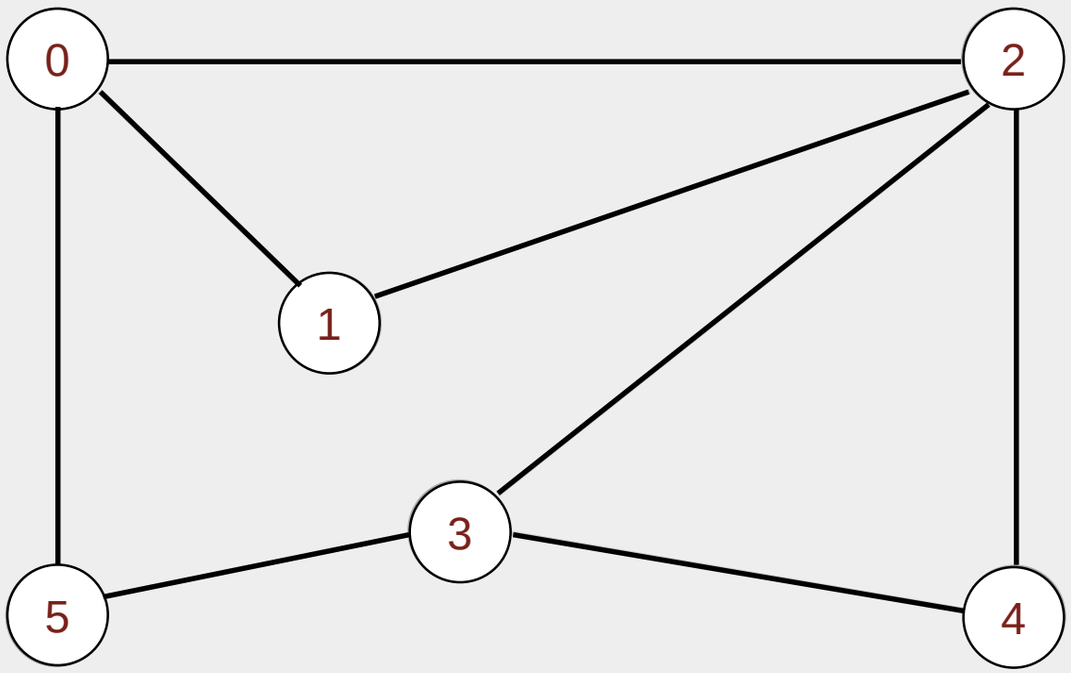
4.1 Breadth-First Search

click to begin demo

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.

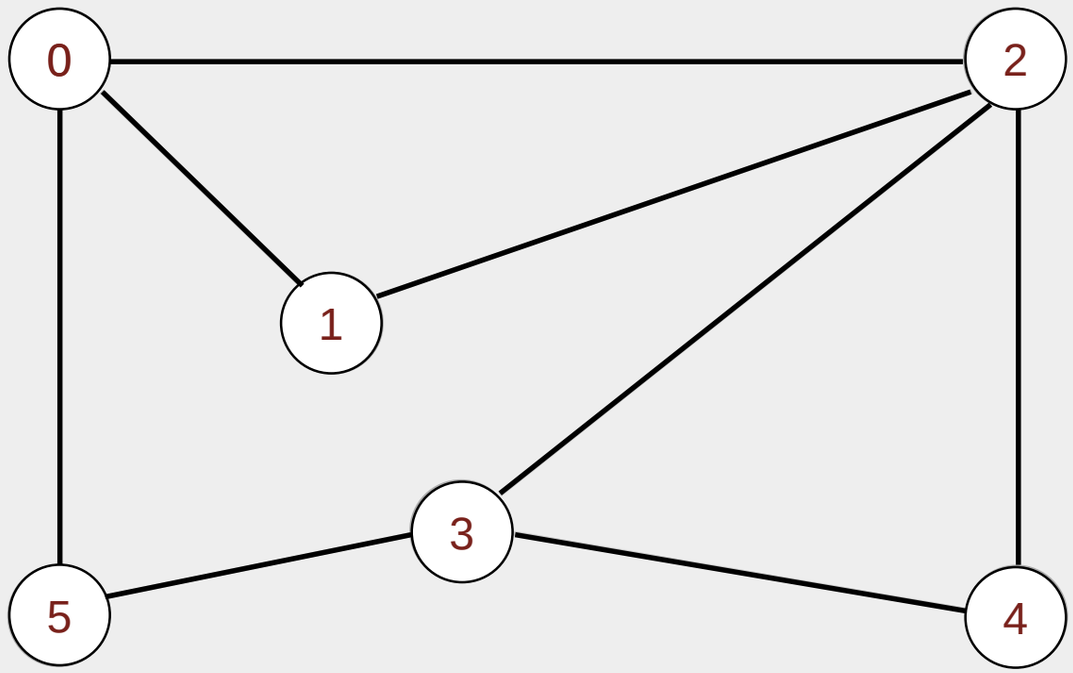


graph G

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue

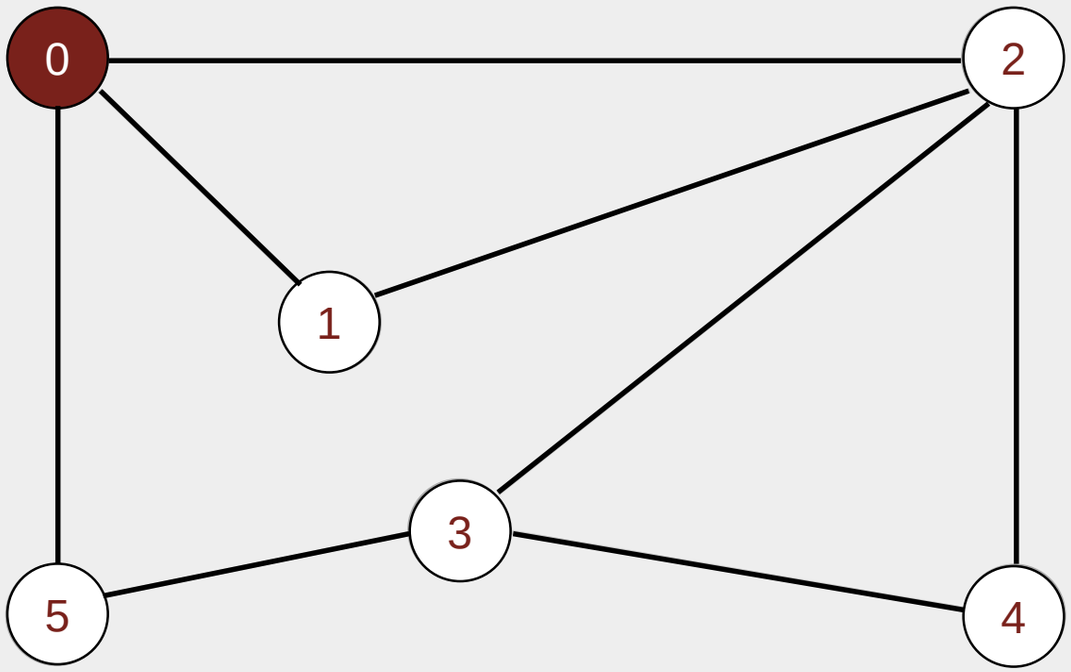
v	edgeTo[v]
0	–
1	–
2	–
3	–
4	–
5	–

add 0 to queue

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



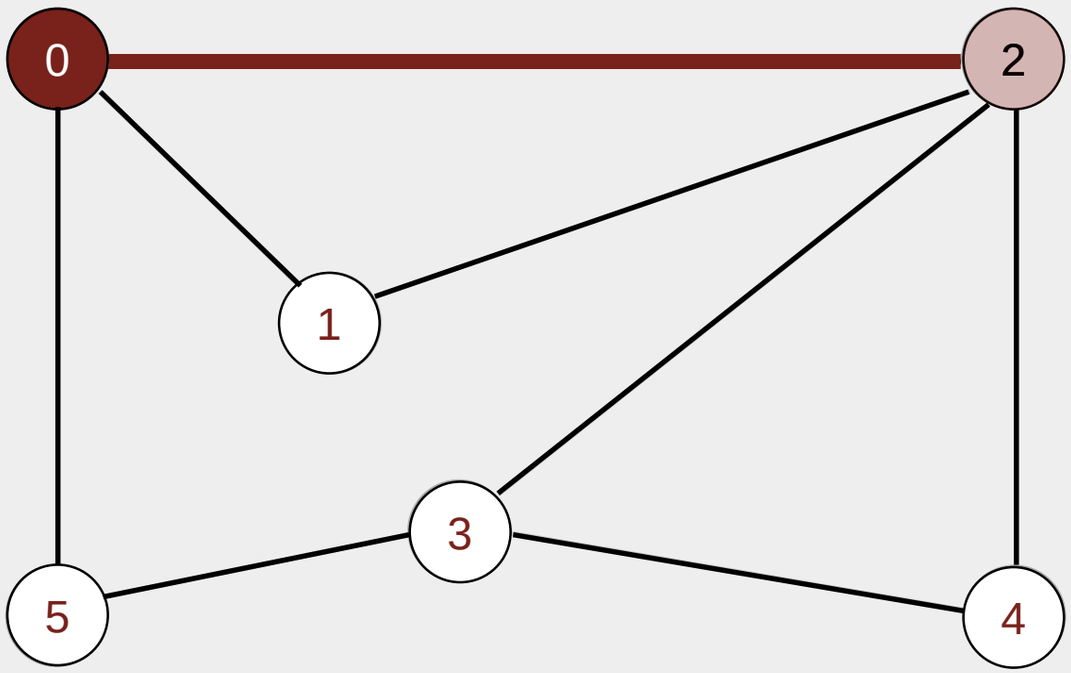
queue	v	edgeTo[v]
	0	–
	1	–
	2	–
	3	–
	4	–
0	5	–

dequeue 0

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue

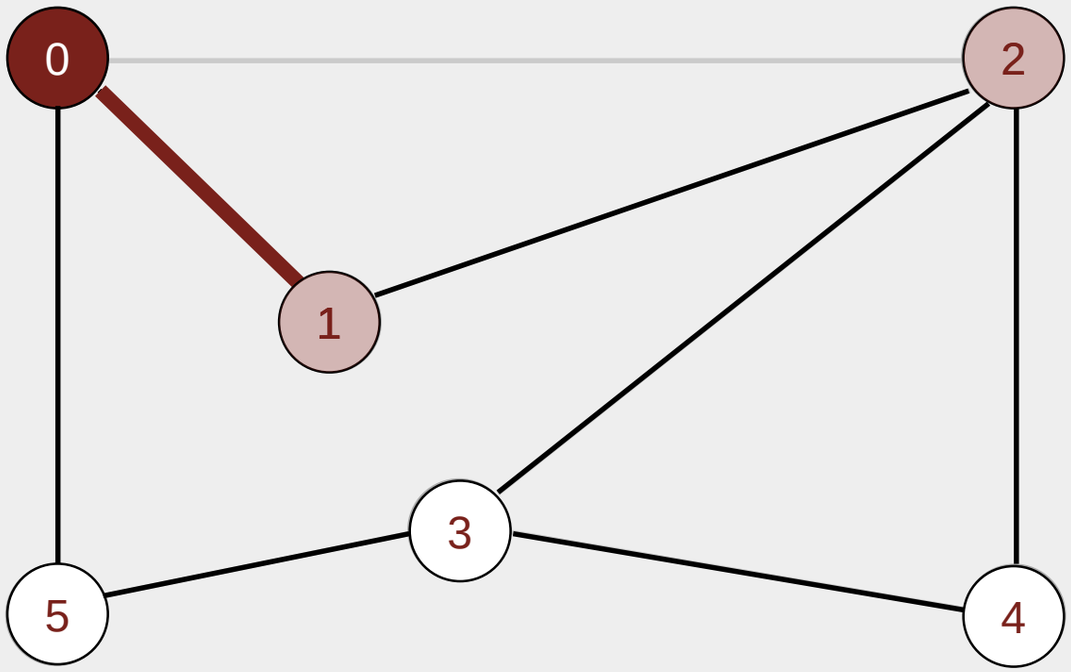
v	edgeTo[v]
0	–
1	0
2	–
3	–
4	–
5	–

dequeue 0

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
2

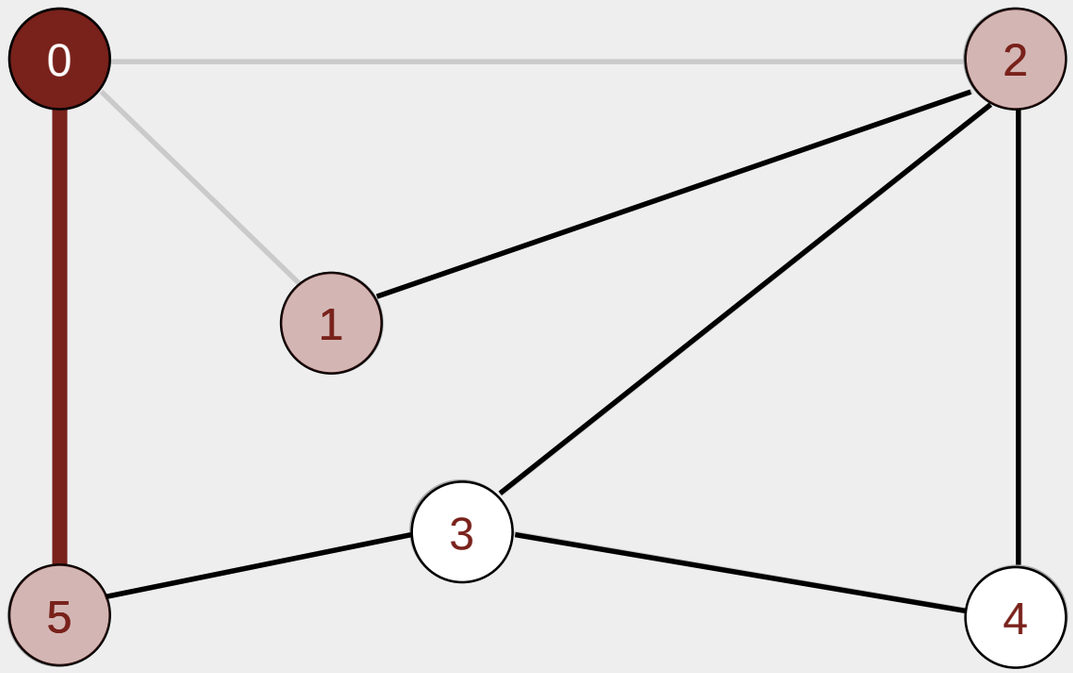
v	edgeTo[v]
0	–
1	0
2	0
3	–
4	–
5	–

dequeue 0

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
1
2

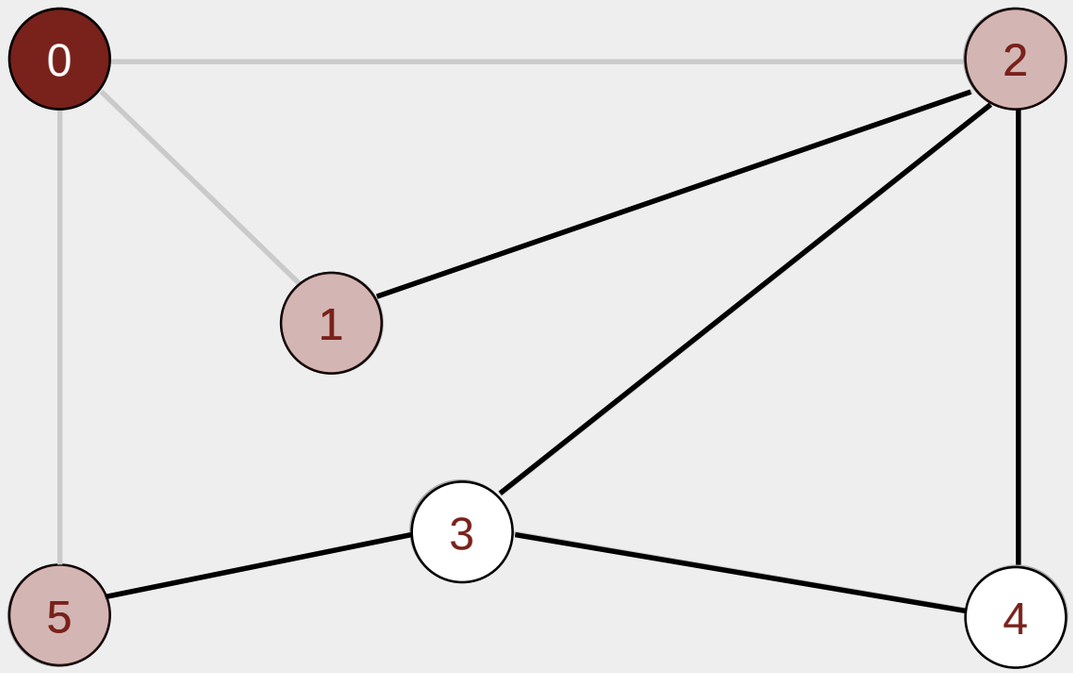
v	edgeTo[v]
0	–
1	0
2	0
3	–
4	0
5	–

dequeue 0

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
5
1
2

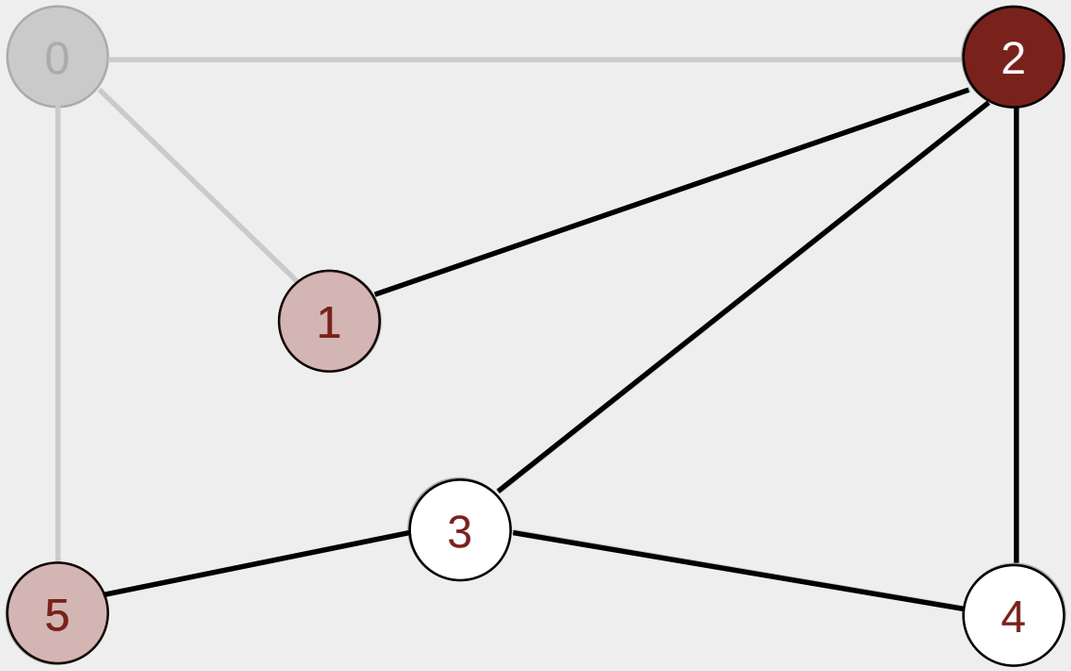
v	edgeTo[v]
0	–
1	0
2	0
3	–
4	–
5	0

0 done

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
5
1
2

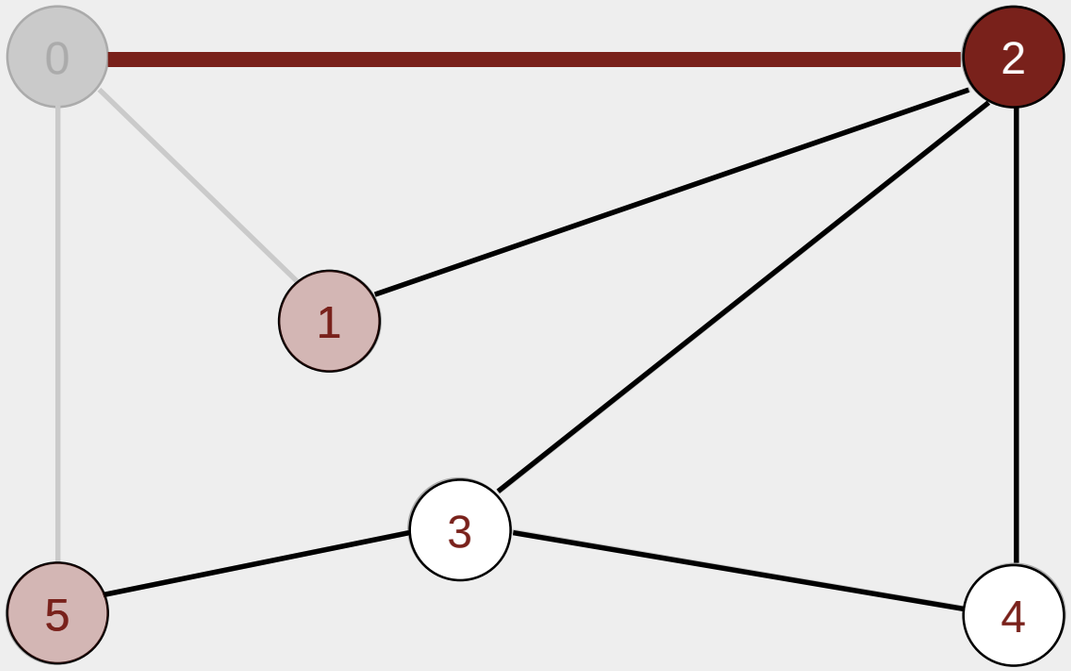
v	edgeTo[v]
0	–
1	0
2	0
3	–
4	–
5	0

dequeue 2

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
5
1

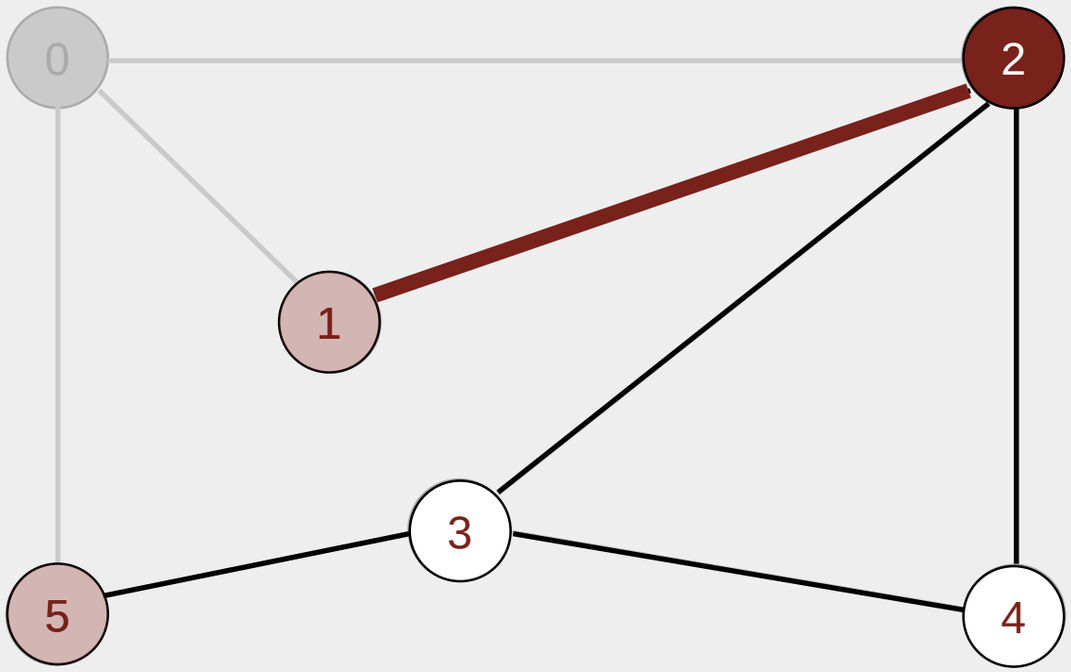
v	edgeTo[v]
0	–
1	0
2	0
3	–
4	–
5	0

dequeue 2

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
5
1

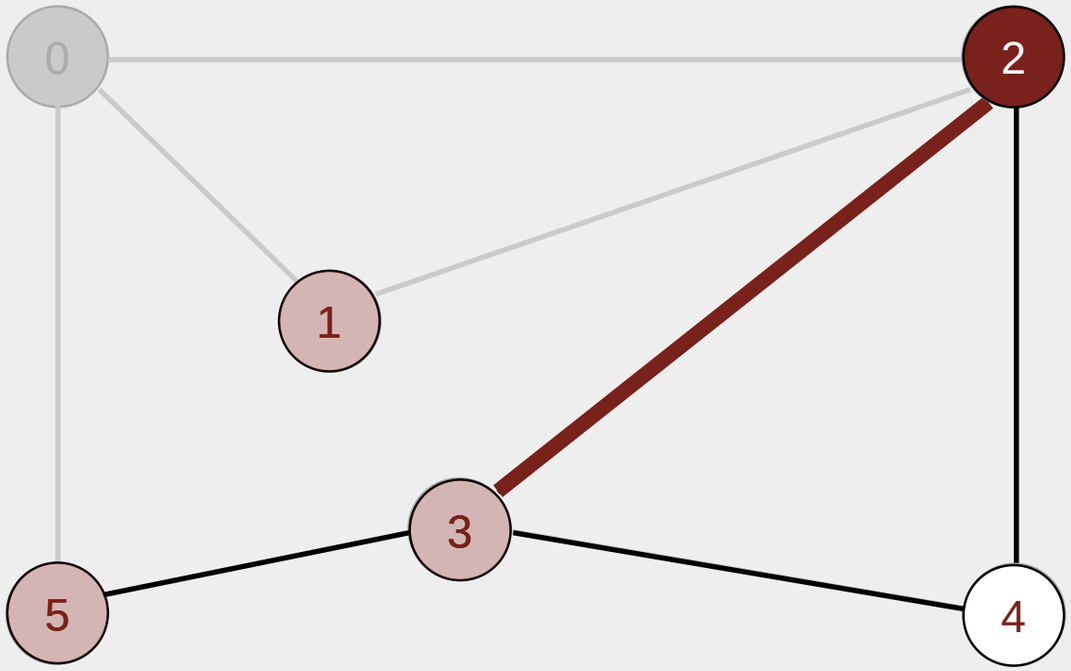
v	edgeTo[v]
0	–
1	0
2	0
3	–
4	–
5	0

dequeue 2

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
5
1

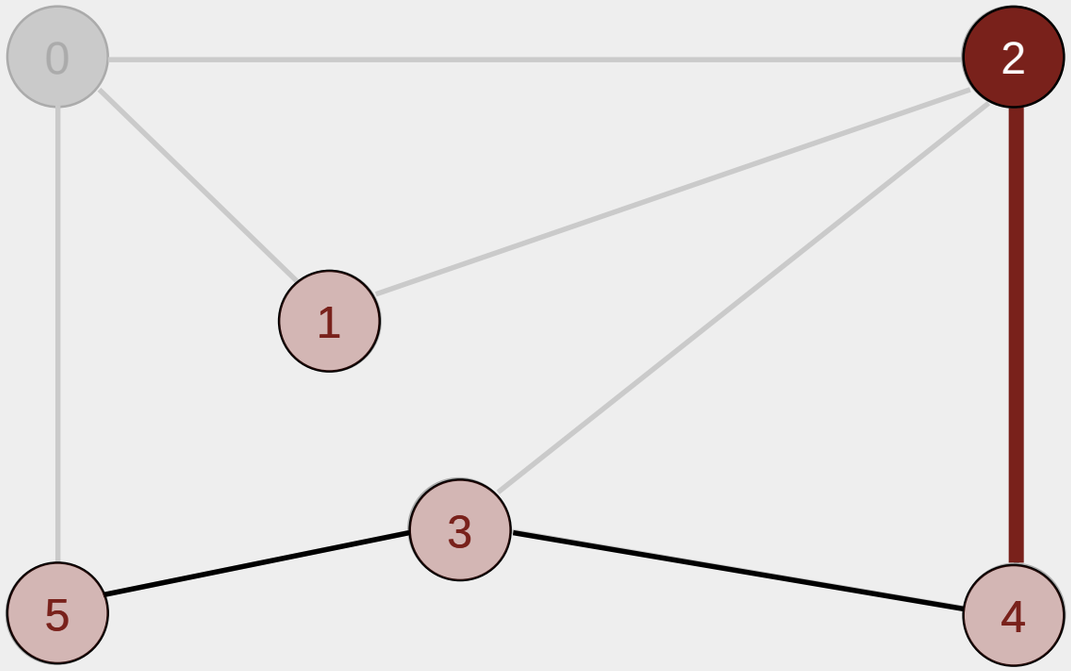
v	edgeTo[v]
0	–
1	0
2	2
3	–
4	–
5	0

dequeue 2

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
3
5
1

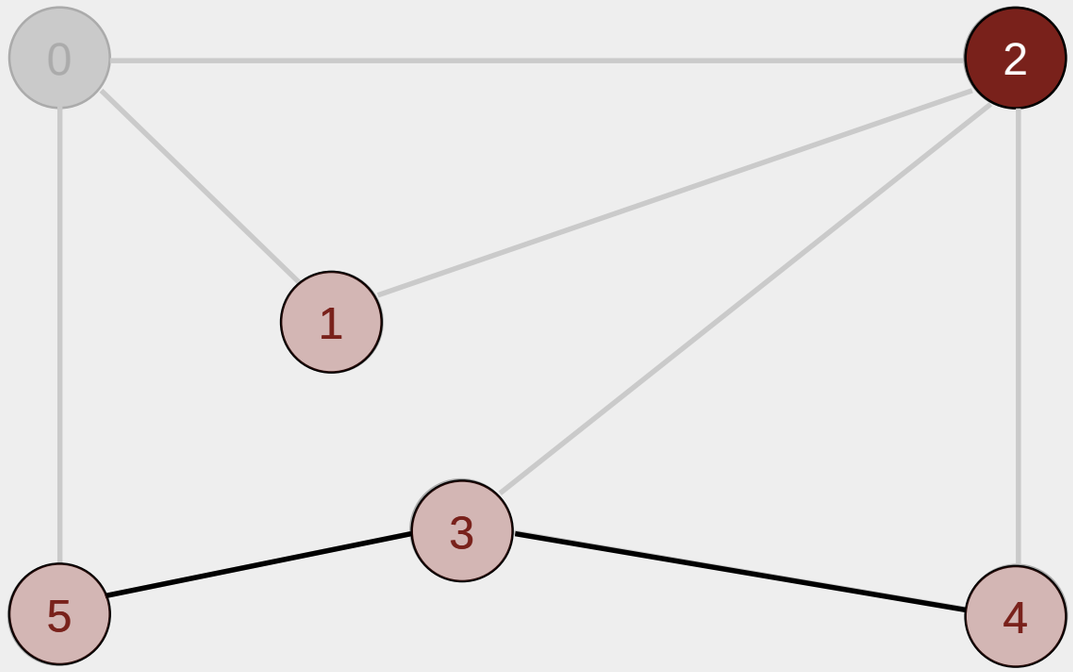
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	–
5	0

dequeue 2

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3
5
1

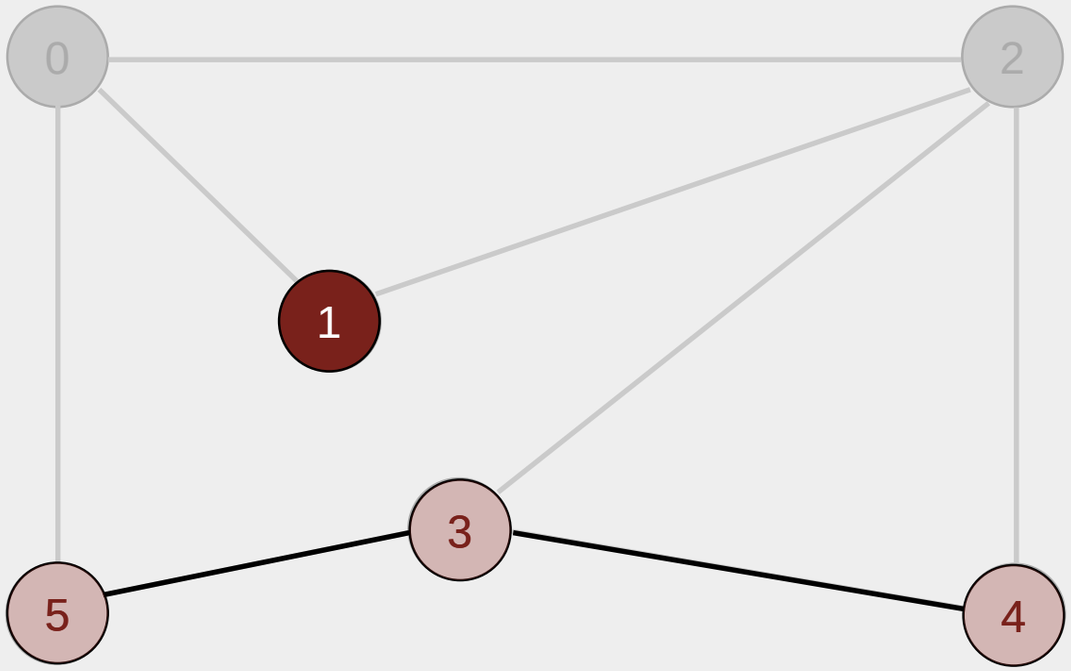
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

2 done

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3
5
1

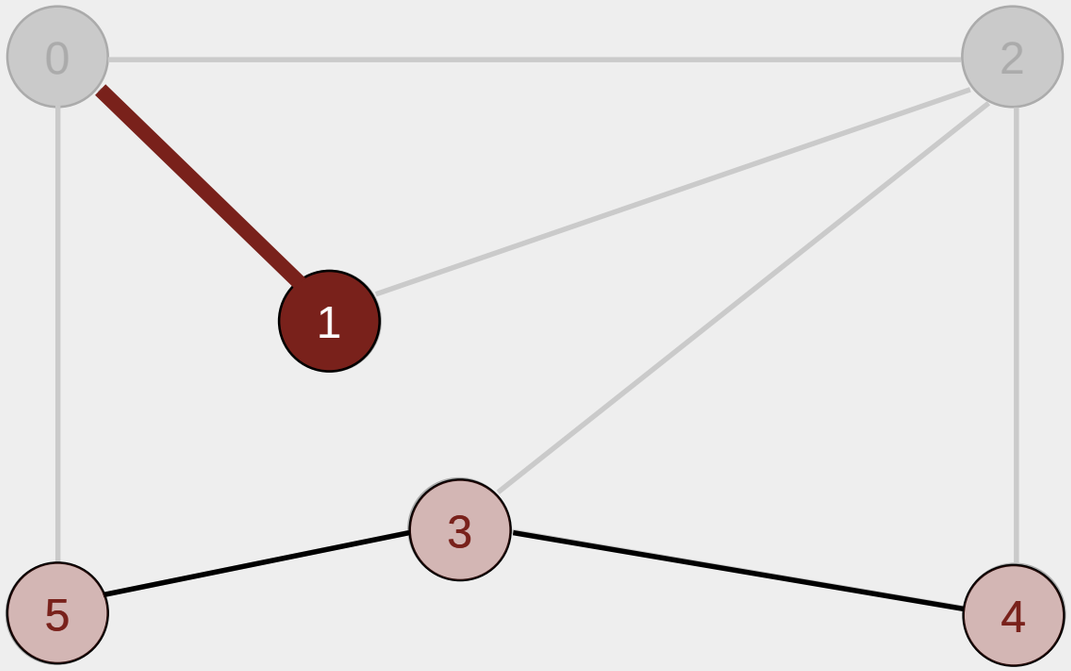
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 1

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3
5

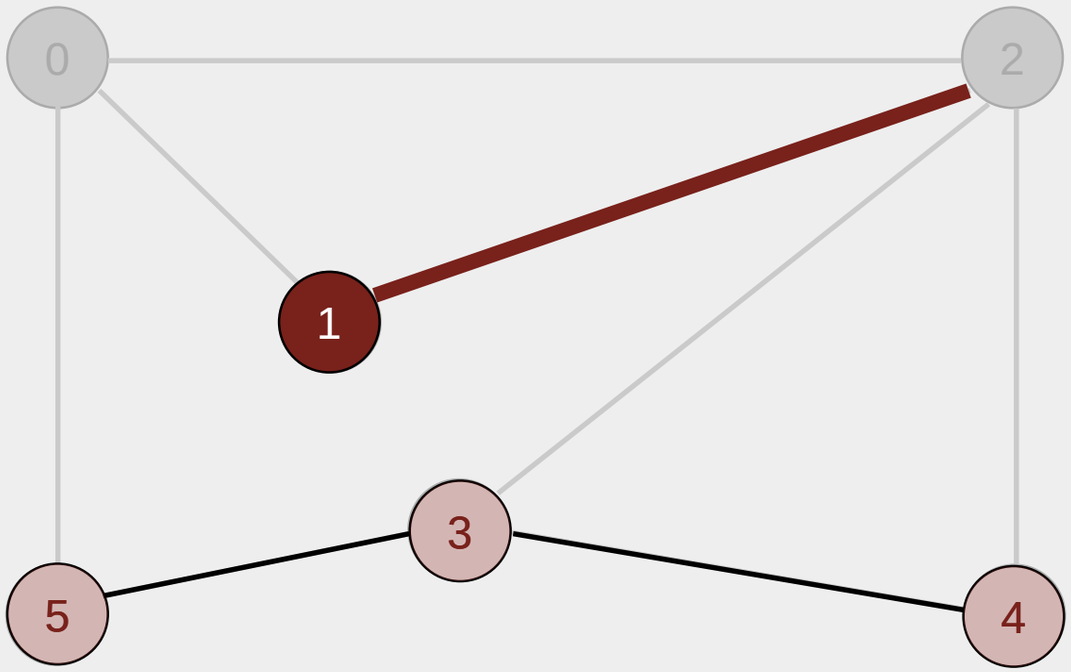
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 1

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3
5

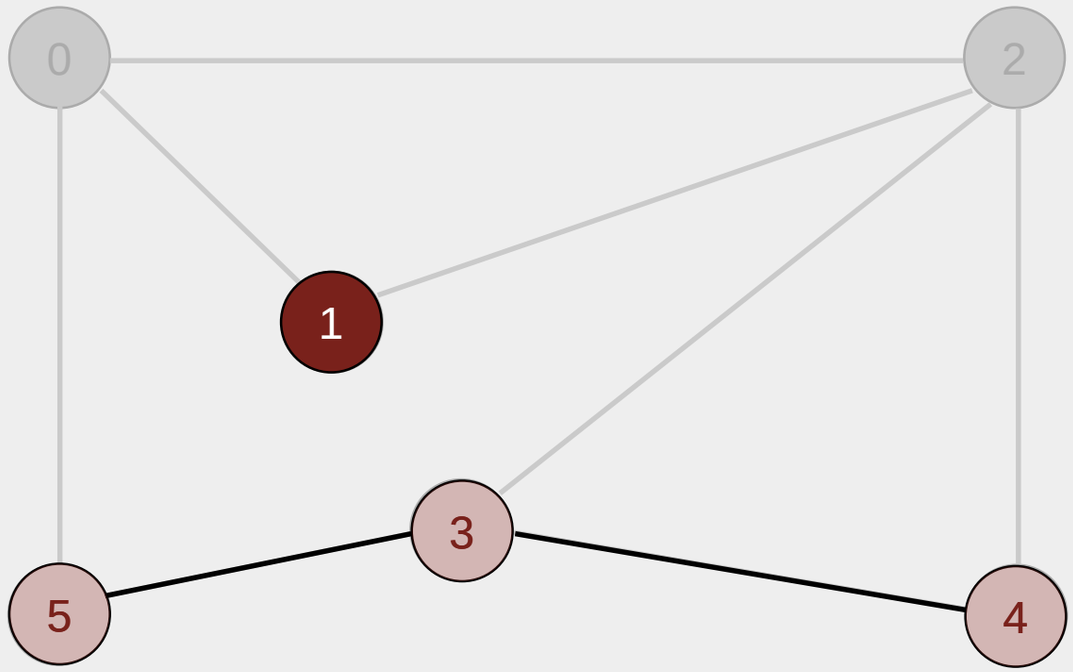
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 1

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3
5

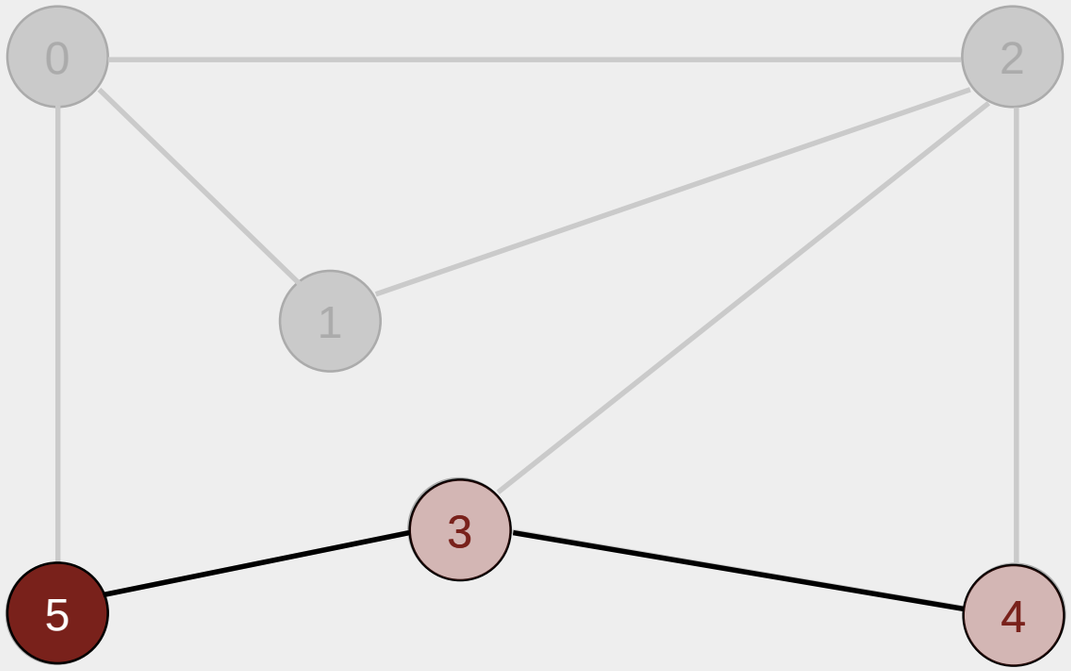
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

1 done

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3
5

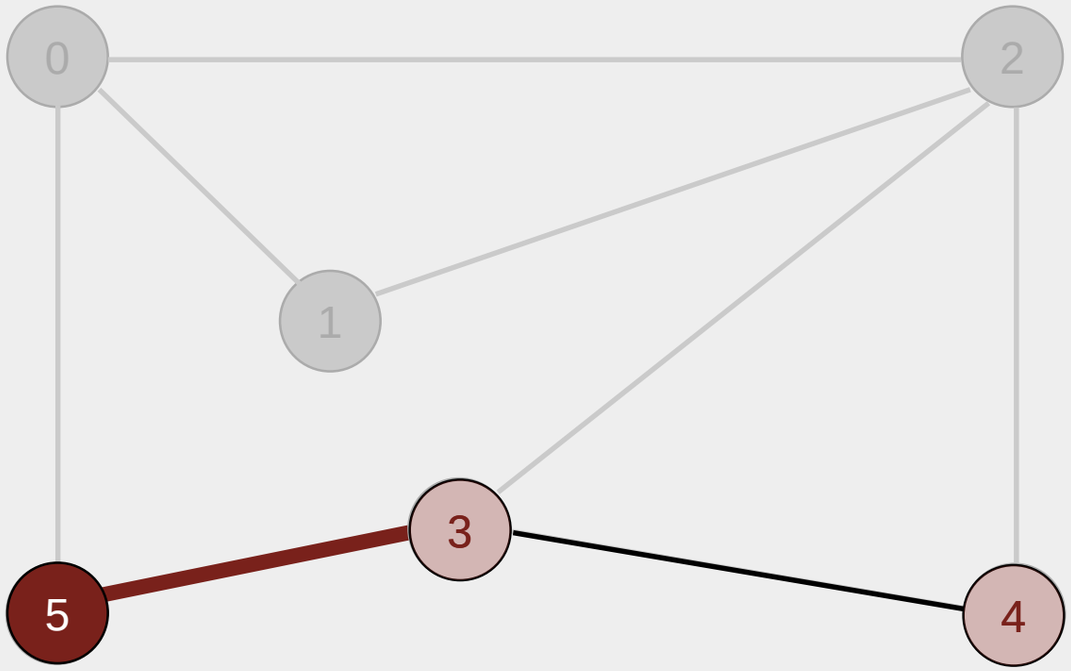
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 5

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3

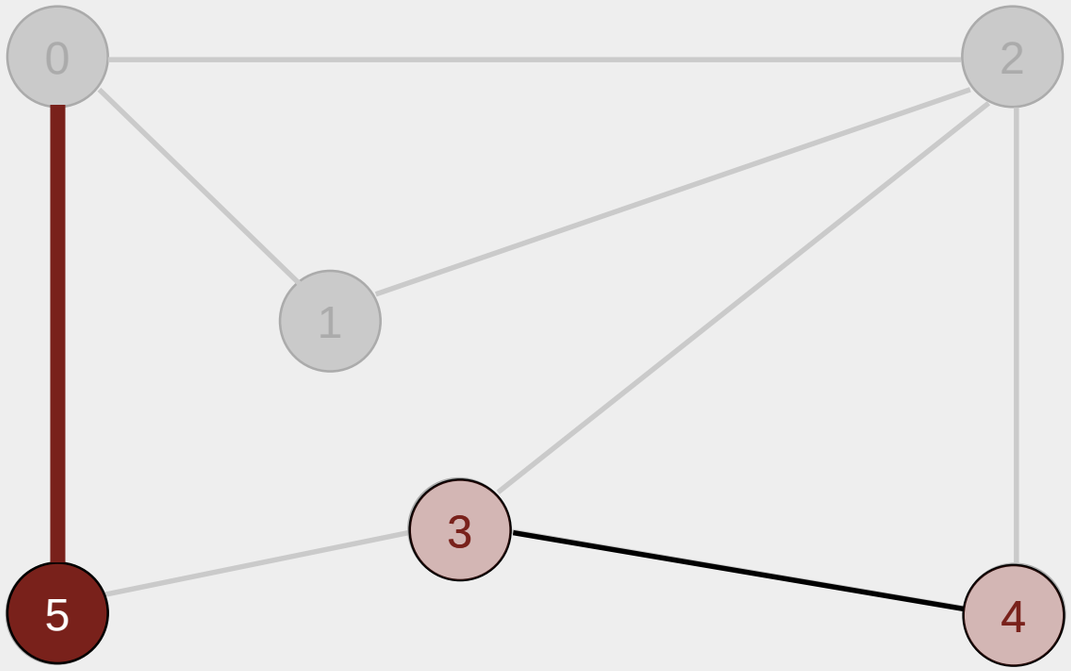
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 5

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3

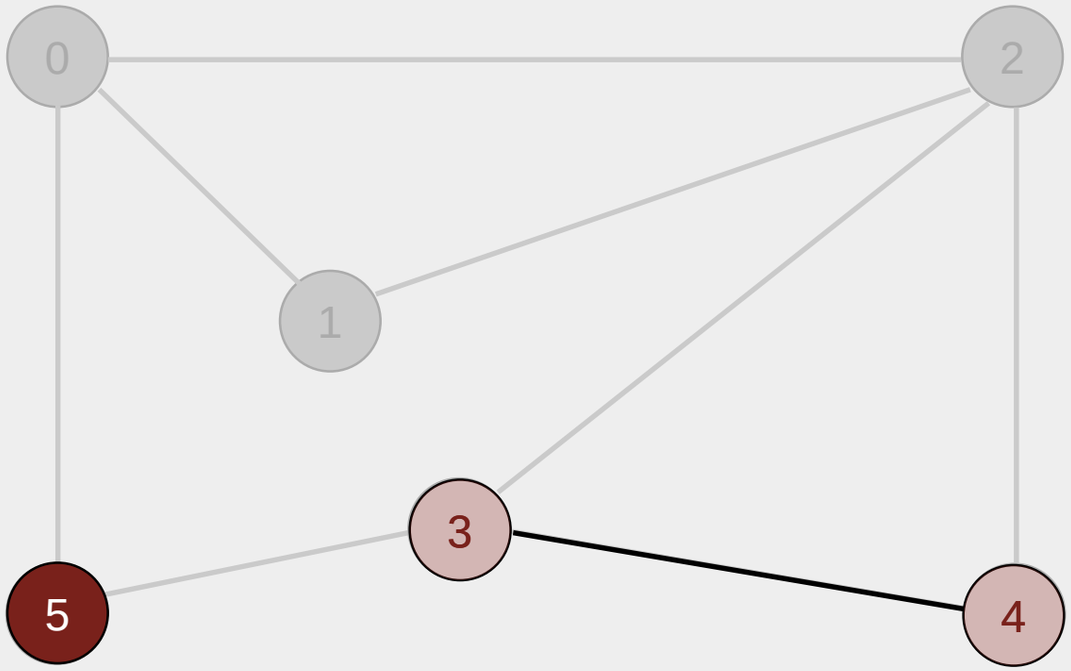
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 5

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3

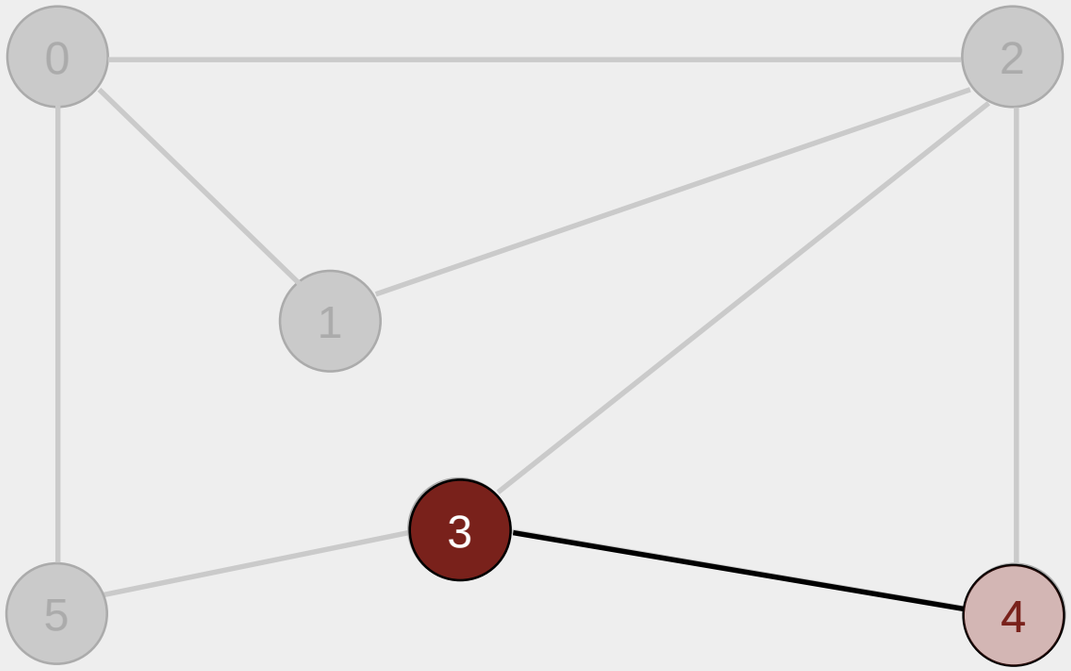
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

5 done

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4
3

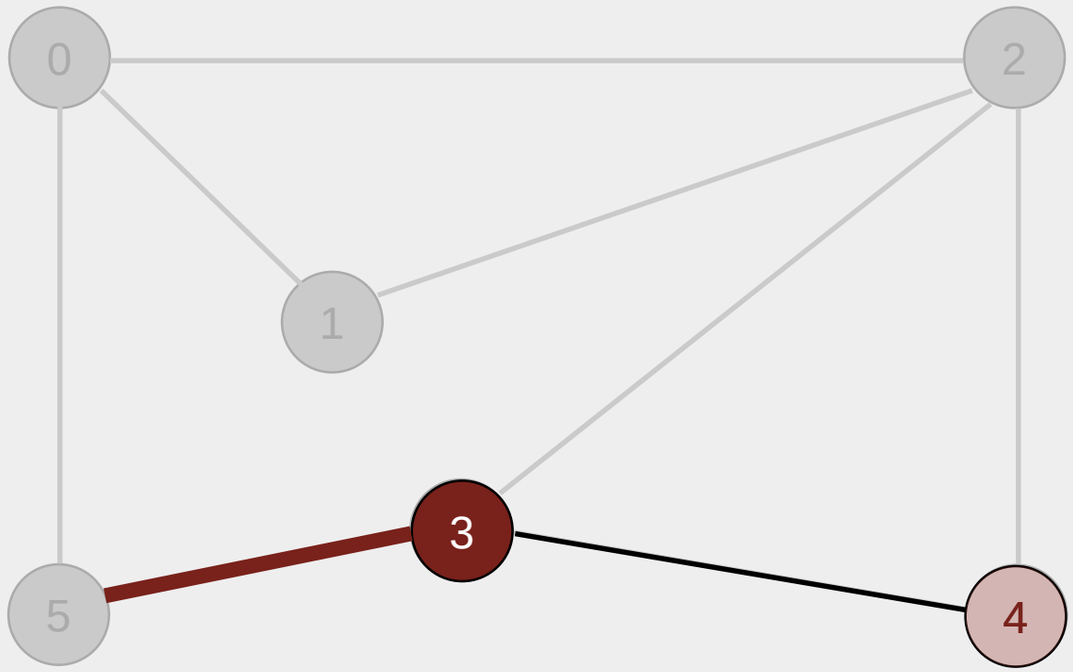
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 3

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4

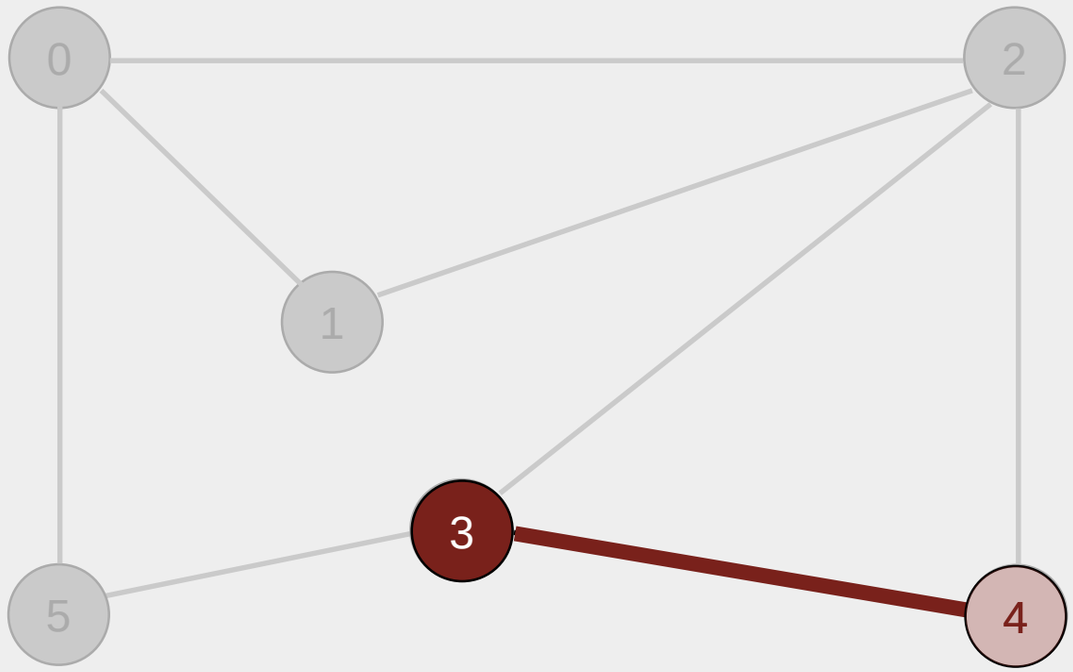
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 3

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4

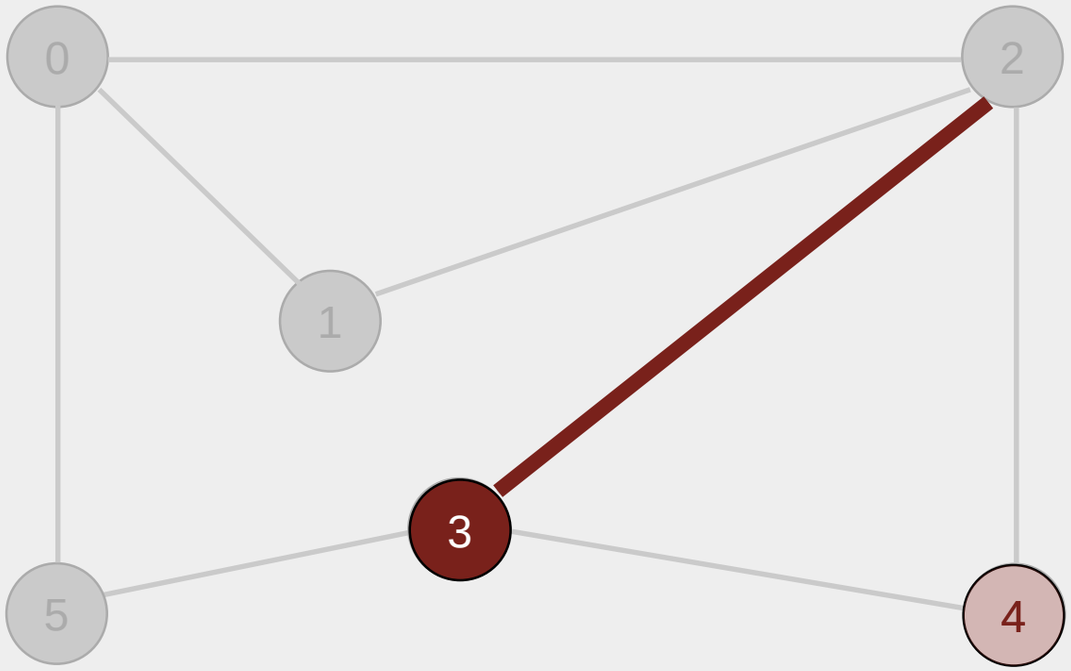
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 3

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4

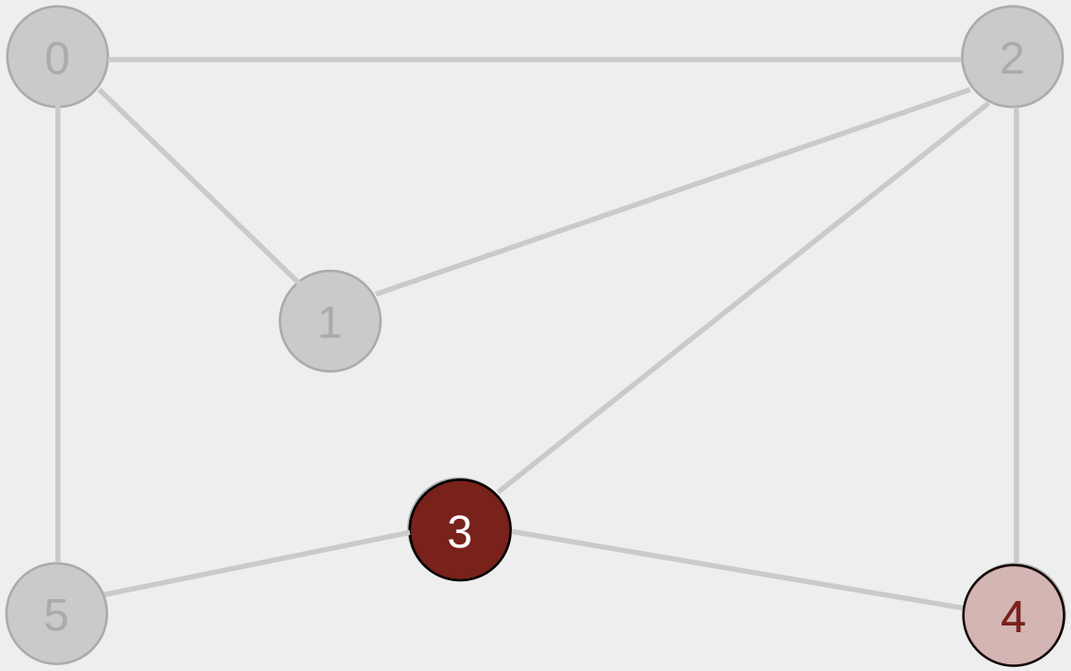
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 3

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4

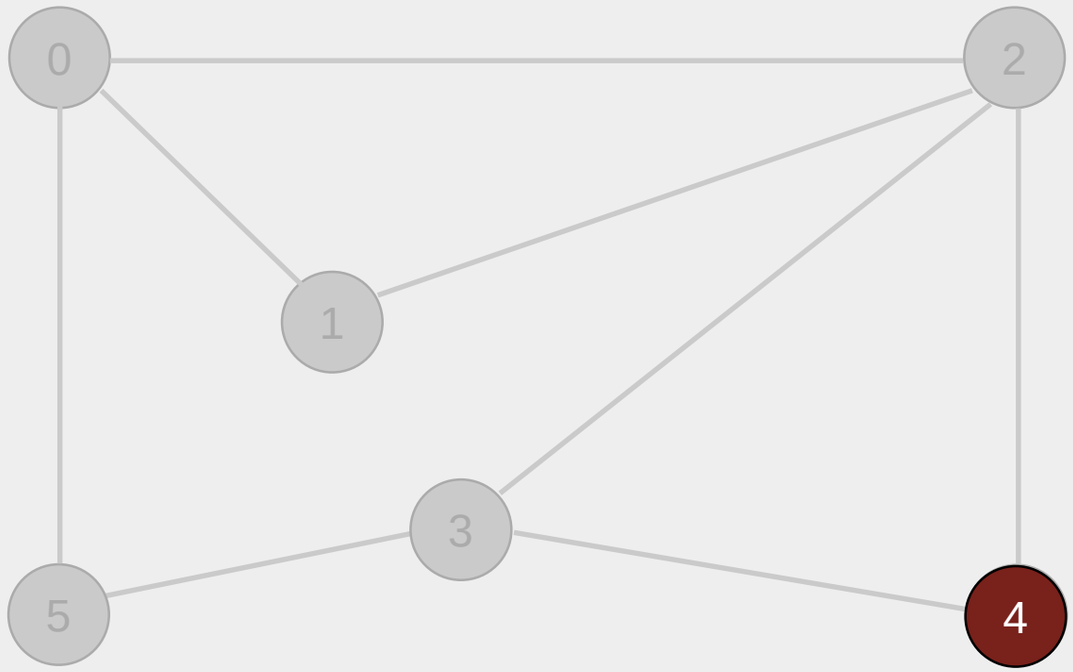
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

3 done

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue
4

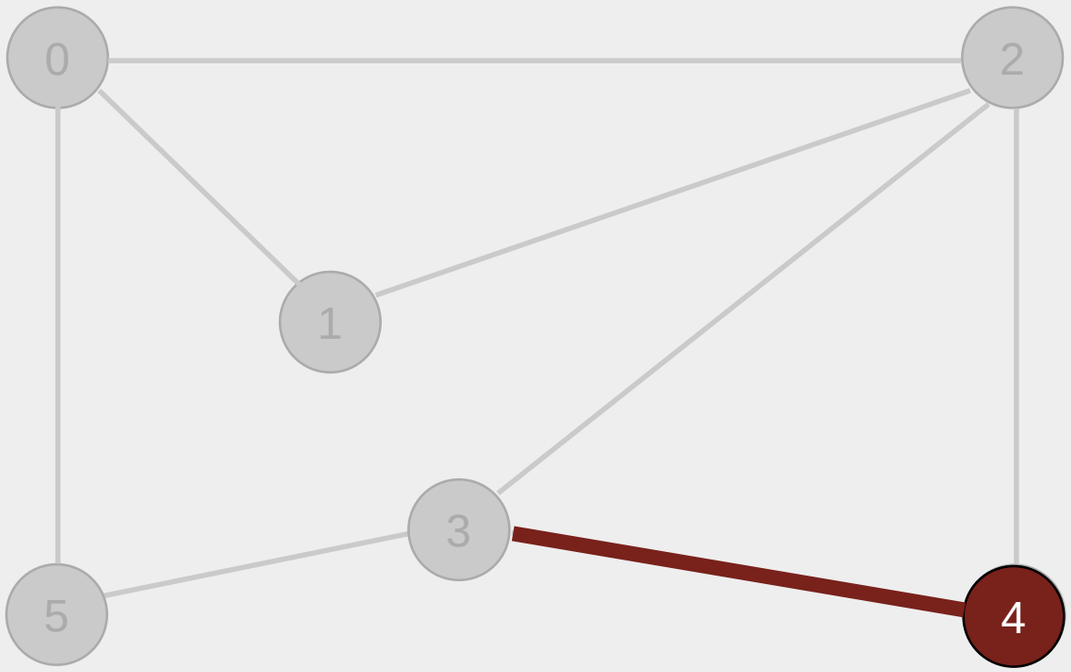
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 4

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue

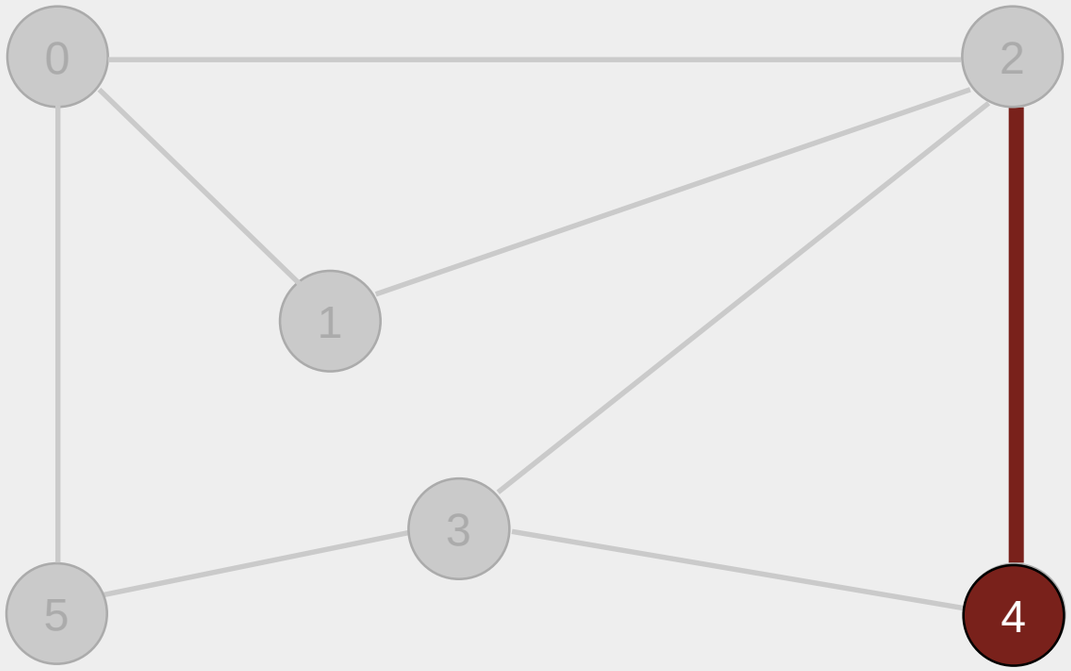
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 4

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue

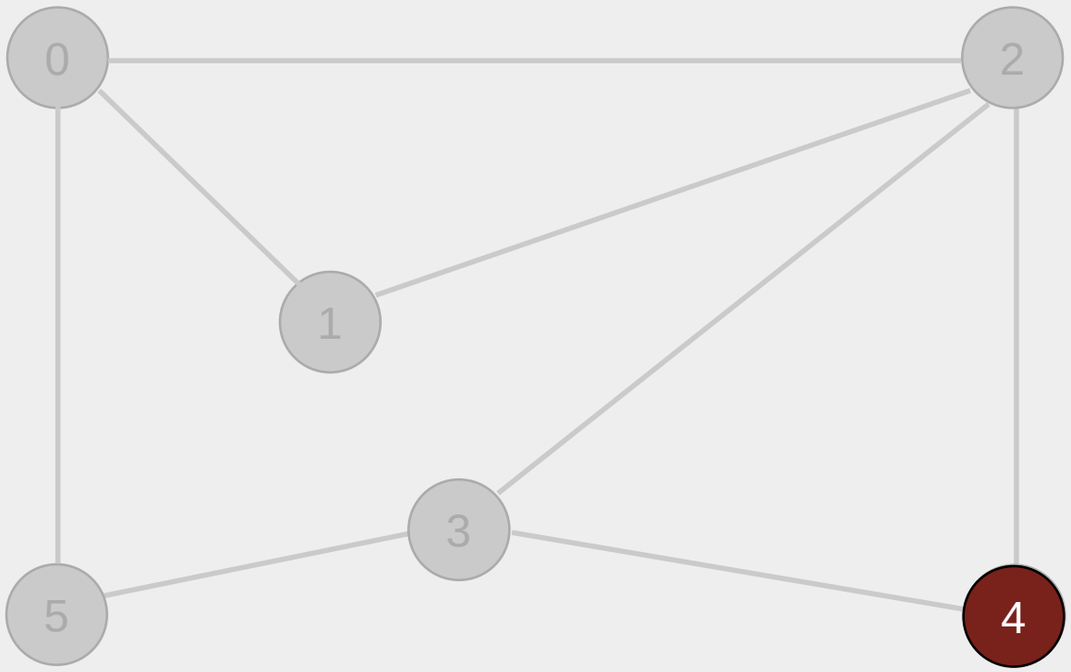
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

dequeue 4

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



queue

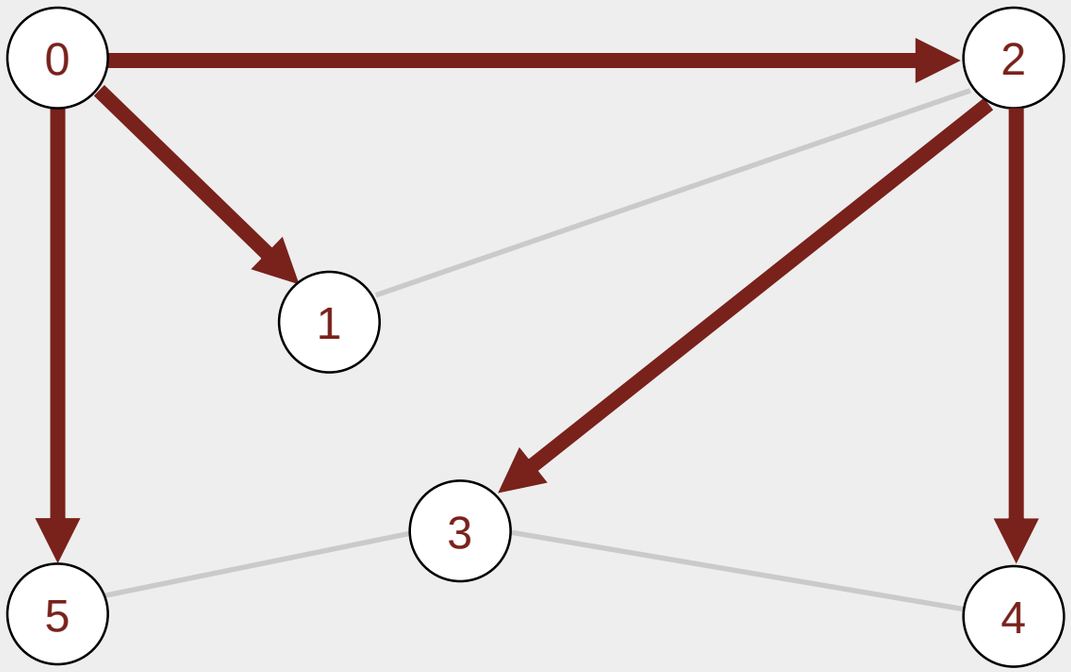
v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

4 done

Breadth-first search

Repeat until queue is empty:

- Remove vertex v from queue.
- Add to queue all unmarked vertices adjacent to v and mark them.



v	edgeTo[v]
0	–
1	0
2	0
3	2
4	2
5	0

done