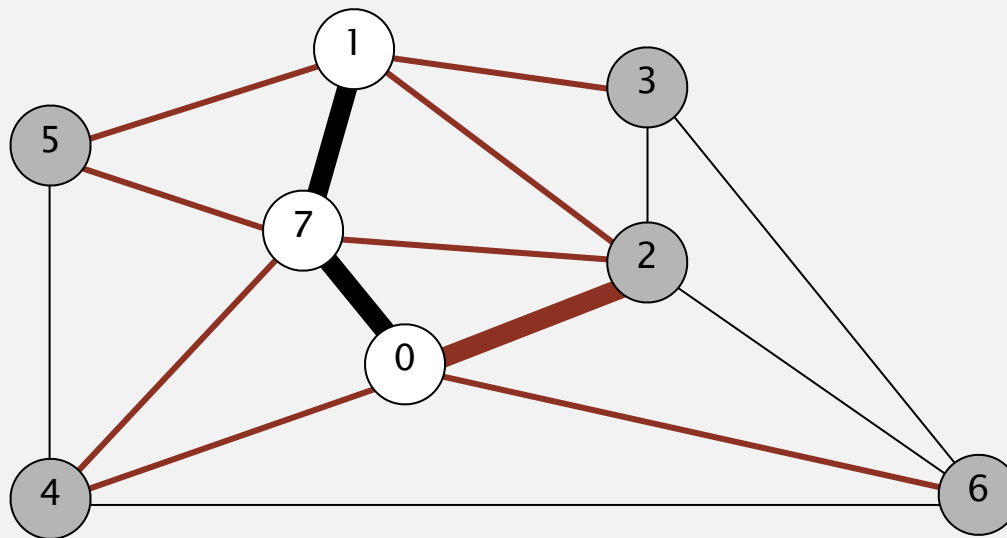
edges on PQ
(sorted by weight)

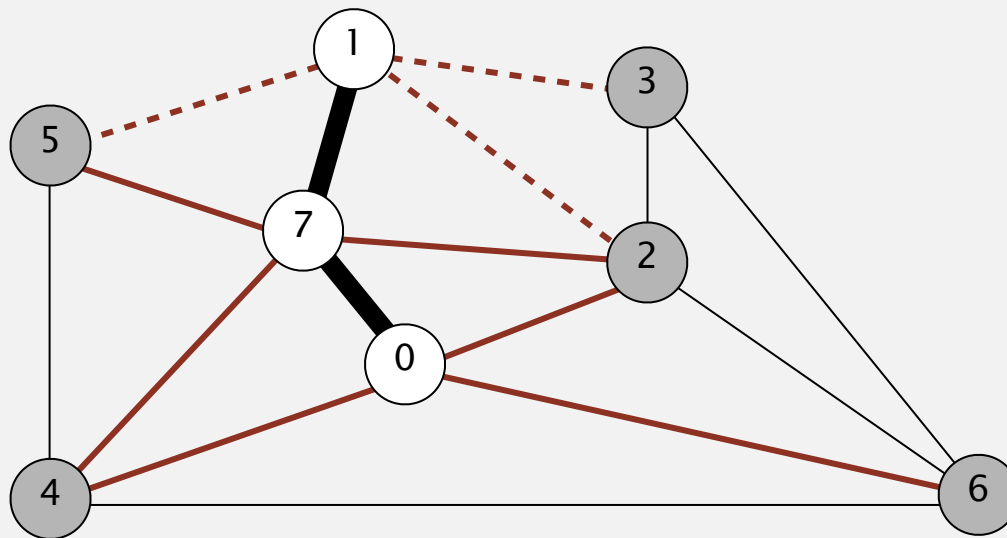|	
0-2	0.26
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
1-2	0.36
4-7	0.37
0-4	0.38
6-0	0.58

MST edges

0-7   1-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

edge becomes obsolete
(lazy implementation leaves on PQ)

edges on PQ
(sorted by weight)

5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
1-2	0.36
4-7	0.37
0-4	0.38
6-0	0.58

MST edges

0-7   1-7   0-2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

no need to add edge 1-2 or 2-7
because it's already obsolete

add to PQ all edges incident to 2

edges on PQ
(sorted by weight)

*	2-3	0.17
	5-7	0.28
	1-3	0.29
	1-5	0.32
	2-7	0.34
	1-2	0.36
	4-7	0.37
	0-4	0.38
*	6-2	0.40
	6-0	0.58

MST edges

0-7   1-7   0-2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
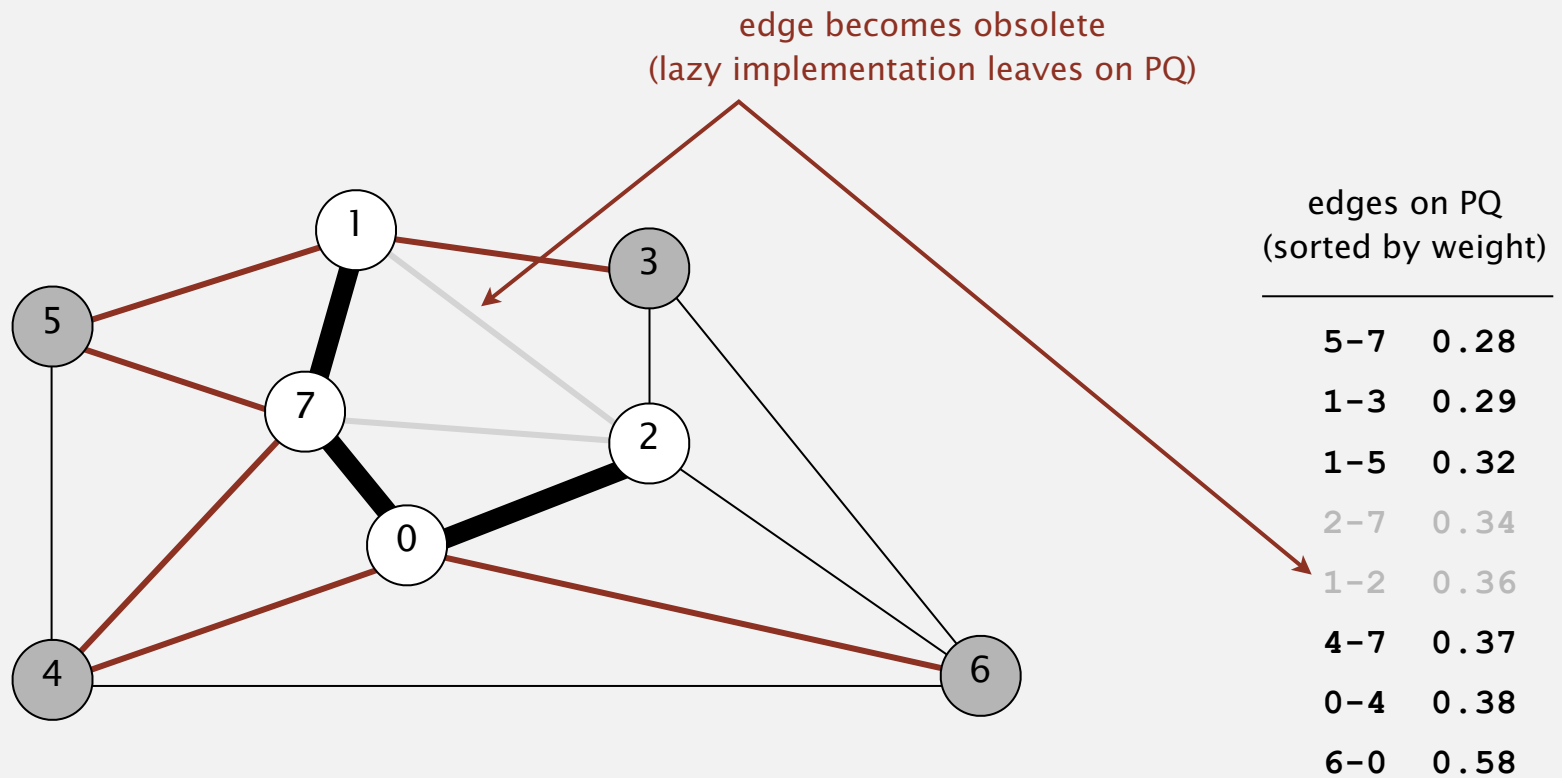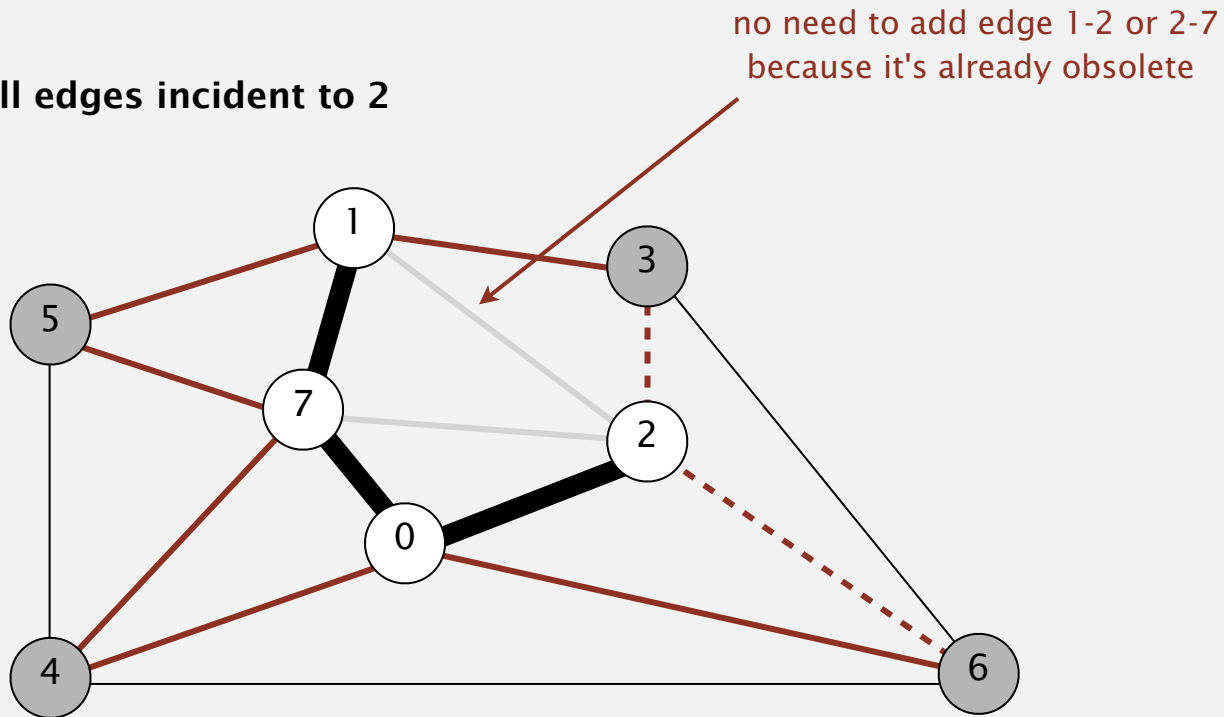
delete 2–3 and add to MST

edges on PQ
(sorted by weight)

*	2–3	0.17
	5–7	0.28
	1–3	0.29
	1–5	0.32
	2–7	0.34
	1–2	0.36
	4–7	0.37
	0–4	0.38
*	6–2	0.40
	6–0	0.58

MST edges

0–7   1–7   0–2

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

edges on PQ
(sorted by weight)

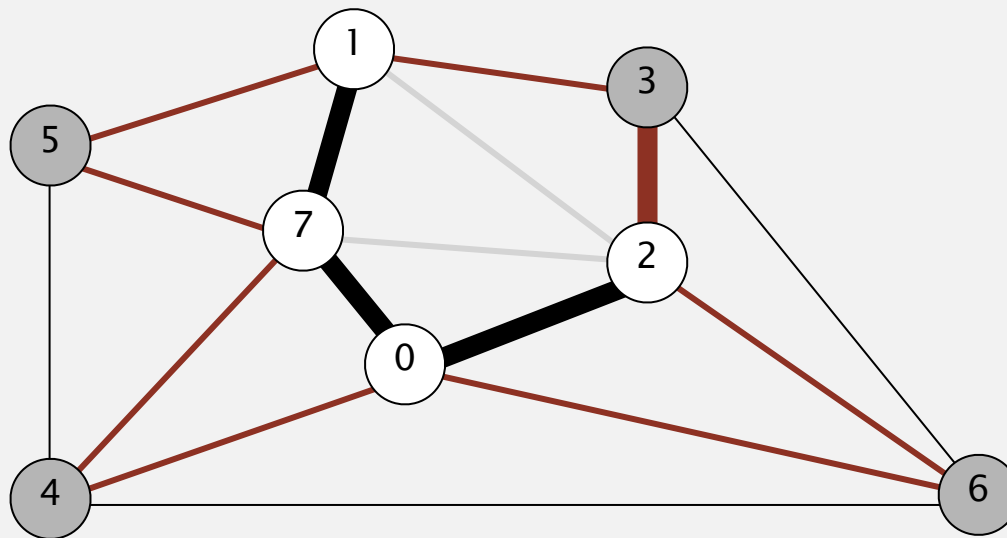|	
5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
6-0	0.58

MST edges

0-7   1-7   0-2   2-3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
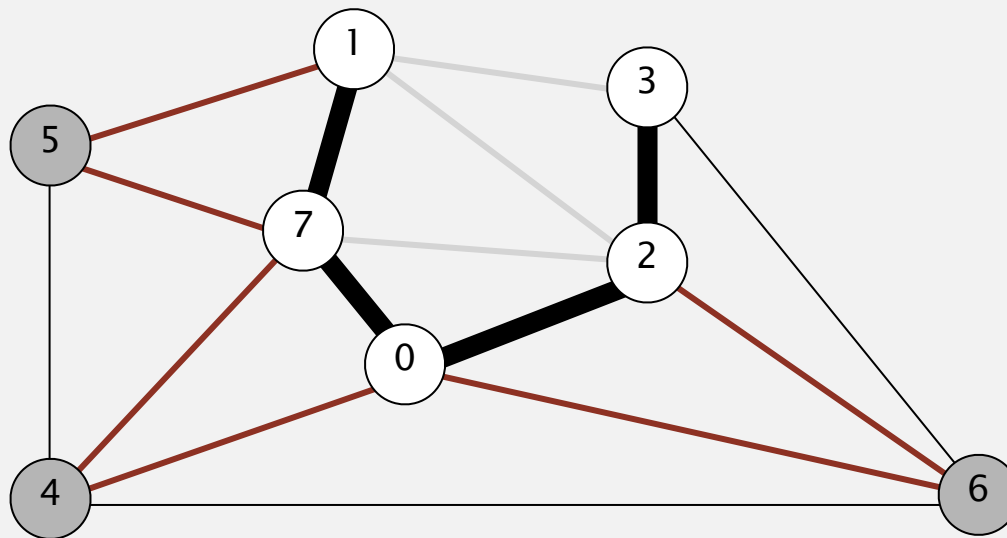
add to PQ all edges incident to 3

edges on PQ
(sorted by weight)

5-7	0.28
1-3	0.29
1-5	0.32
2-7	0.34
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
* 3-6	0.52
6-0	0.58

MST edges

0-7   1-7   0-2   2-3

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 5–7 and add to MST

edges on PQ
(sorted by weight)

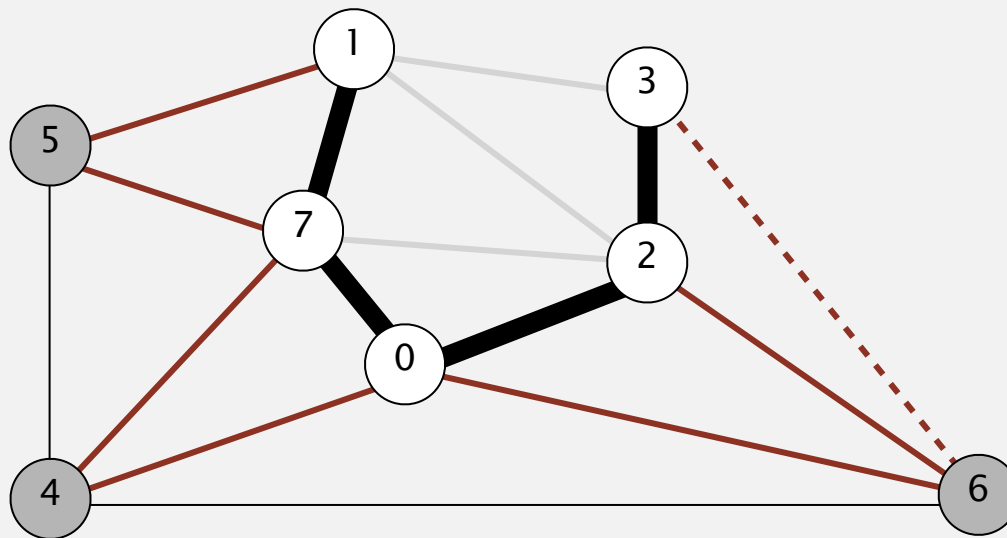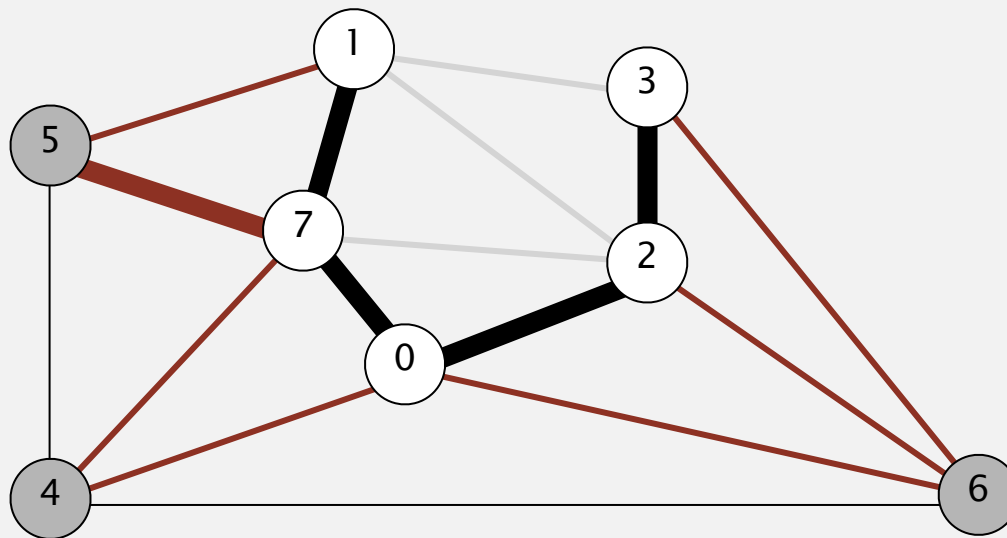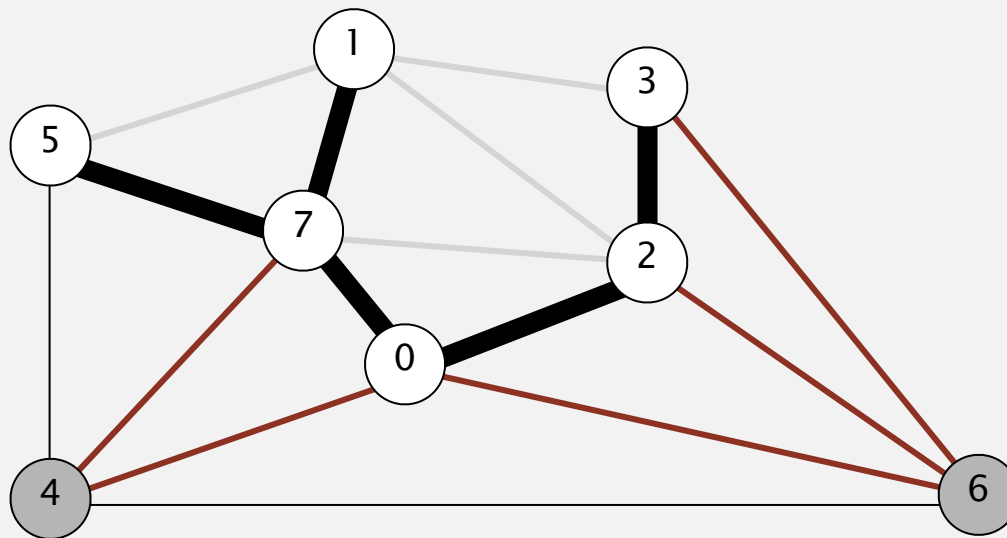|	
5–7	0.28
1–3	0.29
1–5	0.32
2–7	0.34
1–2	0.36
4–7	0.37
0–4	0.38
6–2	0.40
3–6	0.52
6–0	0.58

MST edges

0–7   1–7   0–2   2–3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

edges on PQ
(sorted by weight)

1-3	0.29
1-5	0.32
2-7	0.34
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58

MST edges

0-7   1-7   0-2   2-3   5-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

add to PQ all edges incident to 5

edges on PQ
(sorted by weight)

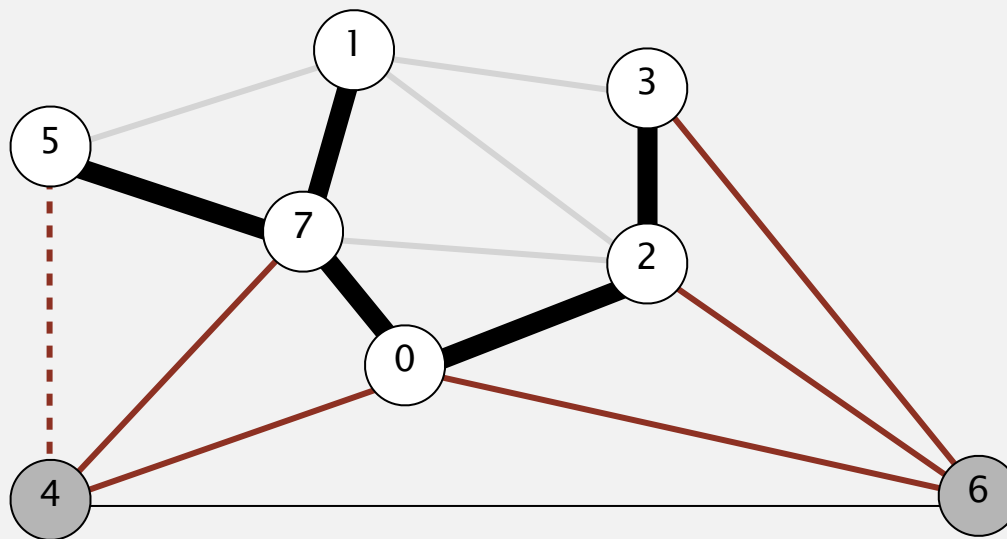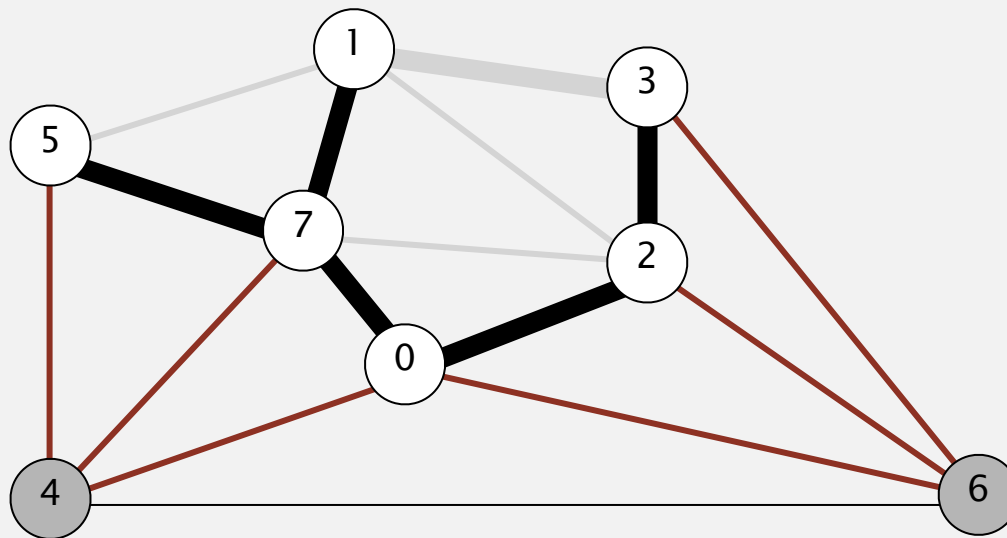|	
1-3	0.29
1-5	0.32
2-7	0.34
* 4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58

MST edges

0-7   1-7   0-2   2-3   5-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 1–3 and discard obsolete edge

edges on PQ
(sorted by weight)

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

MST edges

0–7   1–7   0–2   2–3   5–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 1–5 and discard obsolete edge

edges on PQ
(sorted by weight)

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

MST edges

0–7   1–7   0–2   2–3   5–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
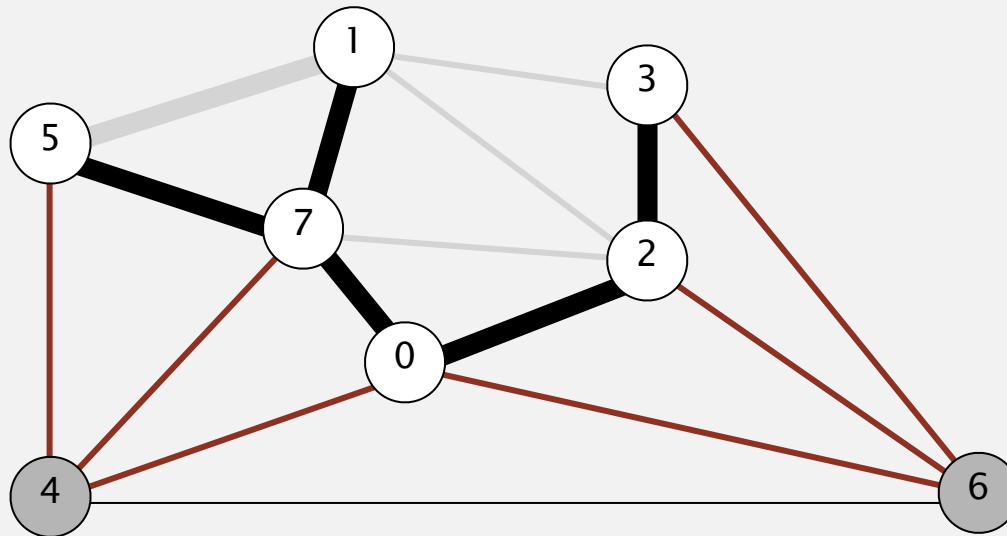
delete 2–7 and discard obsolete edge

edges on PQ
(sorted by weight)

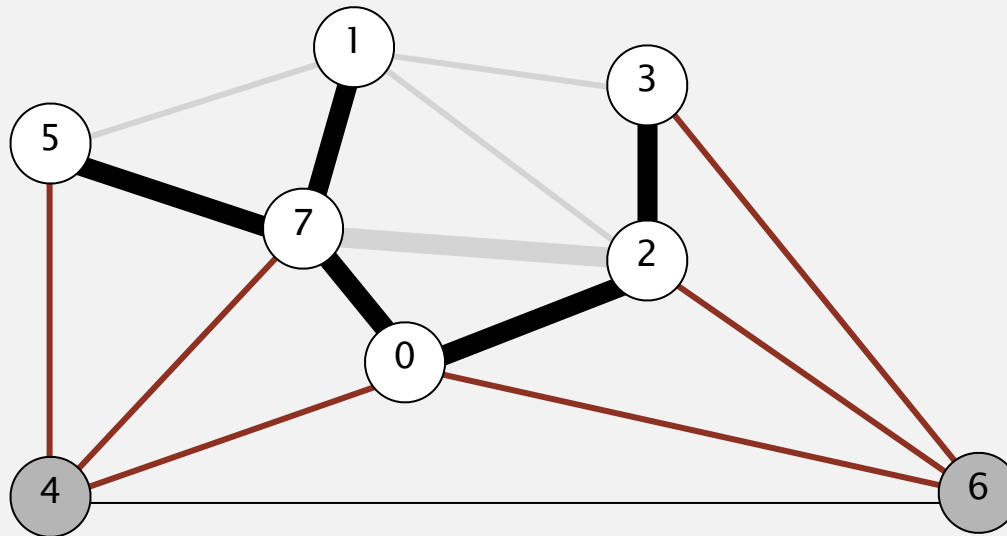|	
2–7	0.34
4–5	0.35
1–2	0.36
4–7	0.37
0–4	0.38
6–2	0.40
3–6	0.52
6–0	0.58

MST edges

0–7   1–7   0–2   2–3   5–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 4–5 and add to MST

edges on PQ
(sorted by weight)

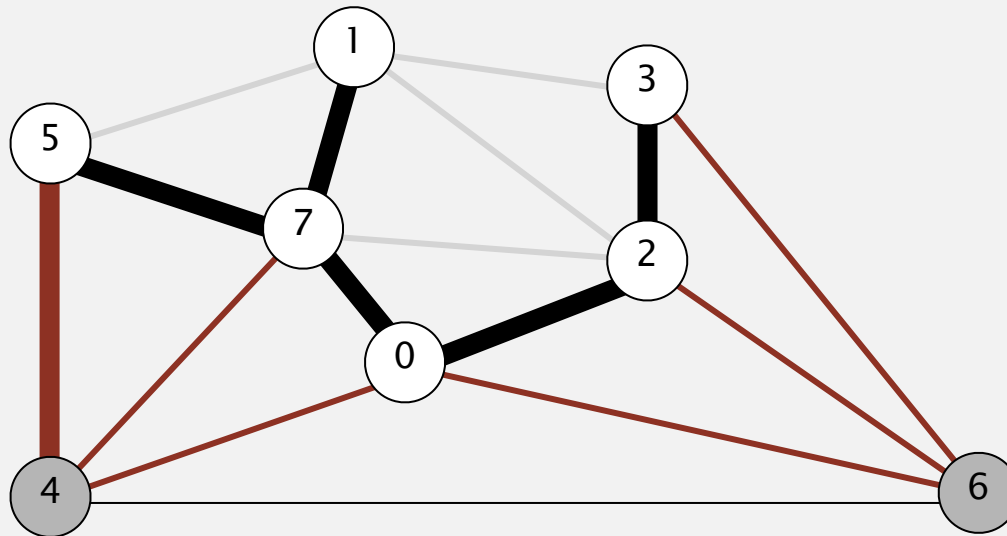|	
4-5	0.35
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58

MST edges

0-7   1-7   0-2   2-3   5-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
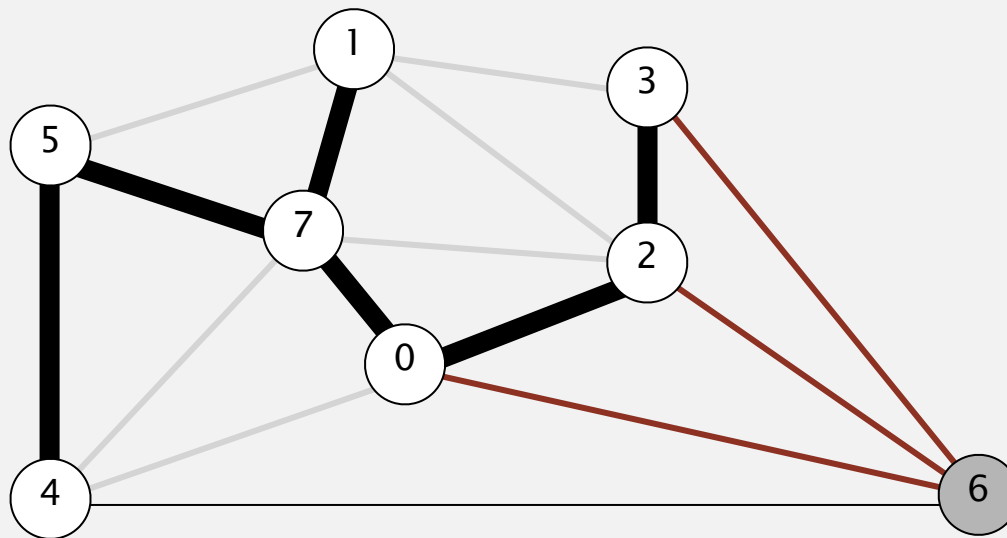
edges on PQ
(sorted by weight)

1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58

MST edges

0-7 1-7 0-2 2-3 5-7 4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

add to PQ all edges incident to 4

edges on PQ
(sorted by weight)

```
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
```

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

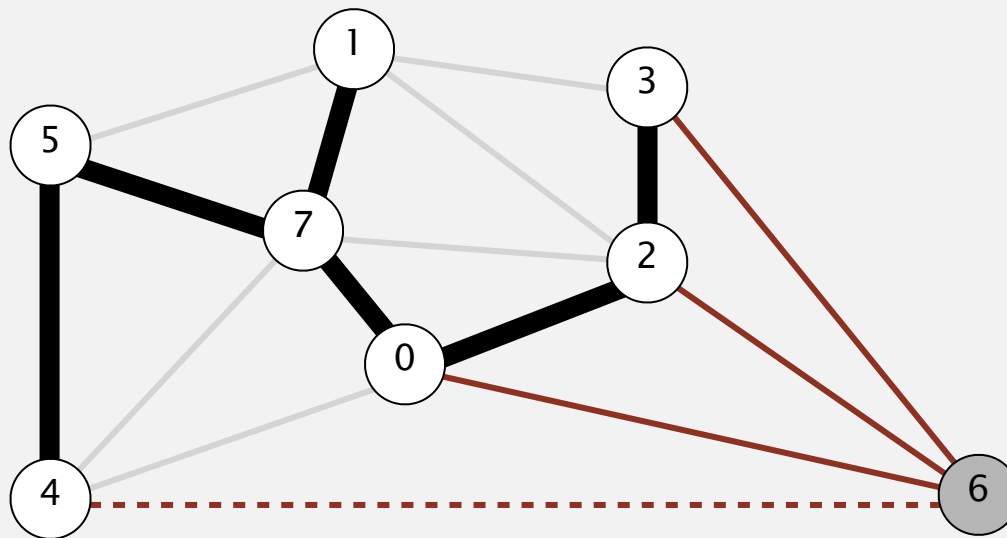**delete 1–2 and discard obsolete edge**

edges on PQ
(sorted by weight)

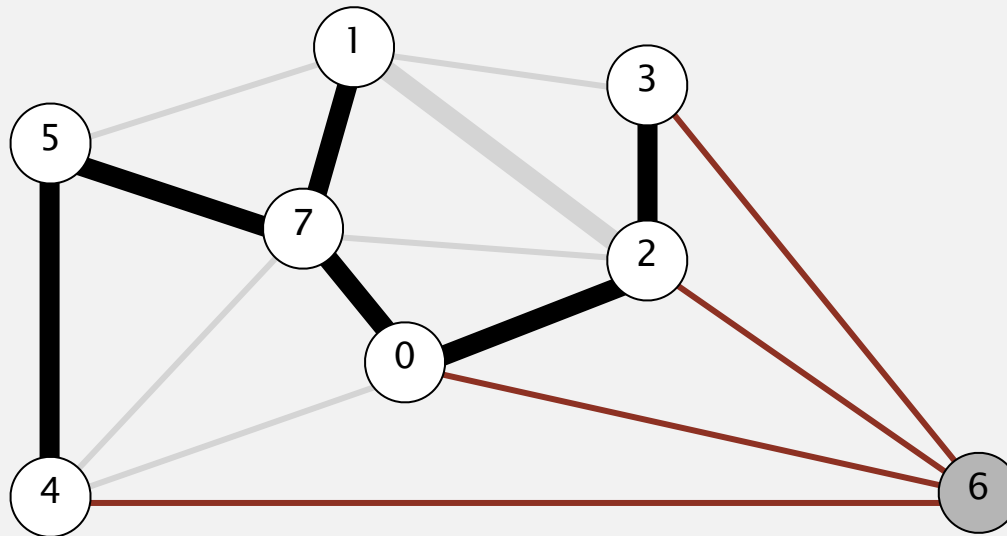|	
1-2	0.36
4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 4–7 and discard obsolete edge

edges on PQ
(sorted by weight)

4-7	0.37
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 0–4 and discard obsolete edge

edges on PQ
(sorted by weight)

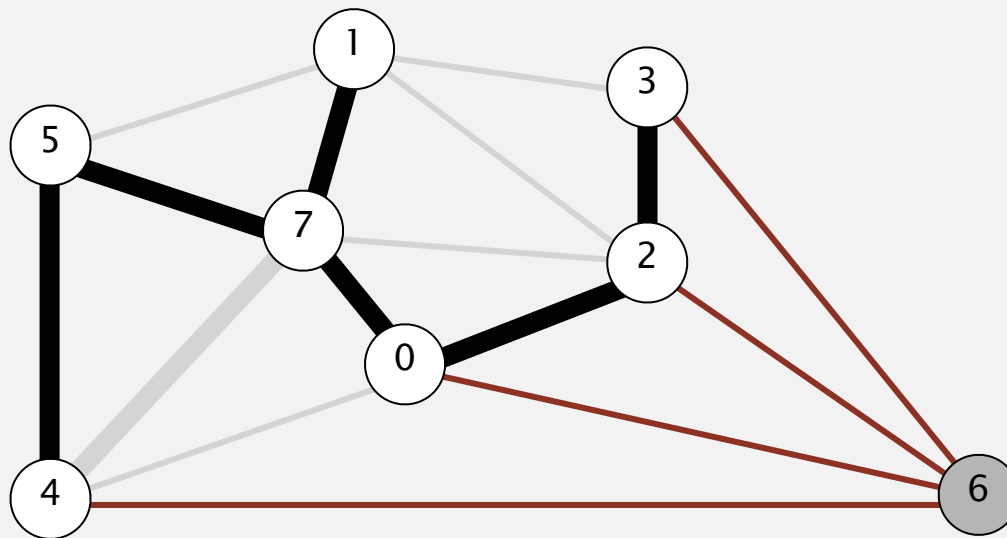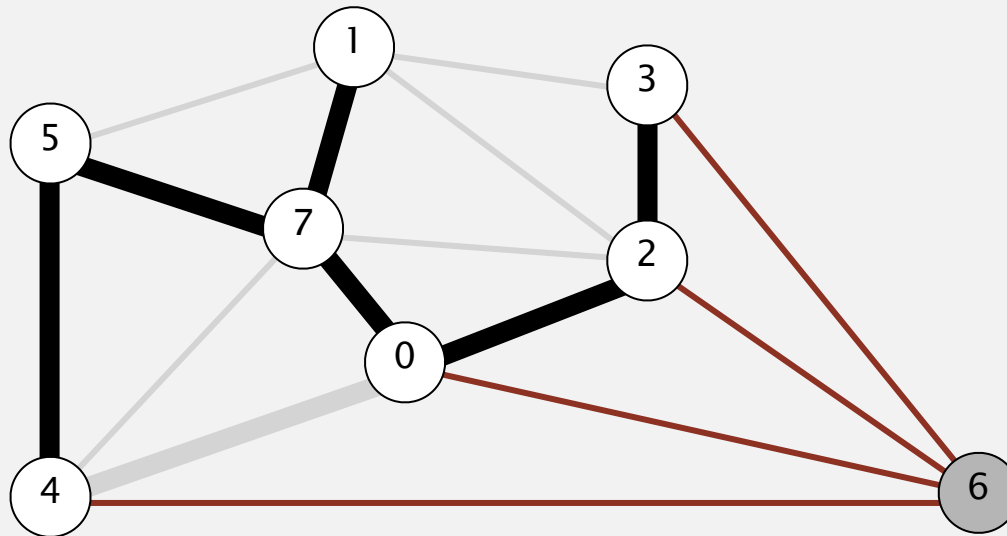|	
0-4	0.38
6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 6-2 and add to MST

edges on PQ
(sorted by weight)

6-2	0.40
3-6	0.52
6-0	0.58
6-4	0.93

MST edges

0-7   1-7   0-2   2-3   5-7   4-5

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

delete 6–2 and add to MST

edges on PQ
(sorted by weight)
_____

3–6   0.52
6–0   0.58
6–4   0.93

MST edges

0–7   1–7   0–2   2–3   5–7   4–5   6–2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

stop since V–1 edges

edges on PQ
(sorted by weight)
_____
3-6   0.52
6-0   0.58
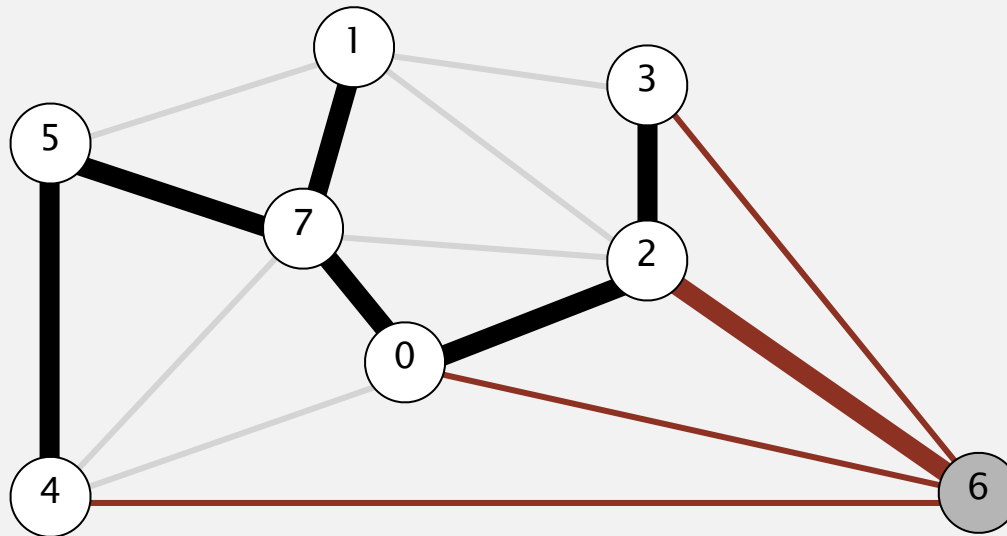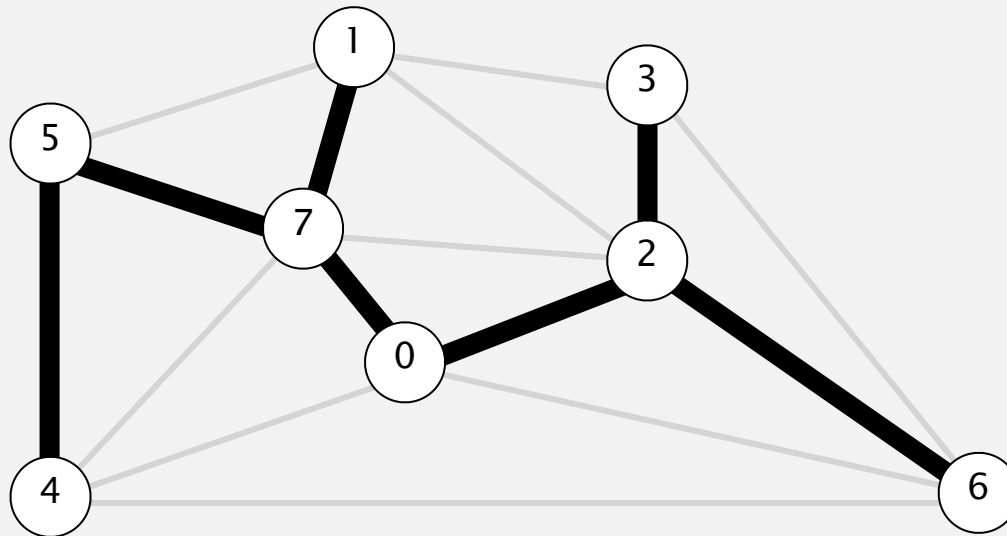6-4   0.93

MST edges
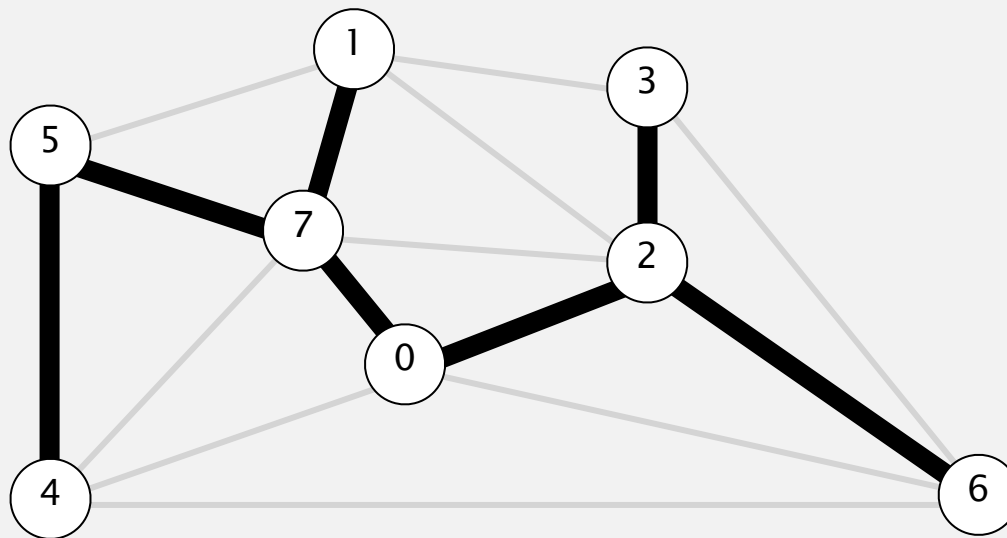
0-7   1-7   0-2   2-3   5-7   4-5   6-2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

MST edges

0–7 1–7 0–2 2–3 5–7 4–5 6–2

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

an edge-weighted graph

```
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
```

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
2	0-2	0.26
4	0-4	0.38
6	6-0	0.58

vertices on PQ
(sorted by weight)

add vertices 7, 2, 4, and 6 to PQ

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
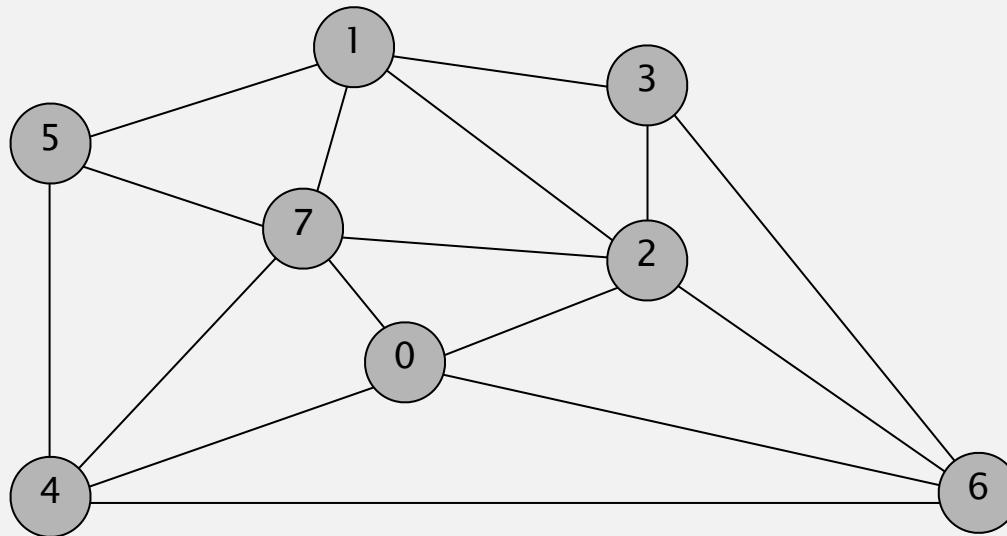- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
2	0–2	0.26
4	0–4	0.38
6	6–0	0.58

vertices on PQ
(sorted by weight)

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
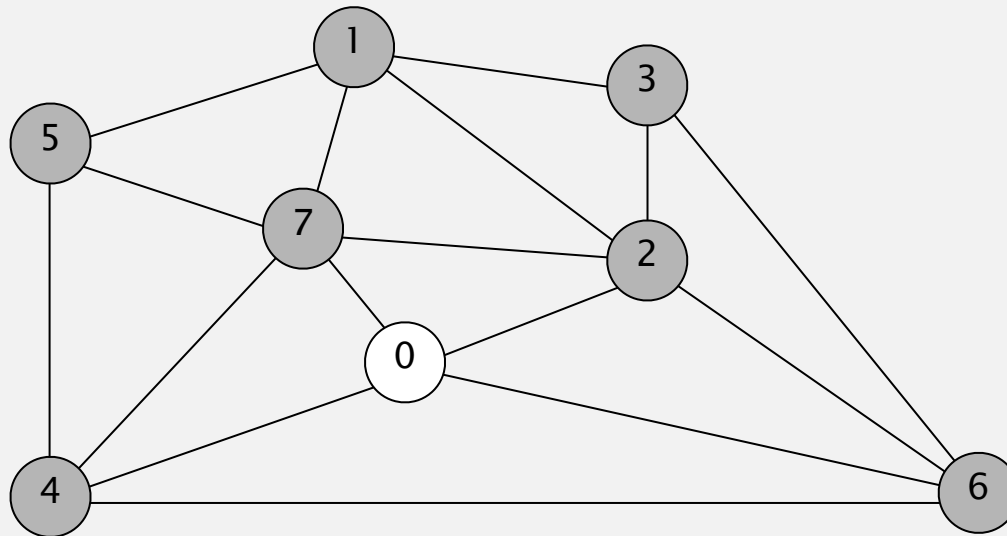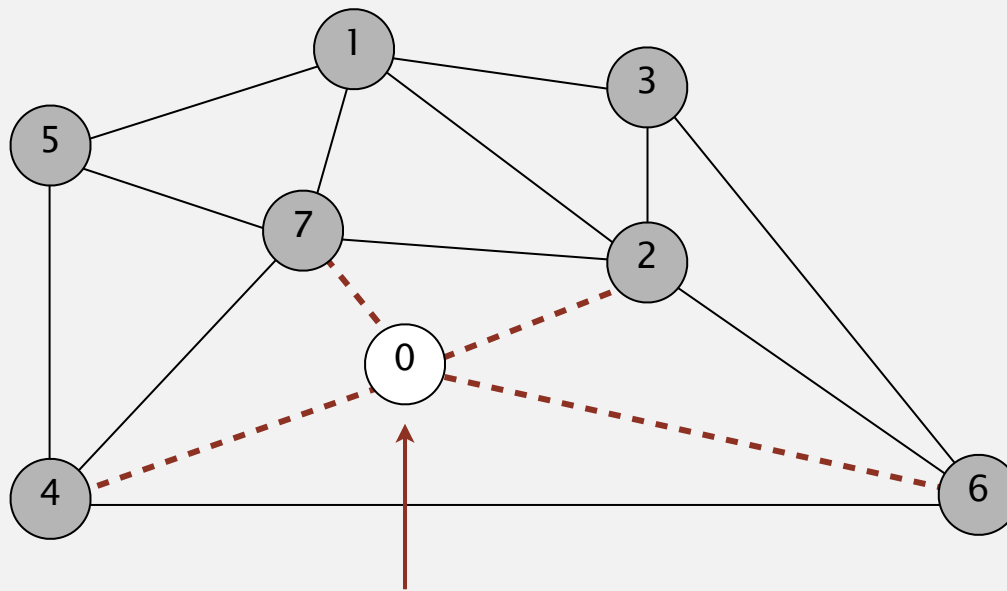- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
2	0–2	0.26
4	0–4	0.38
6	6–0	0.58

vertices on PQ
(sorted by weight)

MST edges

0–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

add vertex 1 to PQ

add vertex 5 to PQ

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
5	5–7	0.28
4	0–4	0.38
6	6–0	0.58

vertices on PQ
(sorted by weight)

already a better connection
to 2 and 4 (discard)

MST edges

0–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
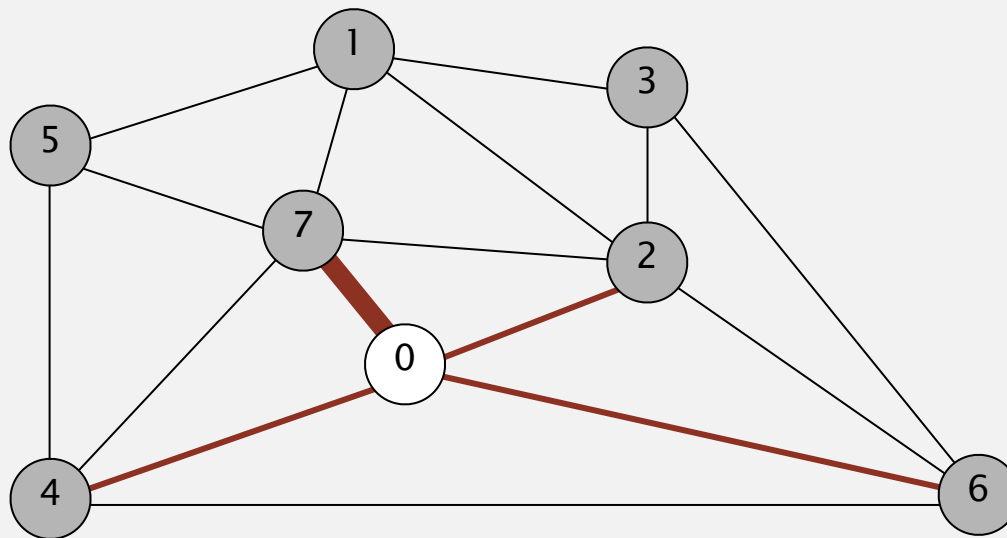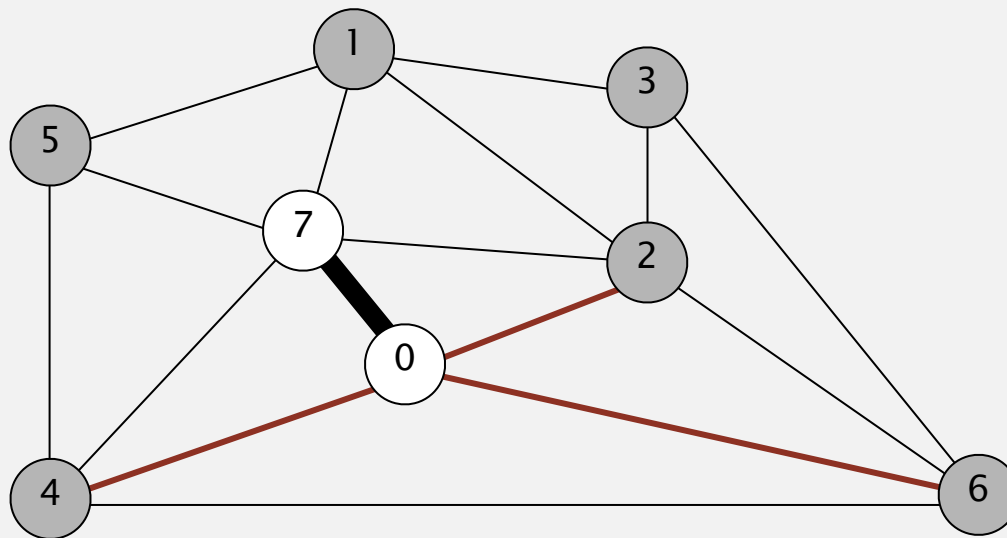- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
5	5–7	0.28
4	0–4	0.38
6	6–0	0.58

vertices on PQ
(sorted by weight)

MST edges

0–7 1–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

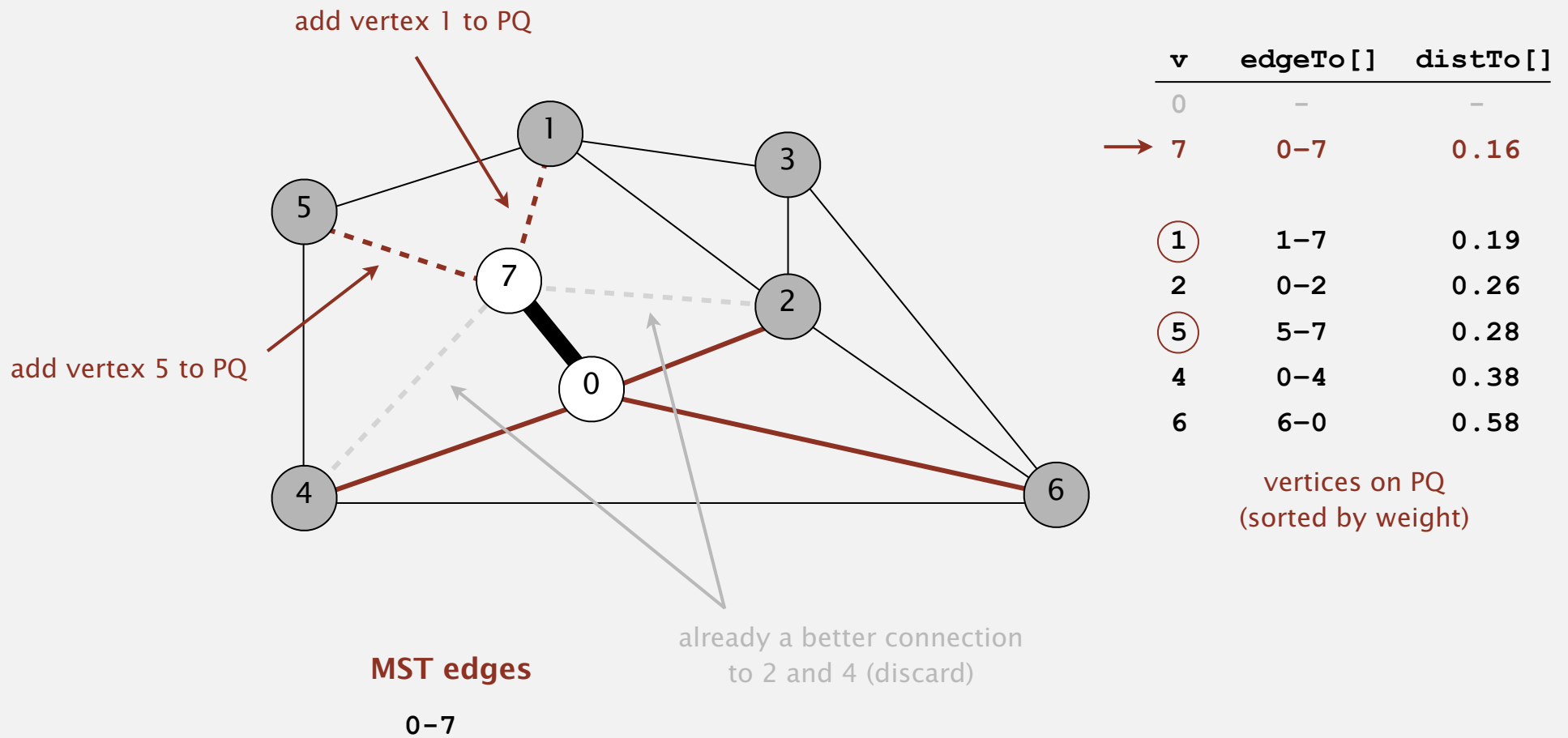| v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
2	0-2	0.26
5	5-7	0.28
4	0-4	0.38
6	6-0	0.58

vertices on PQ
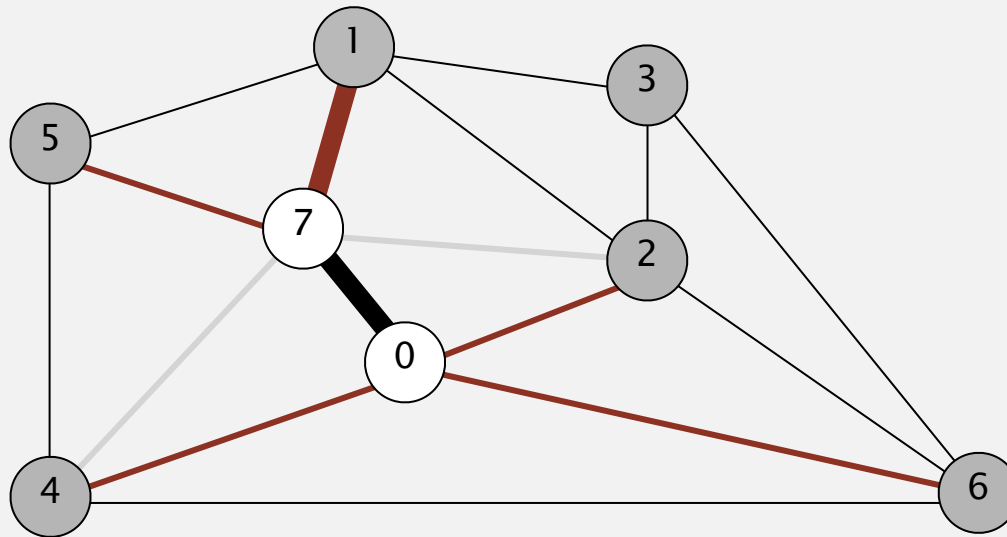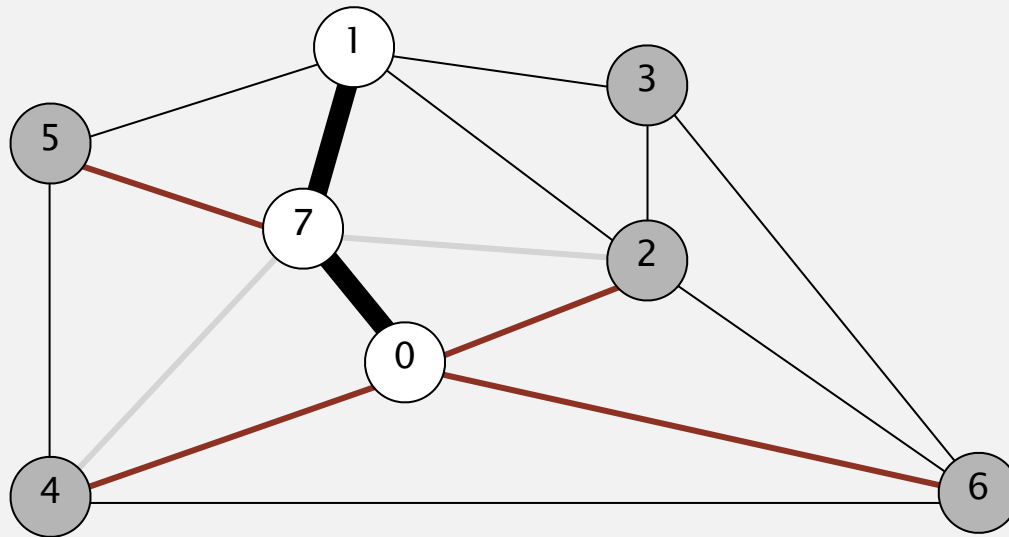(sorted by weight)

MST edges

0-7   1-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

add vertex 3 to PQ

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
5	5–7	0.28
3	1–3	0.29
4	0–4	0.38
6	6–0	0.58

MST edges

0–7   1–7

already a better connection
to 5 and 7 (discard)

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
5	5–7	0.28
3	1–3	0.29
4	0–4	0.38
6	6–0	0.58

MST edges

0–7   1–7

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
→ 2	0-2	0.26
5	5-7	0.28
3	1-3	0.29
4	0-4	0.38
6	6-0	0.58

MST edges

0-7   1-7   0-2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
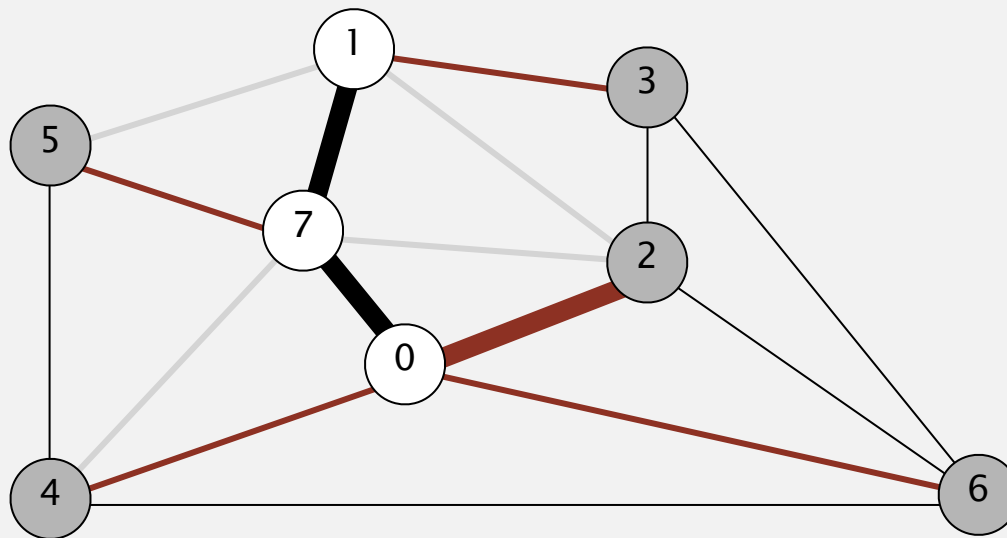- At each step, add to T the min weight edge with exactly one endpoint in T.

decrease key of vertex 3
from 0.29 to 0.17

now better connections
to 0 and 1 (discard)

decrease key of vertex 6
from 0.58 to 0.40

MST edges

0-7   1-7   0-2

v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
2	0-2	0.26
	2-3	0.17
3	1-3	0.29
5	5-7	0.28
4	0-4	0.38
6	6-0	0.58
	6-2	0.40

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.
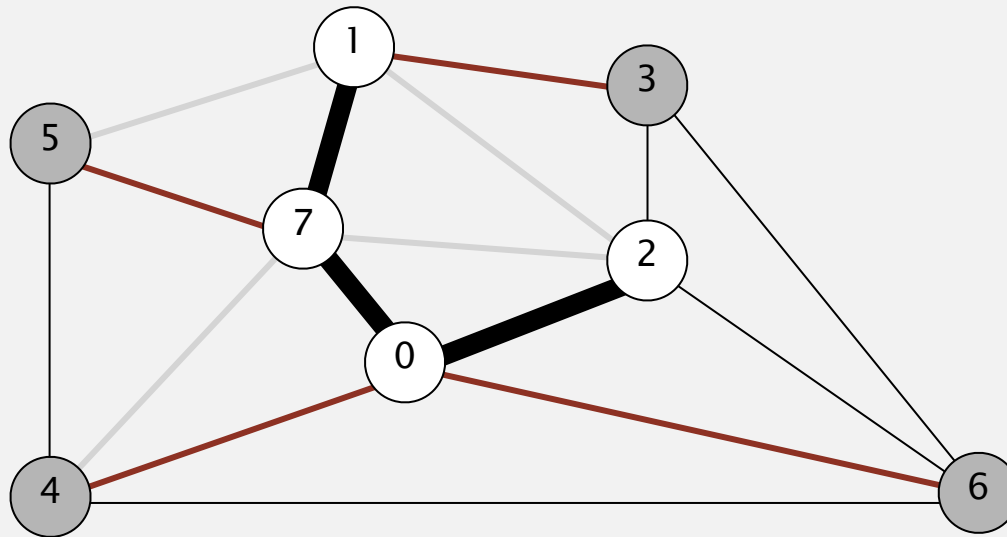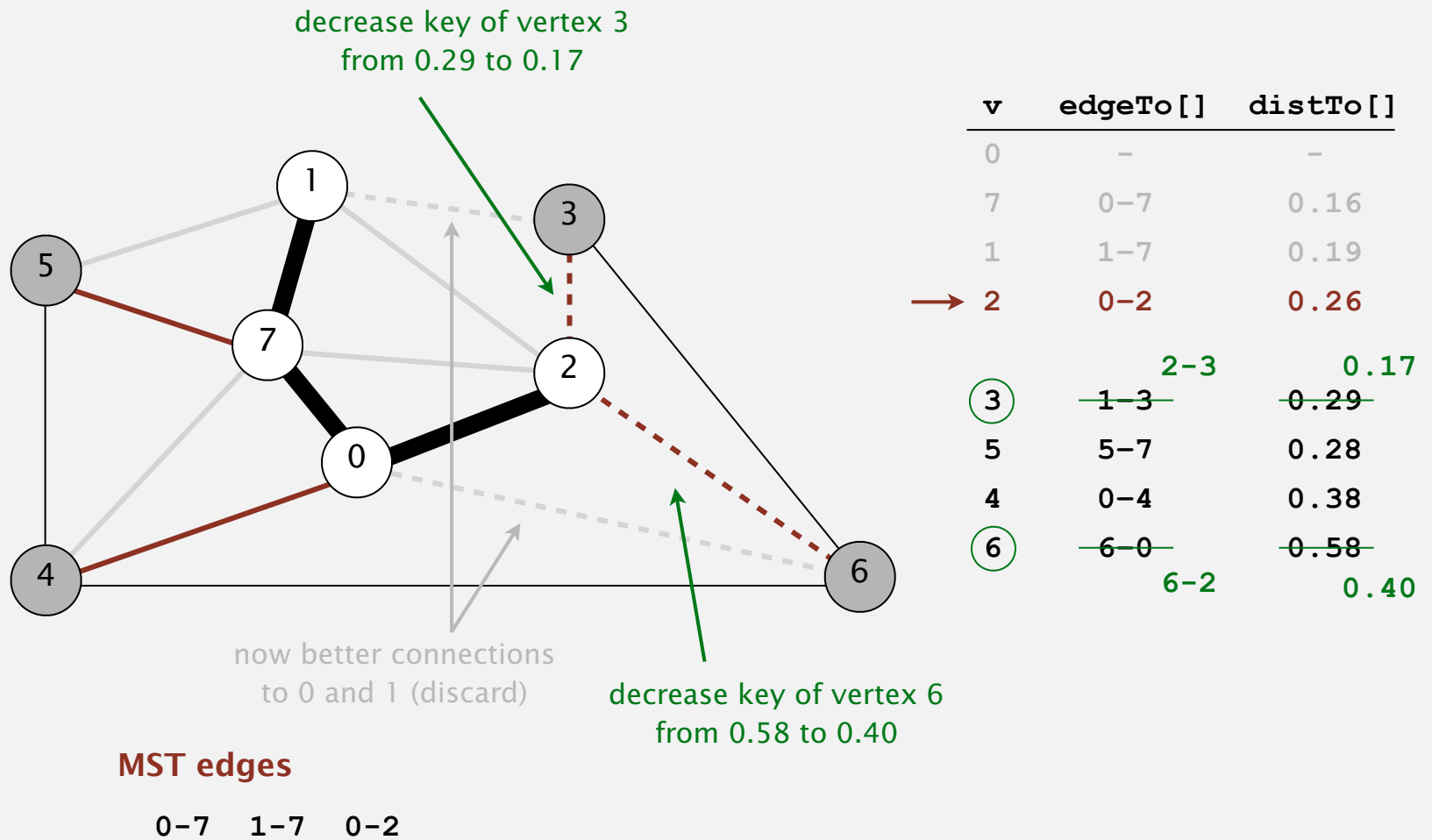

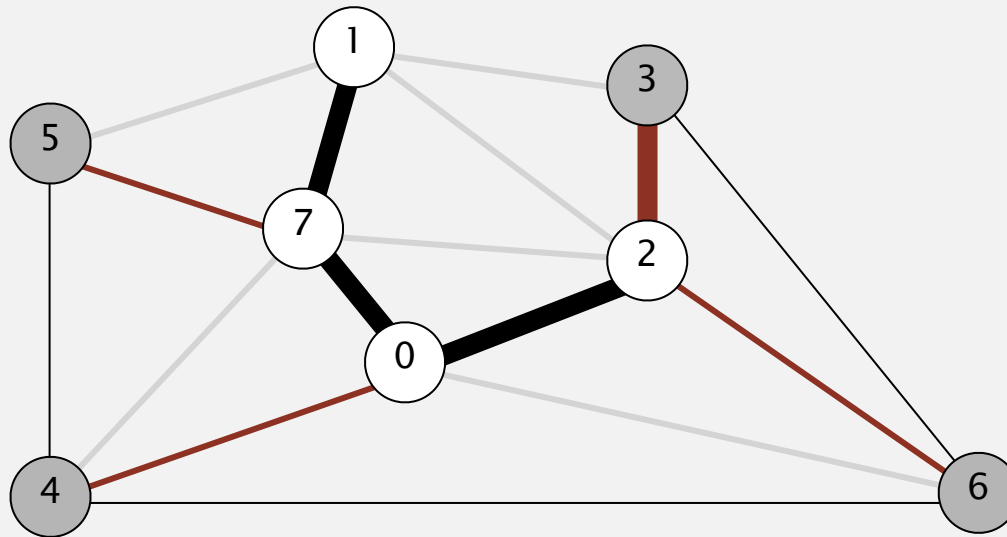| v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
2	0-2	0.26
3	2-3	0.17
5	5-7	0.28
4	0-4	0.38
6	6-2	0.40

MST edges

0-7   1-7   0-2   2-3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
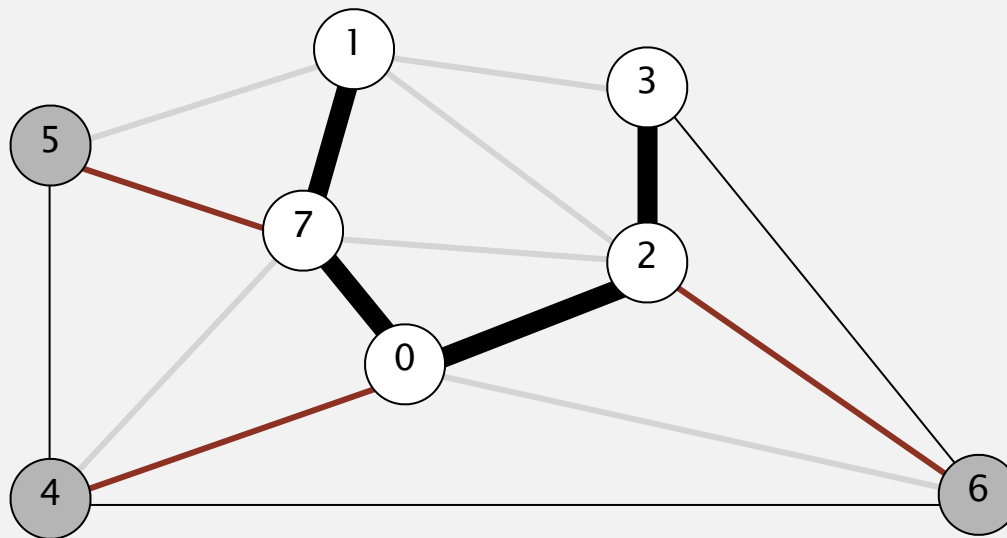- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
4	0–4	0.38
6	6–2	0.40

MST edges

0–7   1–7   0–2   2–3

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
2	0-2	0.26
3	2-3	0.17
5	5-7	0.28
4	0-4	0.38
6	6-2	0.40

already a better connection
to 6 (discard)

MST edges

0-7   1-7   0-2   2-3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
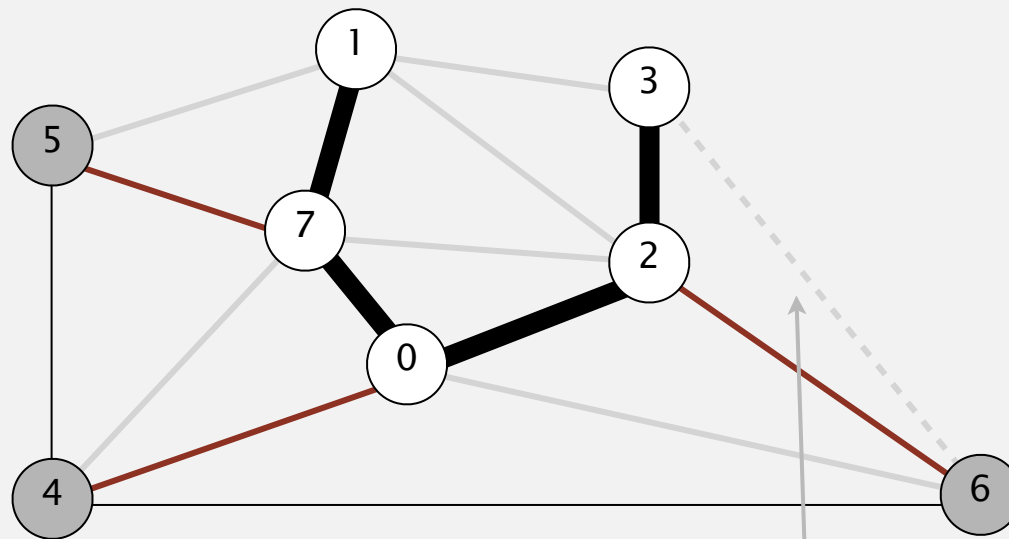- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
2	0-2	0.26
3	2-3	0.17
5	5-7	0.28
4	0-4	0.38
6	6-2	0.40

MST edges

0-7   1-7   0-2   2-3

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0-7	0.16
1	1-7	0.19
2	0-2	0.26
3	2-3	0.17
→ 5	5-7	0.28
4	0-4	0.38
6	6-2	0.40

MST edges

0-7   1-7   0-2   2-3   5-7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
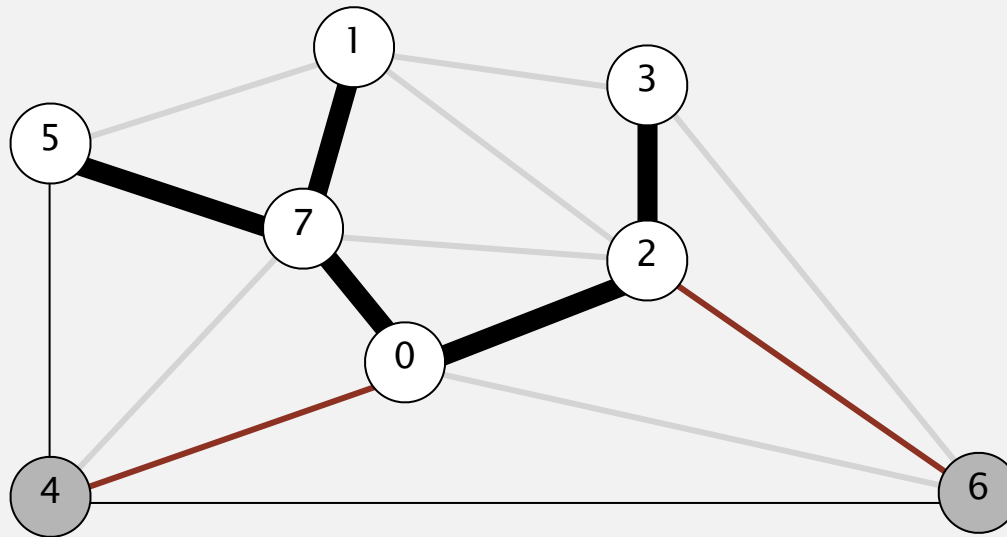- At each step, add to T the min weight edge with exactly one endpoint in T.

decrease key of 4
from 0.38 to 0.35

now a better connection
to 0 (discard)

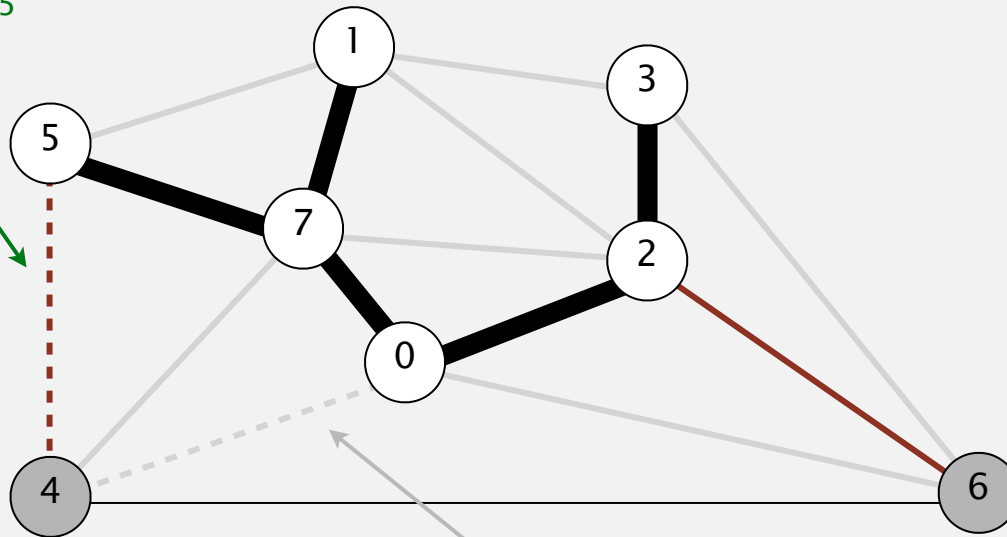| v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
4	4–5 ~~0–4~~	0.35 ~~0.38~~
6	6–2	0.40

MST edges

0–7   1–7   0–2   2–3   5–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
→ 4	4–5	0.35
6	6–2	0.40

MST edges

0–7   1–7   0–2   2–3   5–7

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
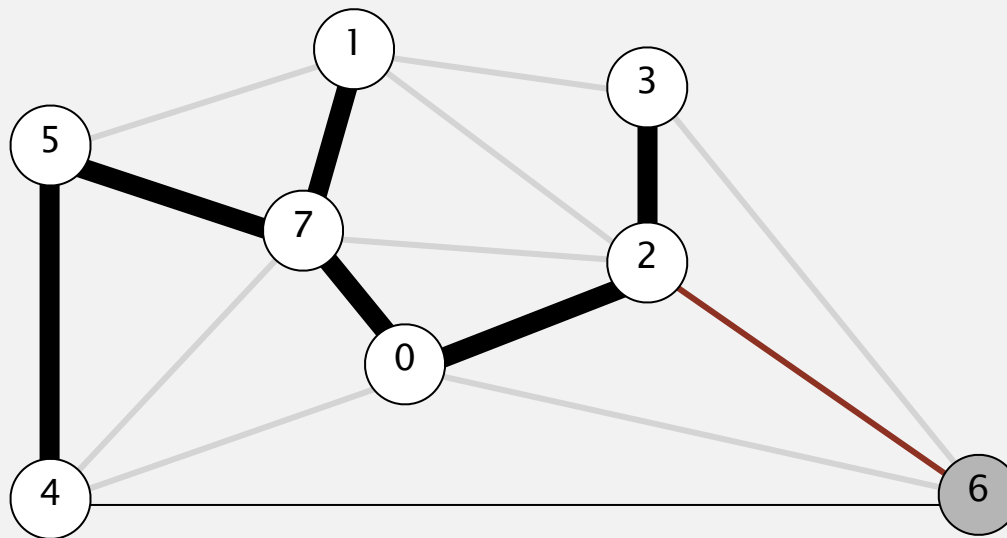- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
→ 4	4–5	0.35
6	6–2	0.40

MST edges

0–7 1–7 0–2 2–3 5–7 4–5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
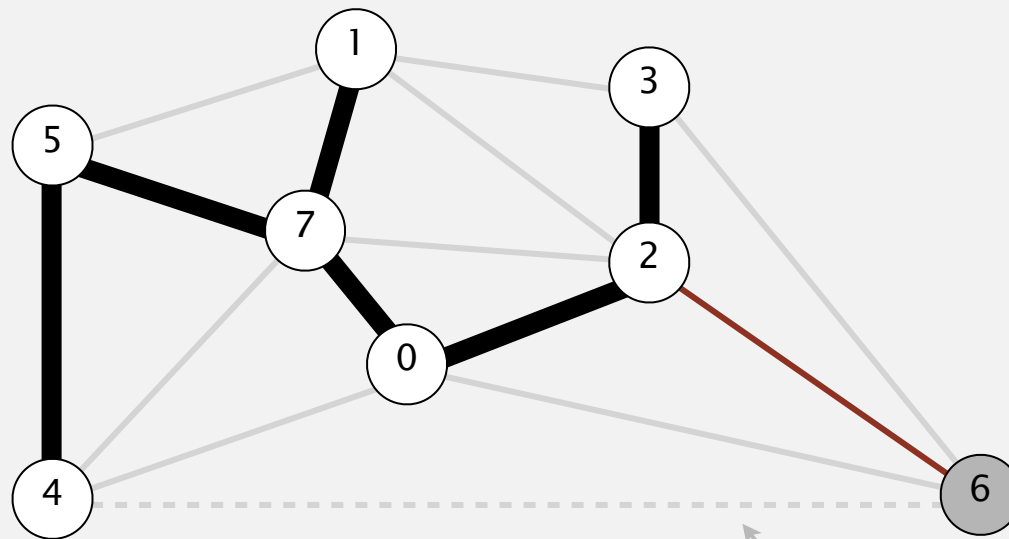- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
4	4–5	0.35
6	6–2	0.40

already a better connection
to 6 (discard)

MST edges

0–7 1–7 0–2 2–3 5–7 4–5

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Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
4	4–5	0.35
6	6–2	0.40

MST edges

0–7   1–7   0–2   2–3   5–7   4–5

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
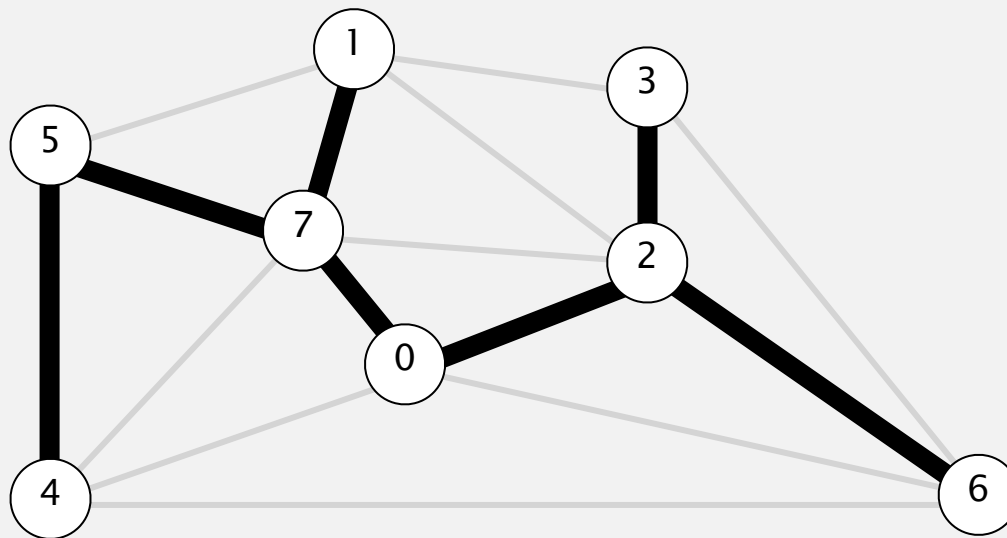- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
4	4–5	0.35
→ 6	6–2	0.40

MST edges

0-7   1-7   0-2   2-3   5-7   4-5   6-2

Prim's algorithm

- Start with vertex 0 and greedily grow tree T.
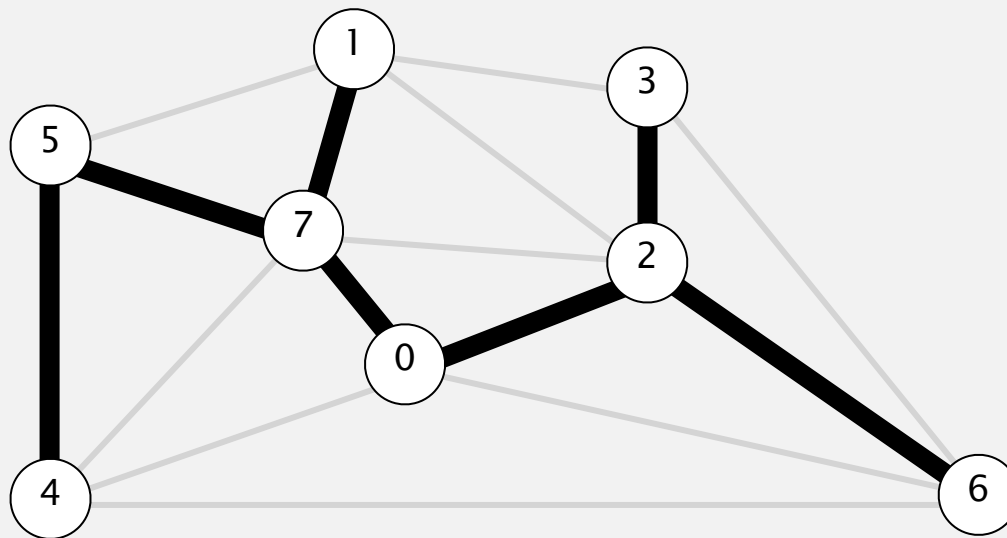- At each step, add to T the min weight edge with exactly one endpoint in T.

v	edgeTo[]	distTo[]
0	–	–
7	0–7	0.16
1	1–7	0.19
2	0–2	0.26
3	2–3	0.17
5	5–7	0.28
4	4–5	0.35
6	6–2	0.40

MST edges

0–7   1–7   0–2   2–3   5–7   4–5   6–2