



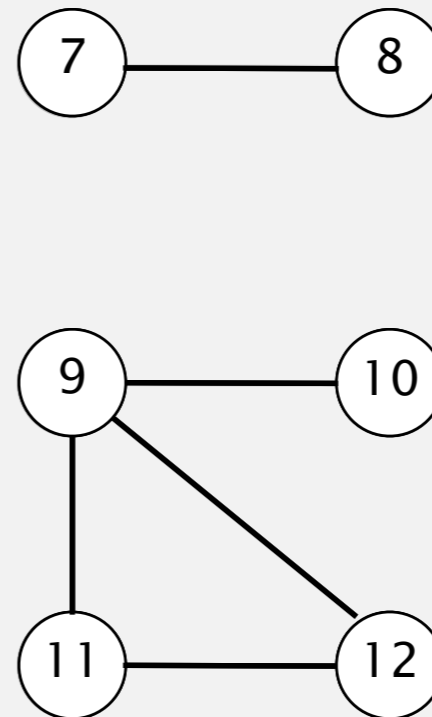
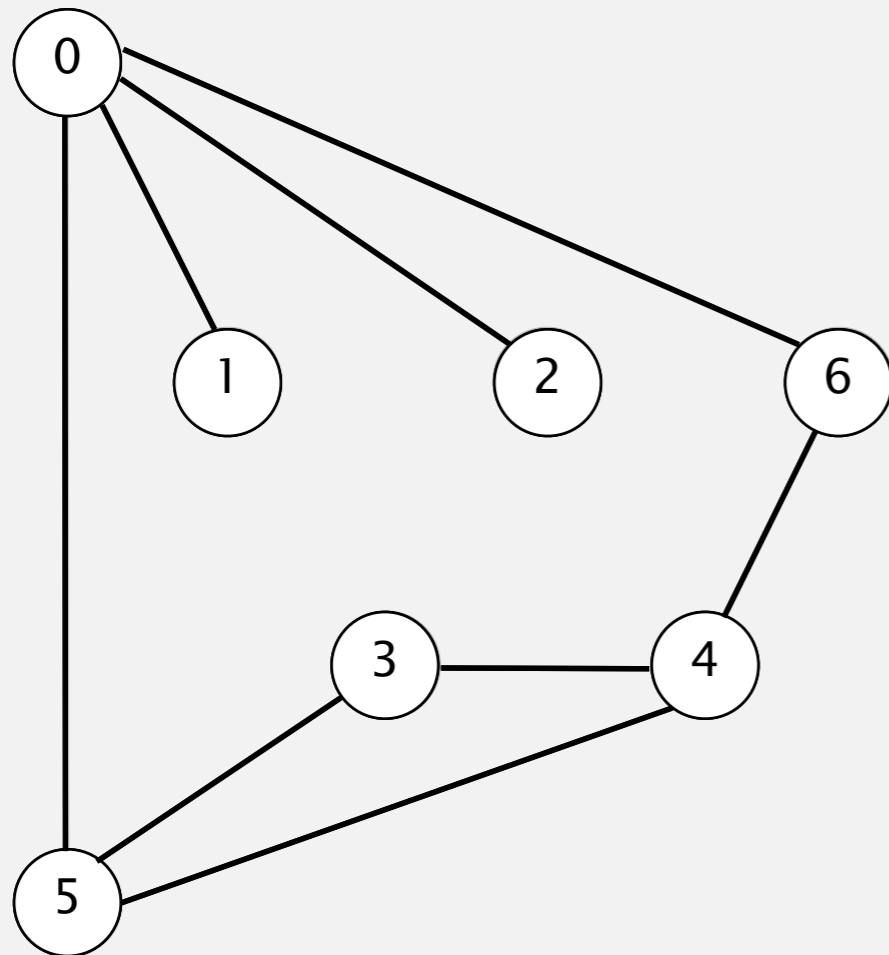
<http://algs4.cs.princeton.edu>

4.1 DEPTH-FIRST SEARCH DEMO

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



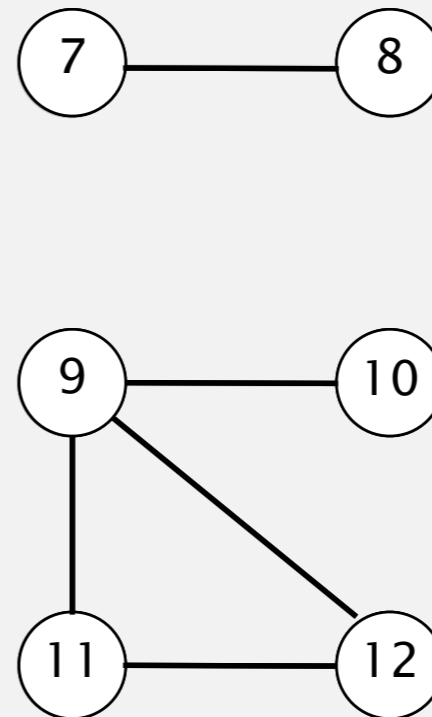
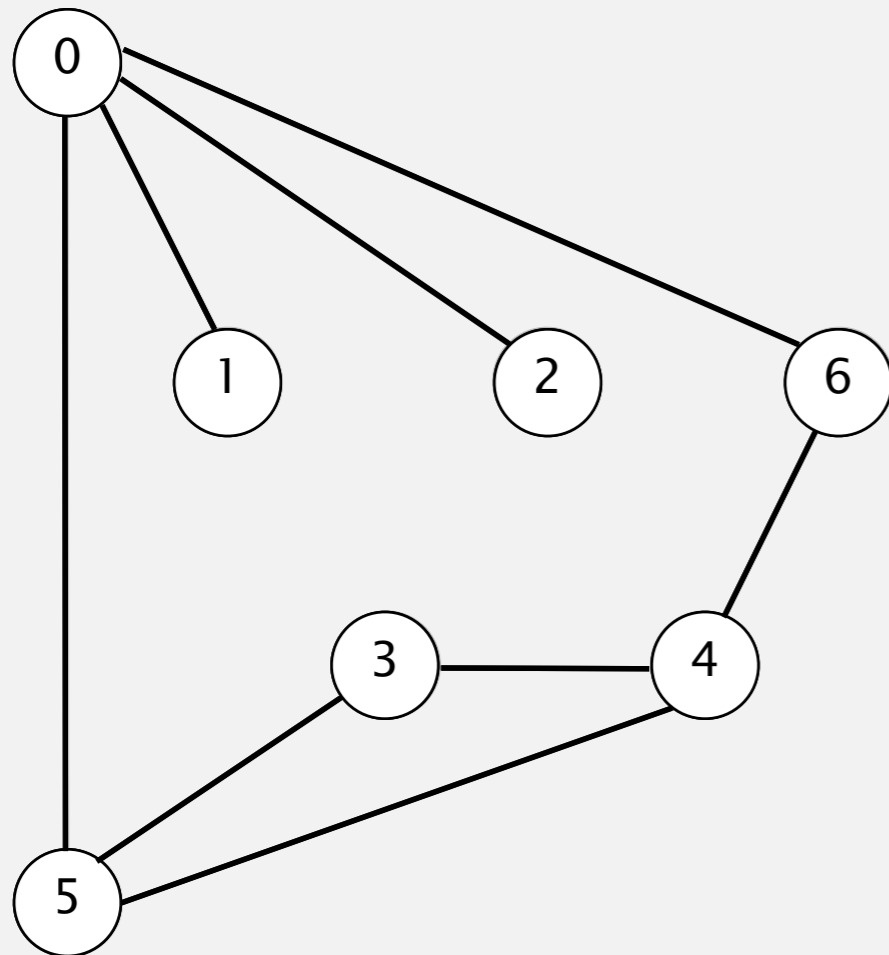
tinyG.txt
V → 13
13 ← *E*
0 5
4 3
0 1
9 12
6 4
5 4
0 2
11 12
9 10
0 6
7 8
9 11
5 3

graph G

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



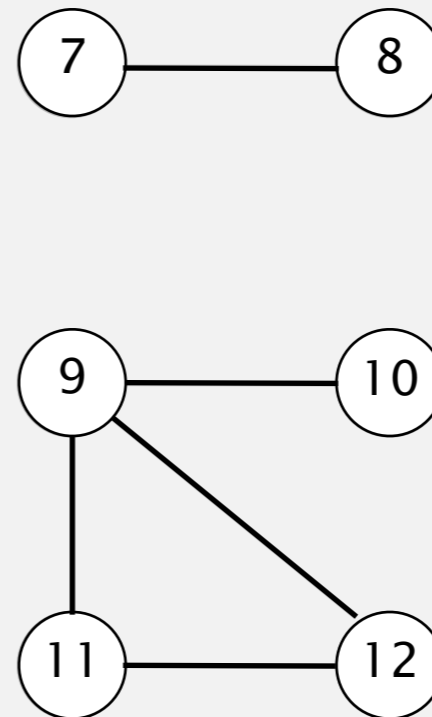
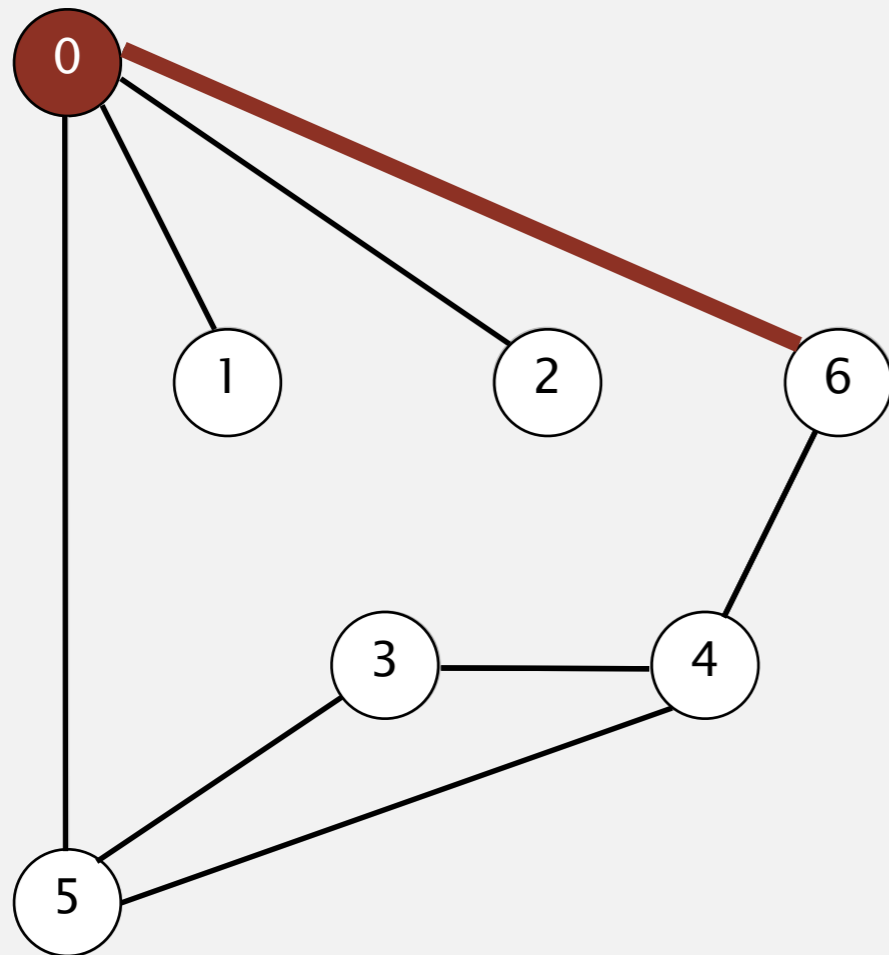
v	marked[]	edgeTo[]
0	F	—
1	F	—
2	F	—
3	F	—
4	F	—
5	F	—
6	F	—
7	F	—
8	F	—
9	F	—
10	F	—
11	F	—
12	F	—

graph G

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



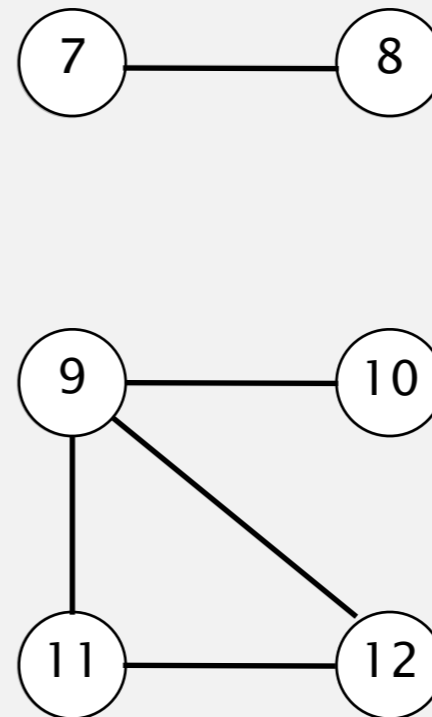
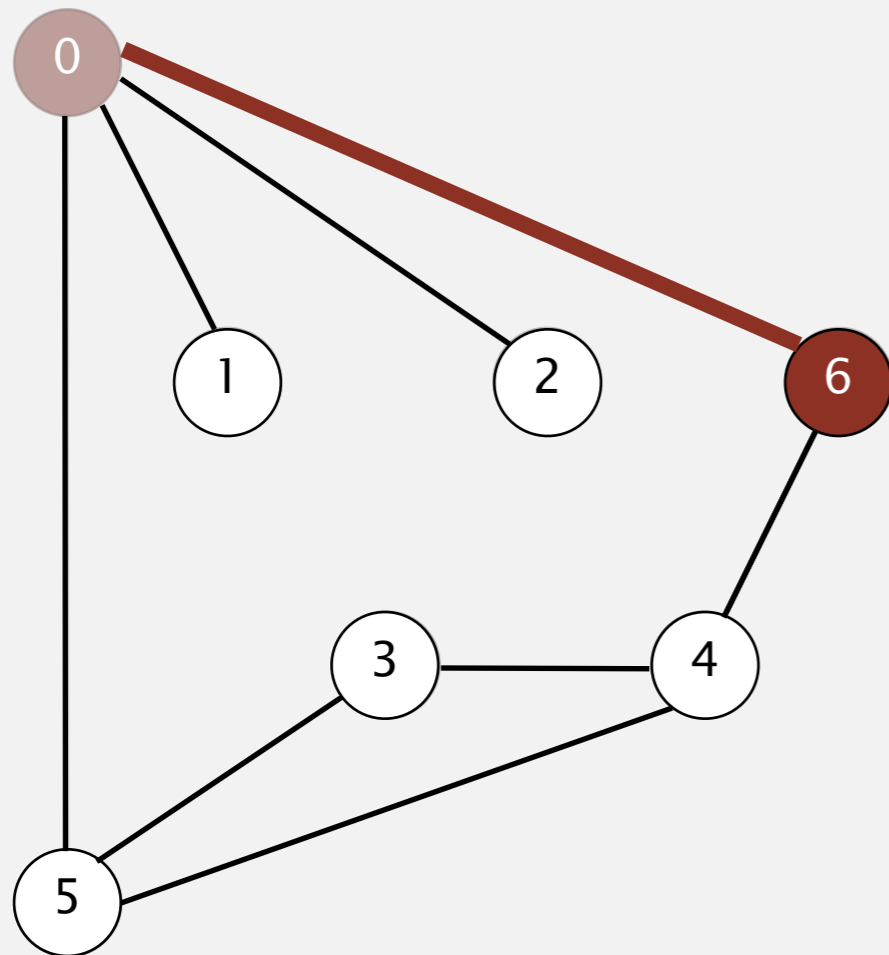
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	F	-
4	F	-
5	F	-
6	F	-
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 0

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



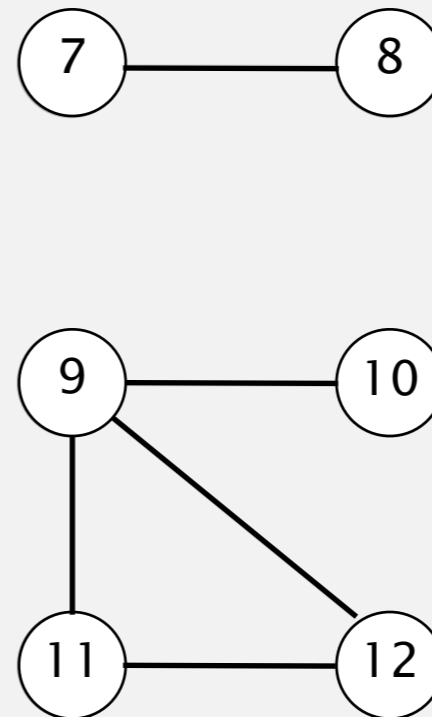
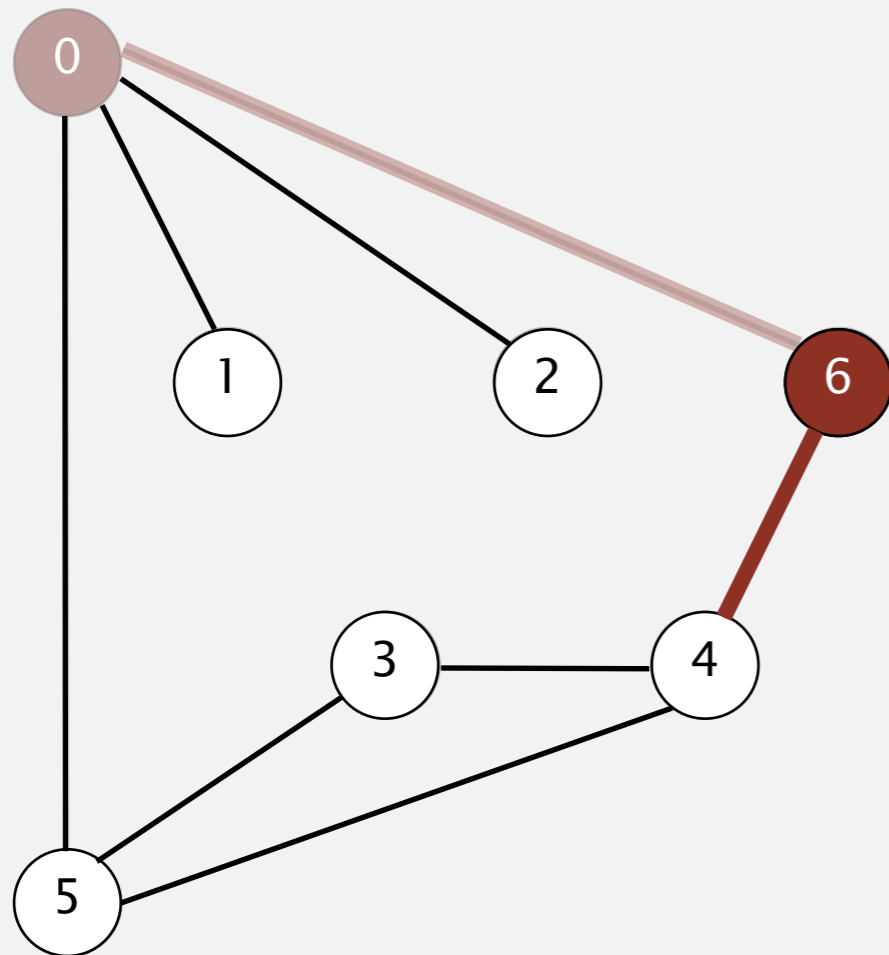
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	F	-
4	F	-
5	F	-
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 6

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



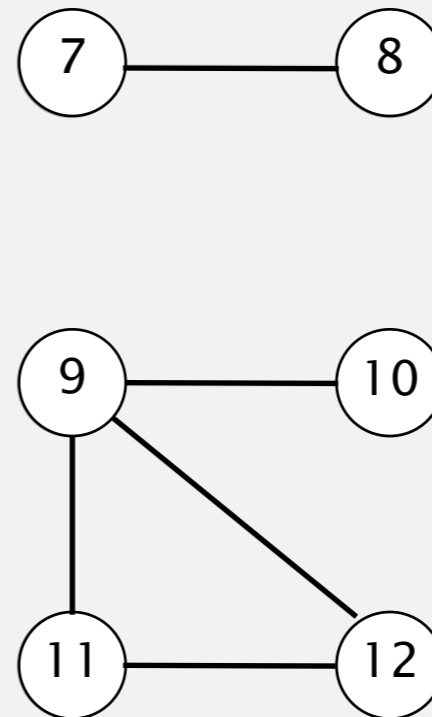
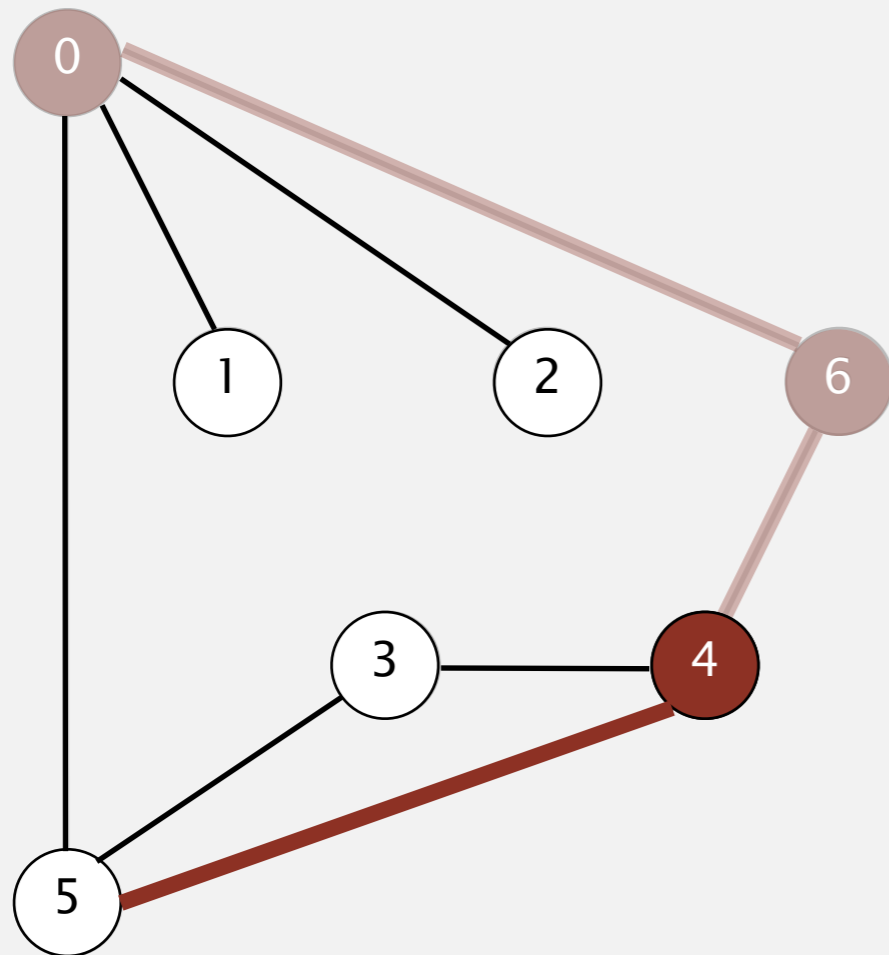
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	F	-
4	F	-
5	F	-
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 6

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



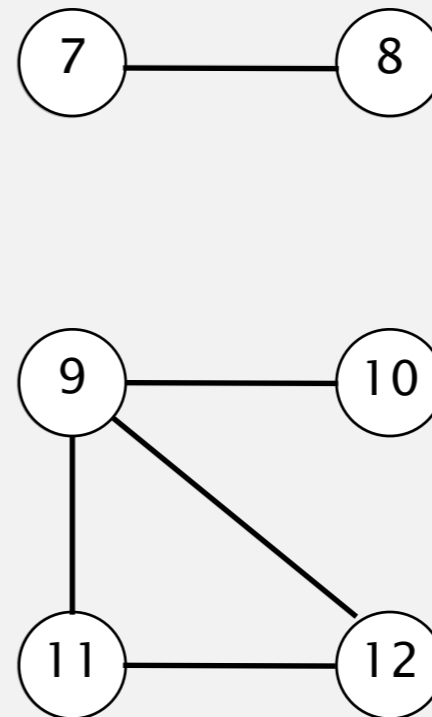
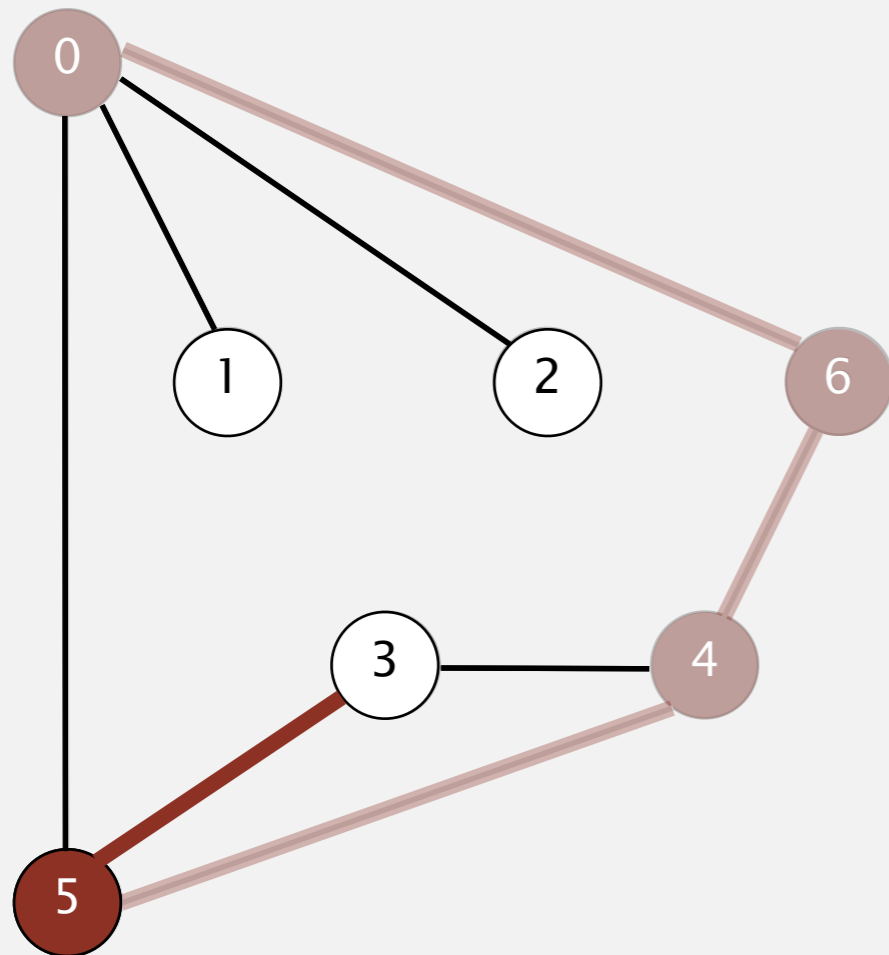
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	F	-
4	T	6
5	F	-
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 4

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



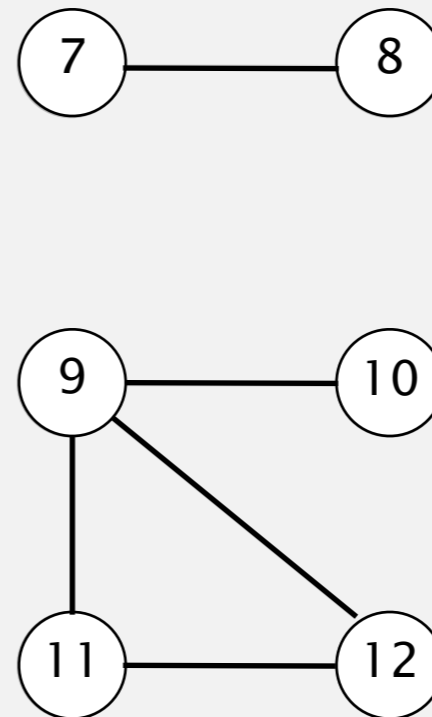
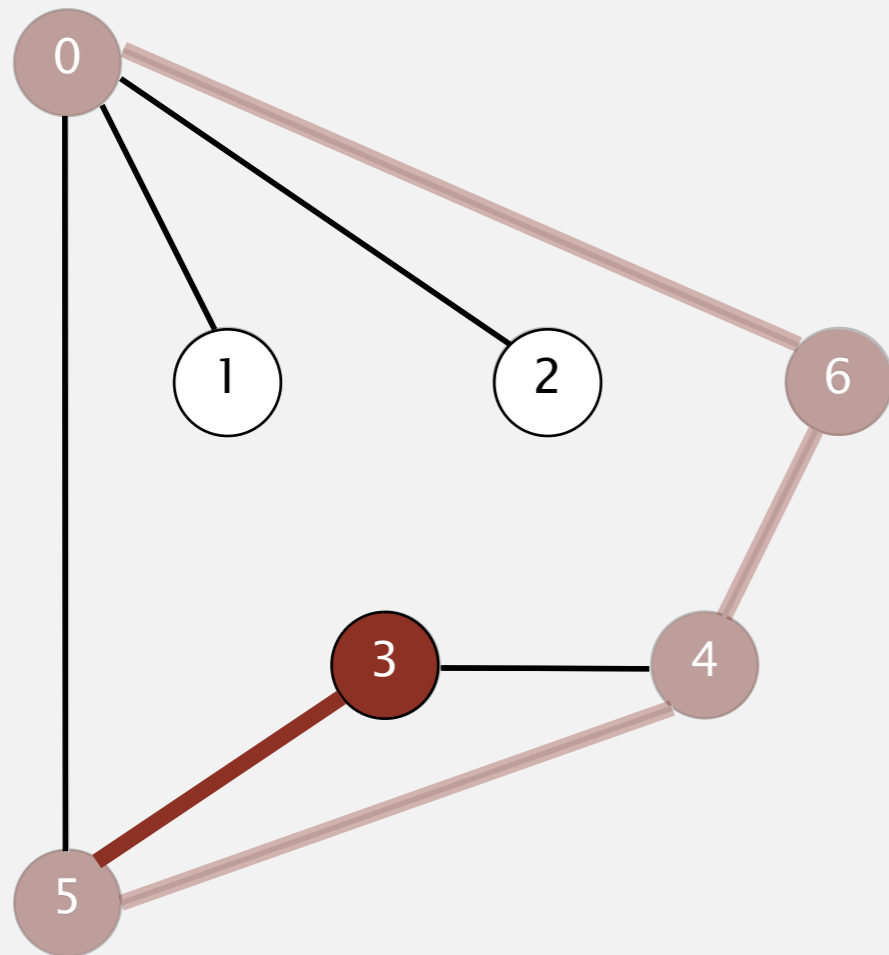
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	F	-
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 5

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



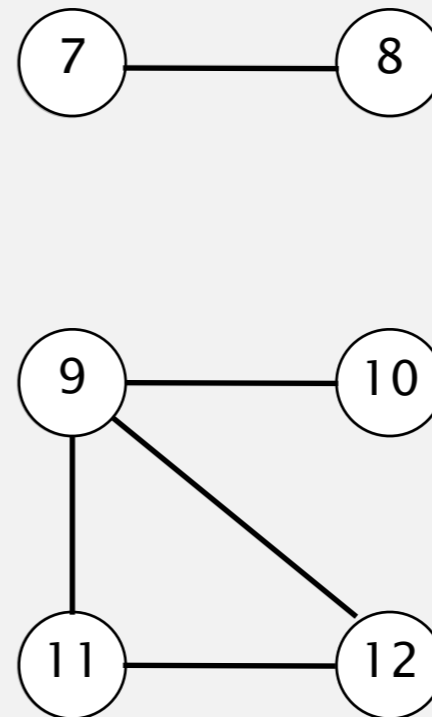
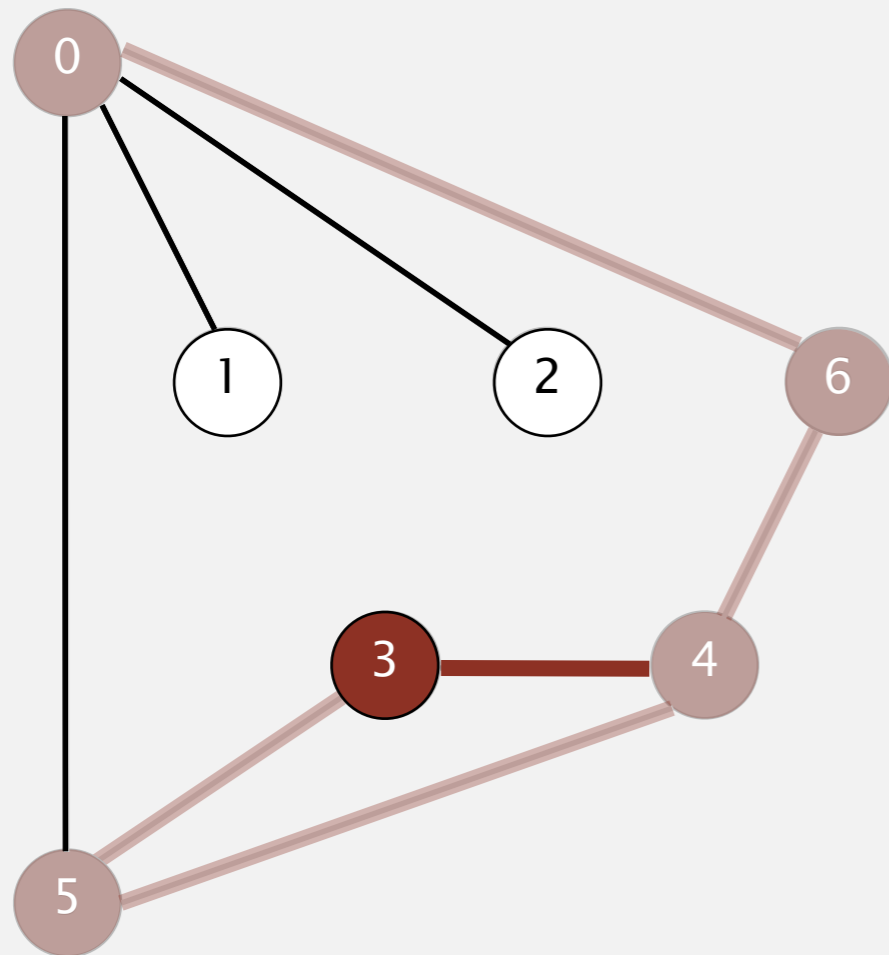
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 3

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



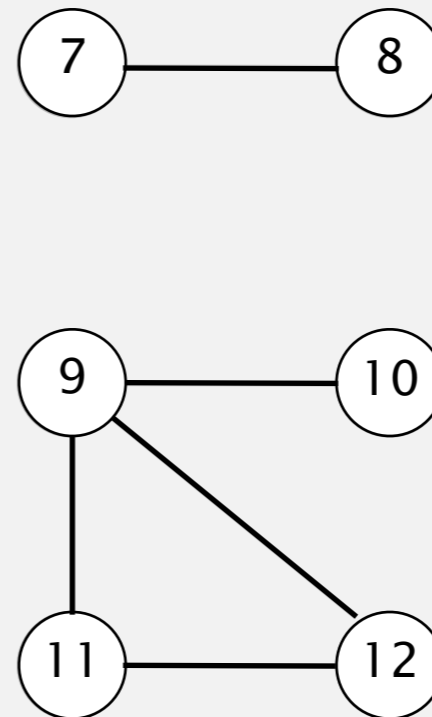
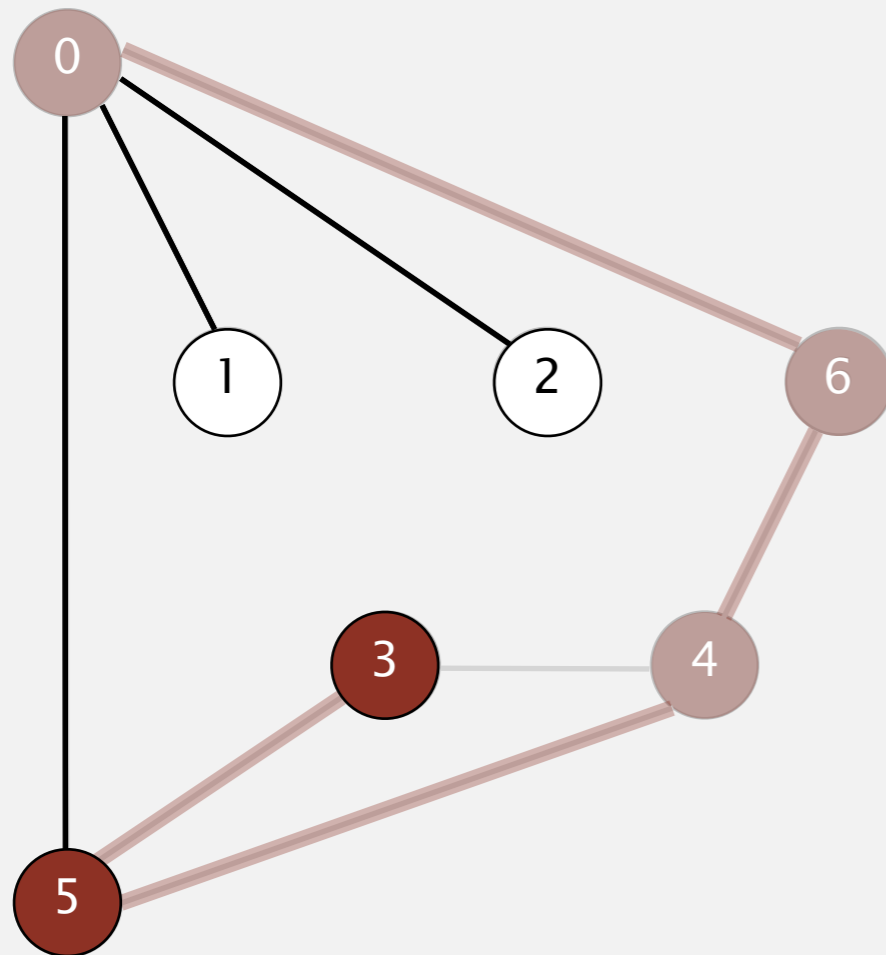
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 3

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



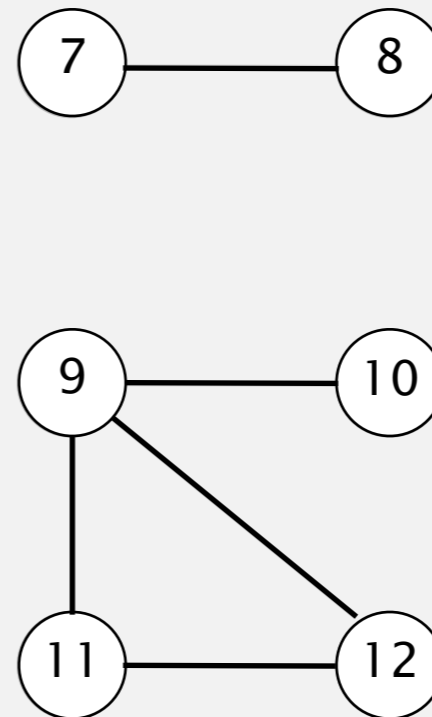
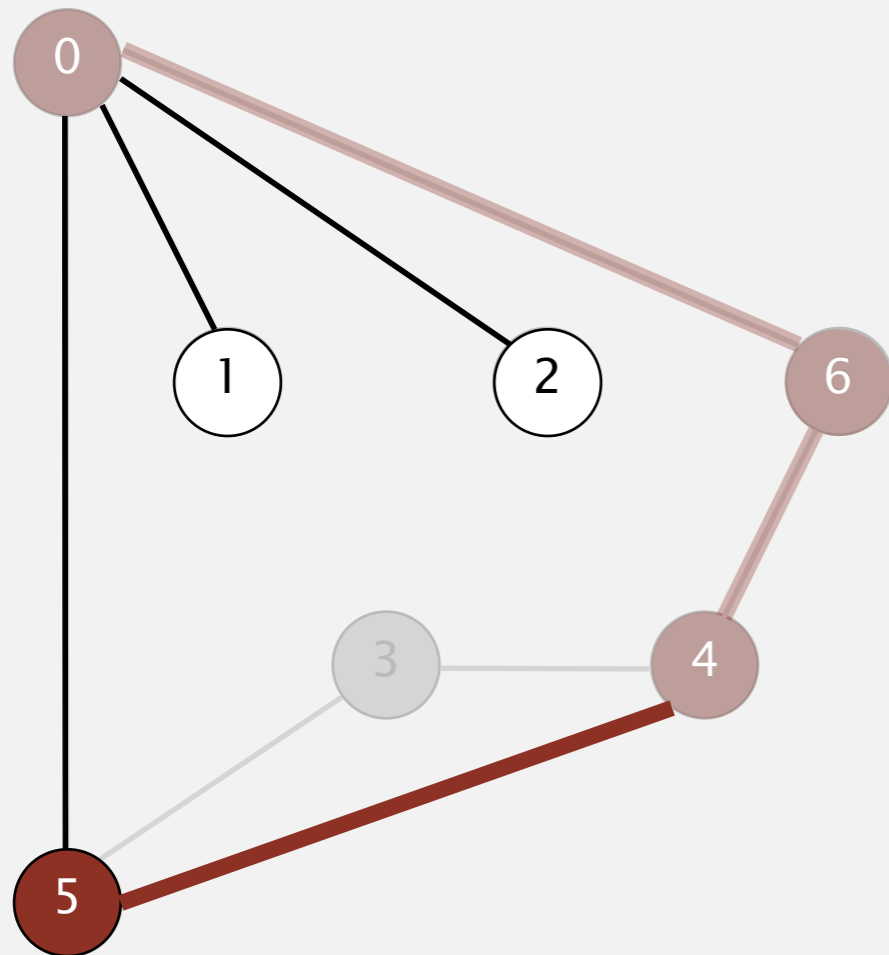
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

3 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



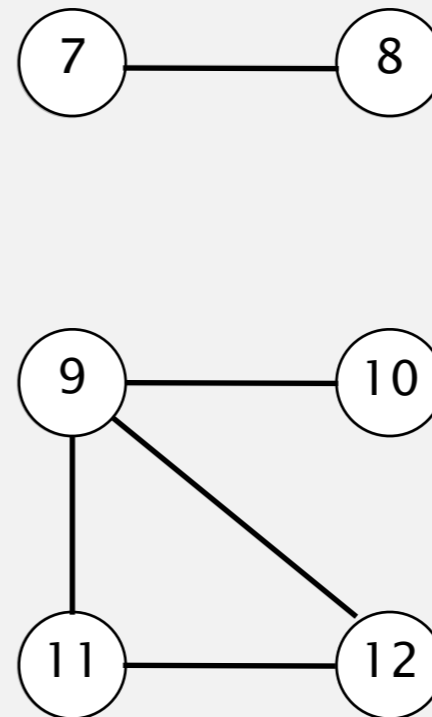
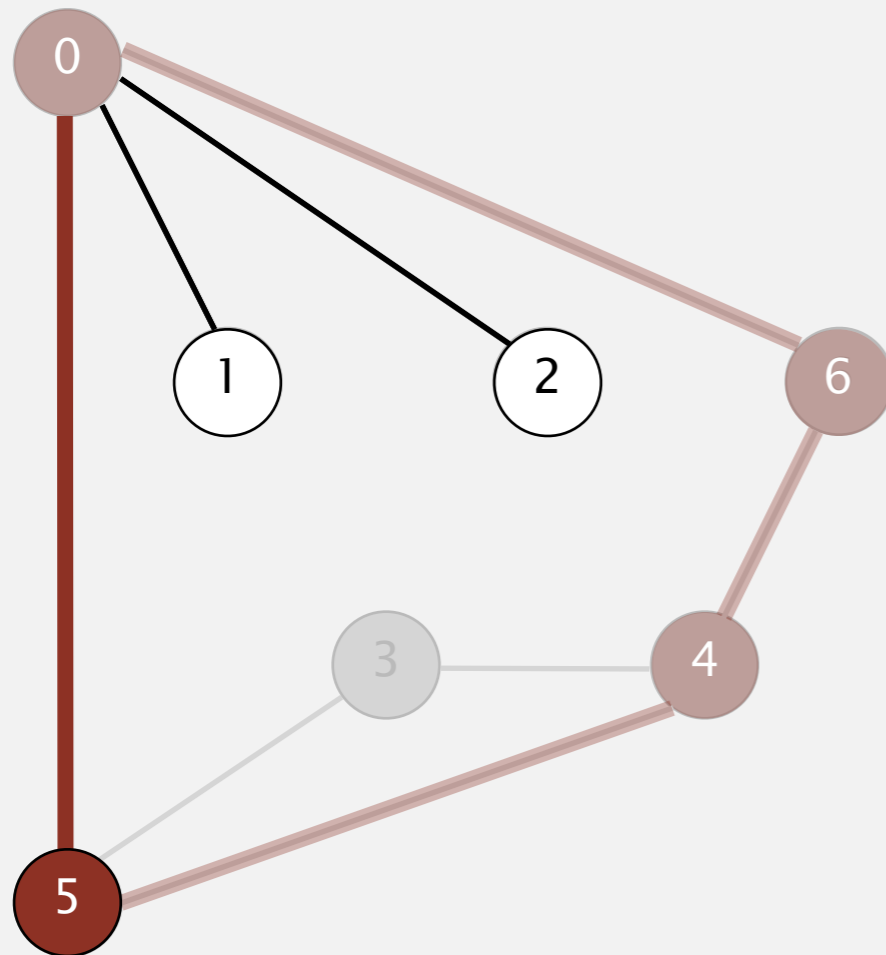
v	marked[]	edgeTo[]
0	T	—
1	F	—
2	F	—
3	T	5
4	T	6
5	T	4
6	T	0
7	F	—
8	F	—
9	F	—
10	F	—
11	F	—
12	F	—

visit 5

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



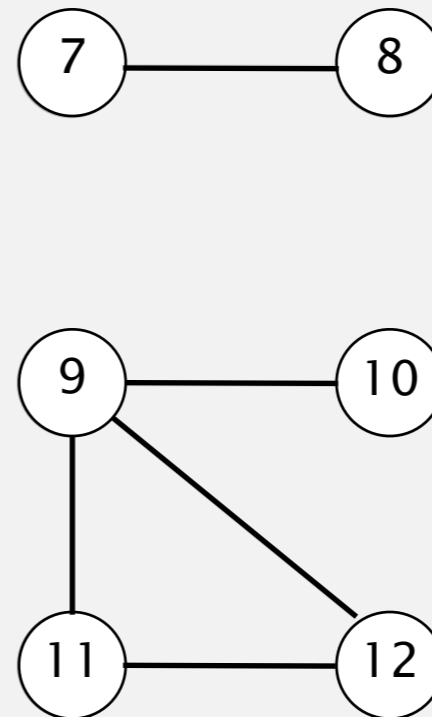
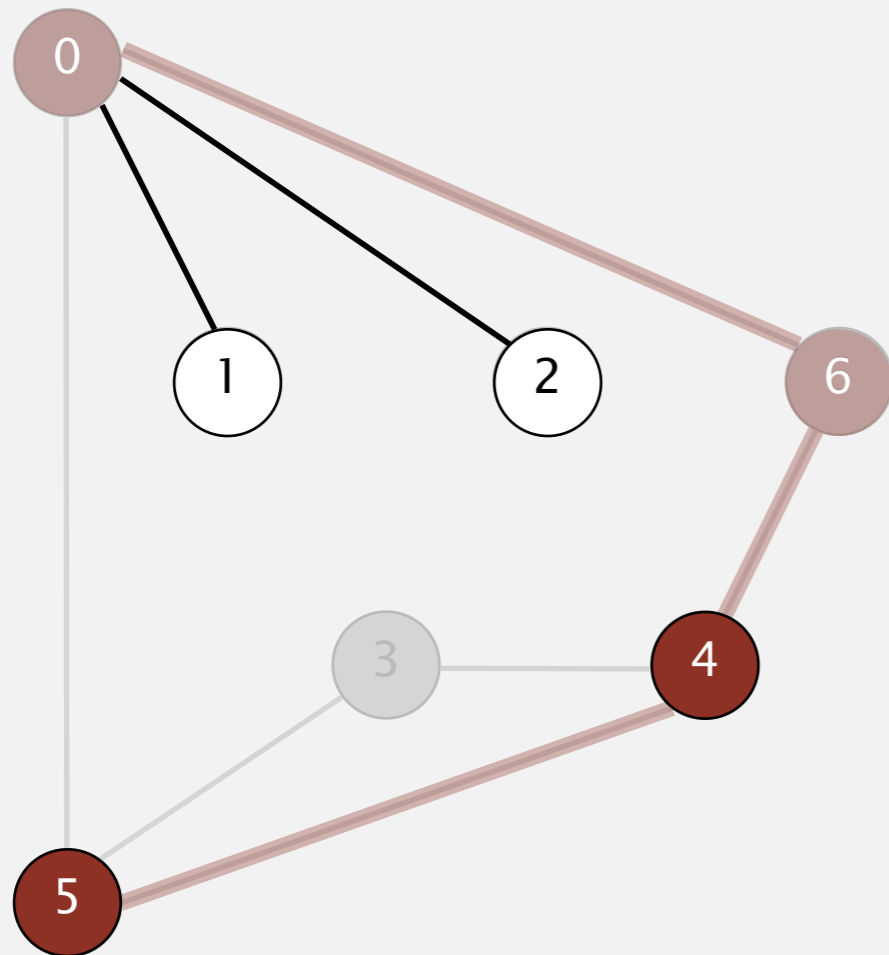
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 5

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



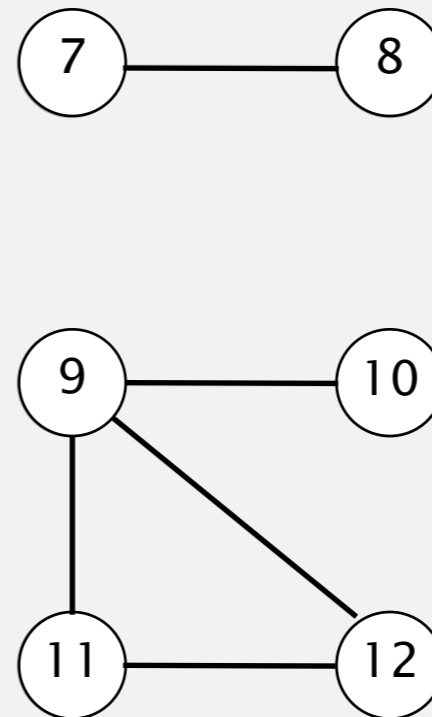
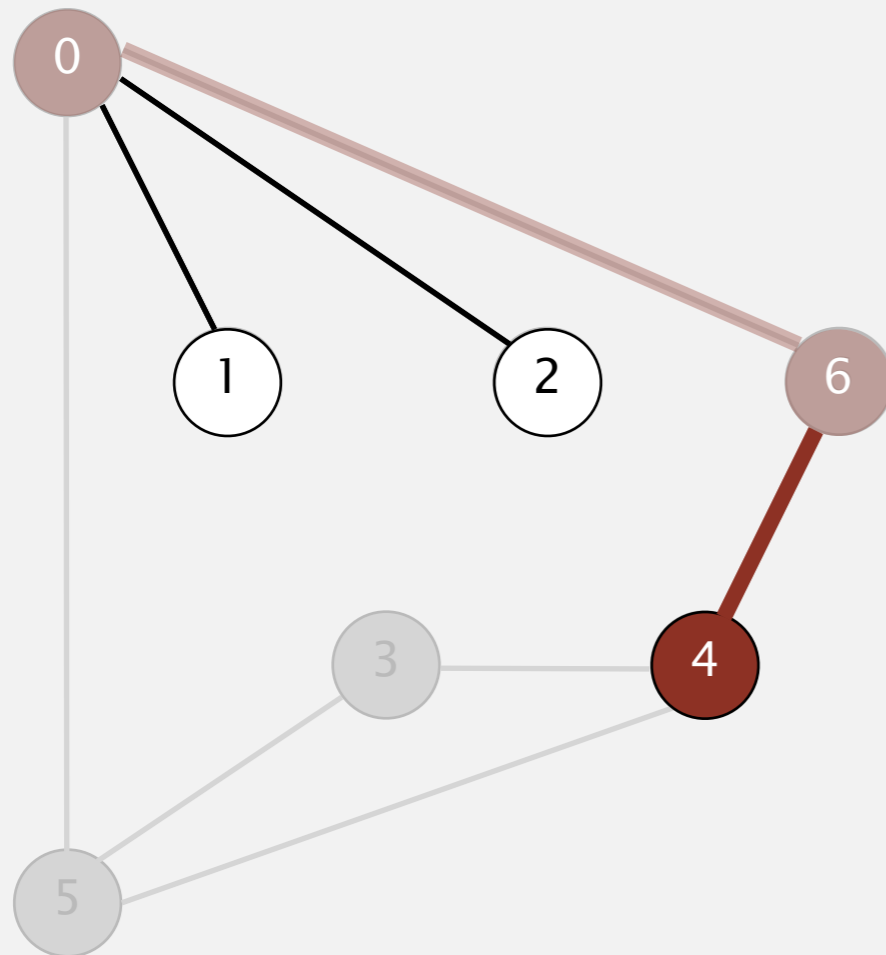
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

5 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



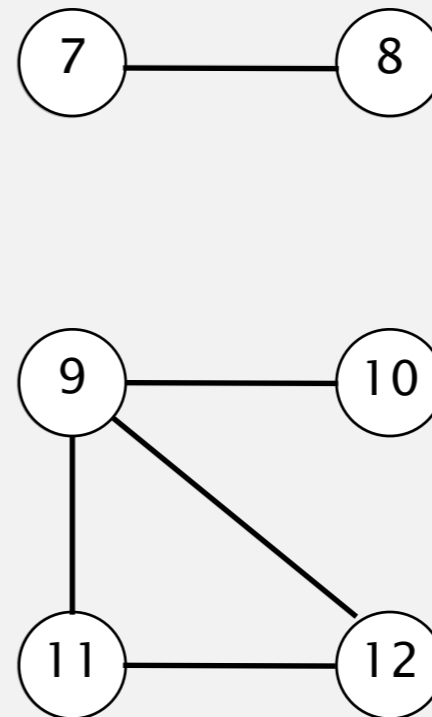
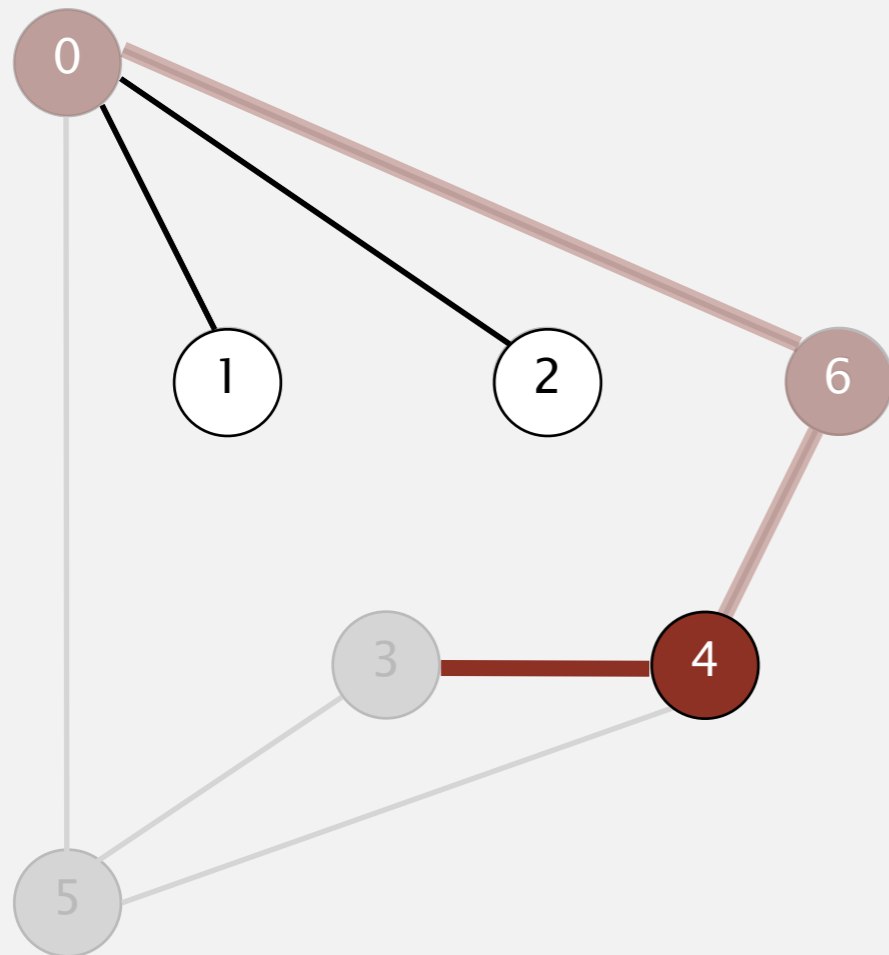
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 4

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



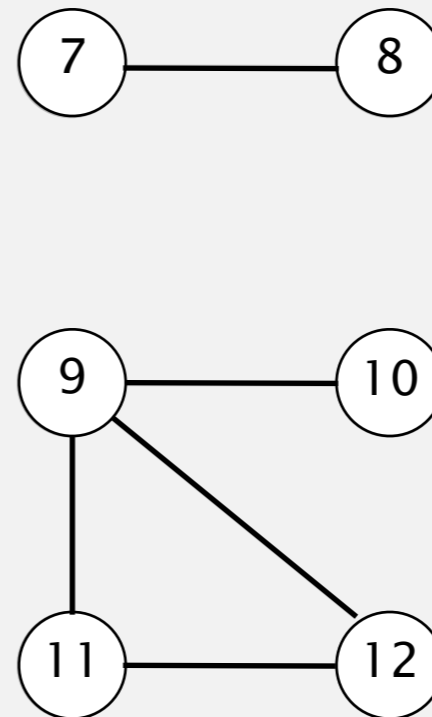
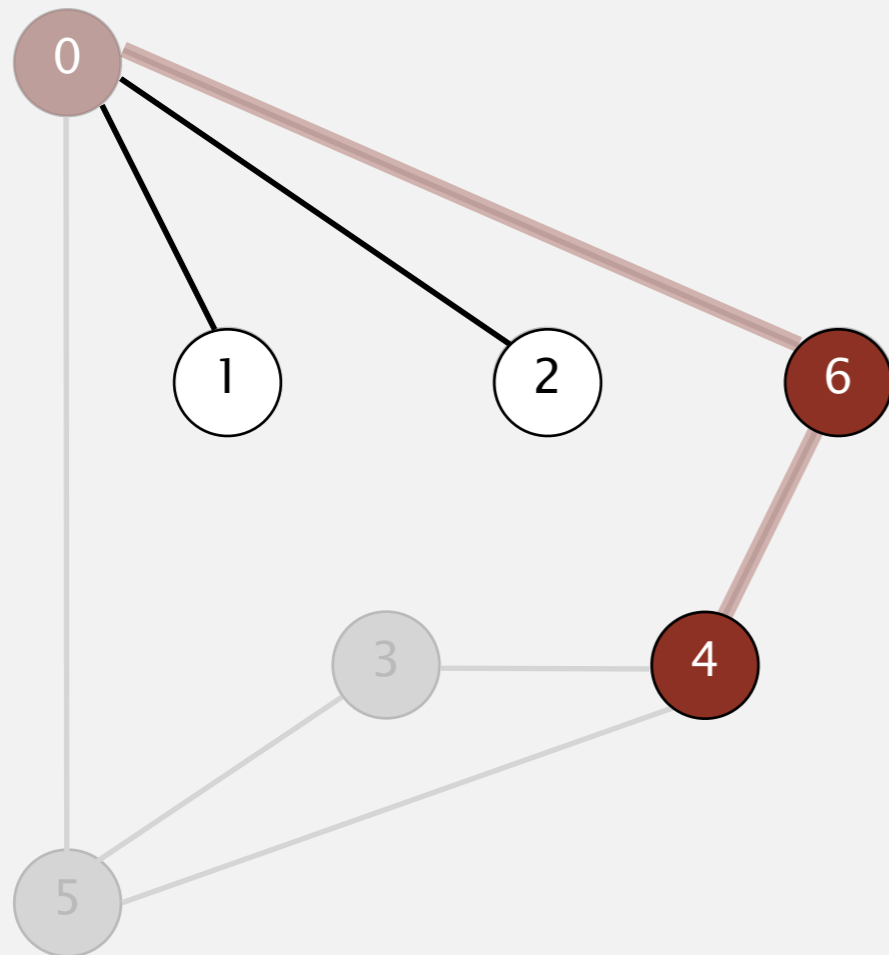
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 4

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



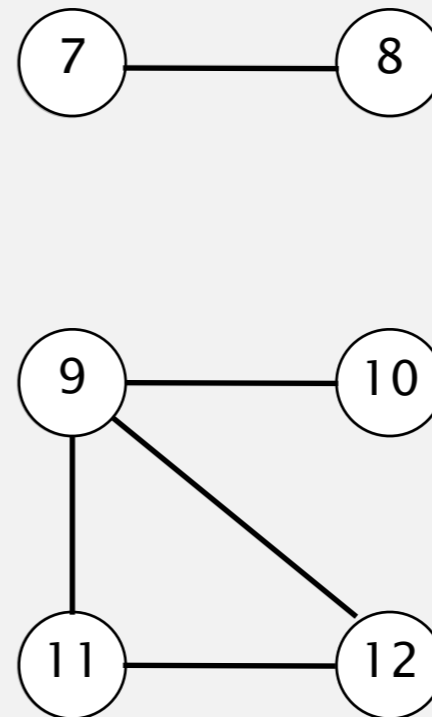
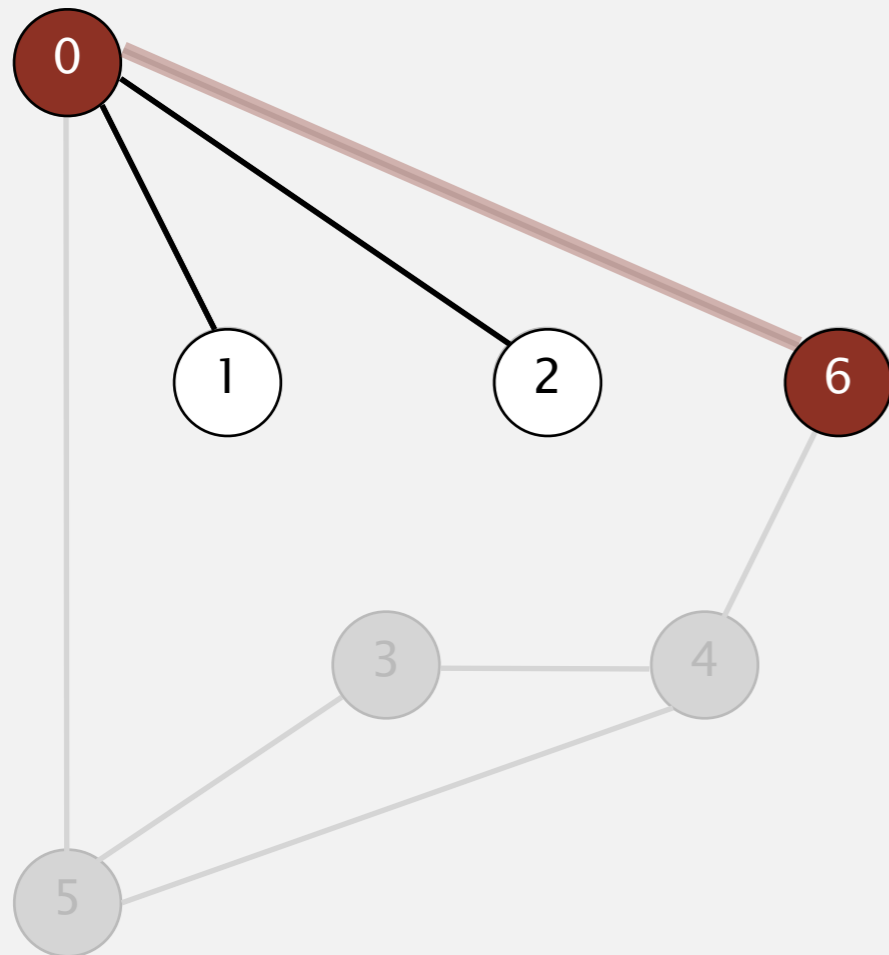
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

4 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



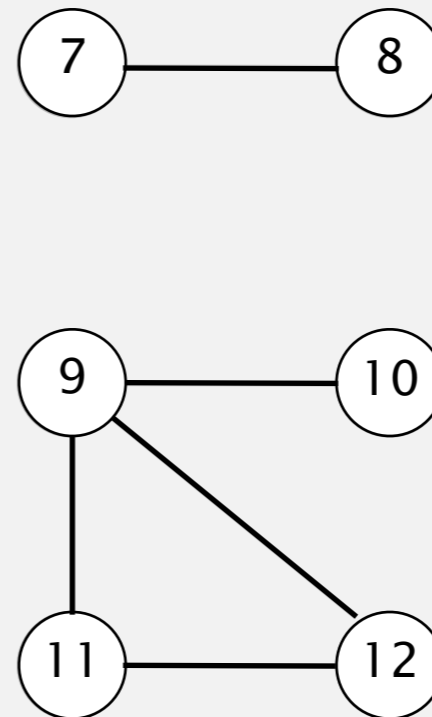
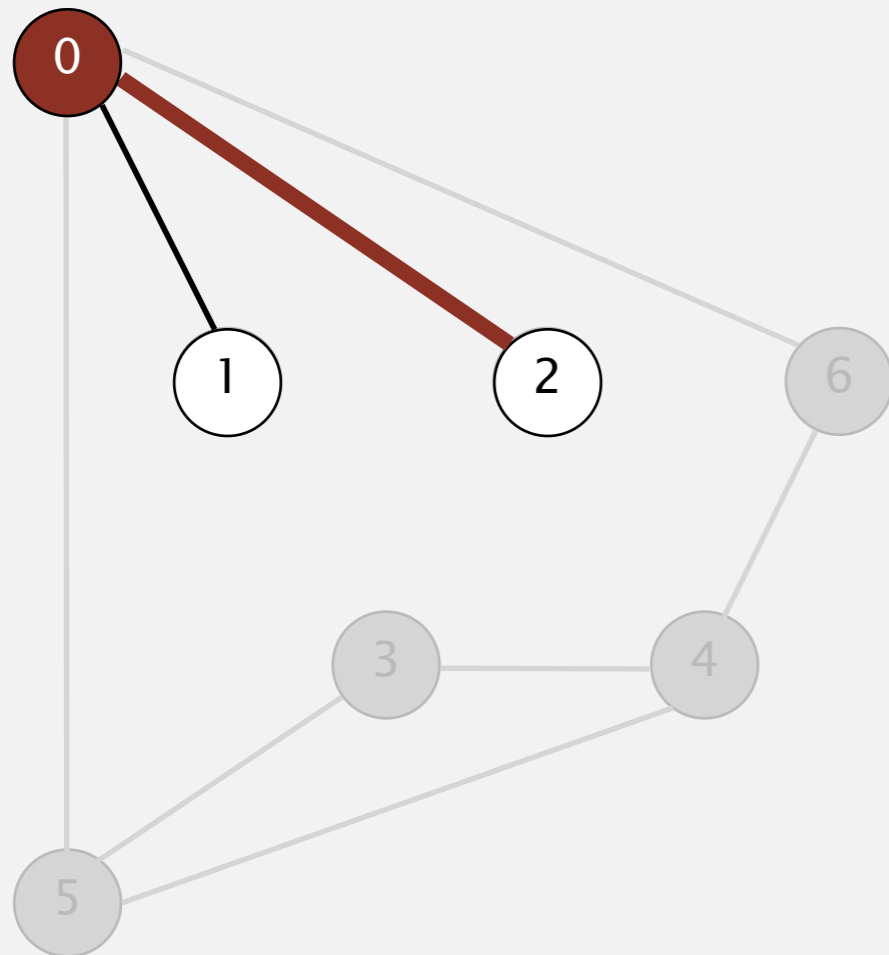
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

6 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



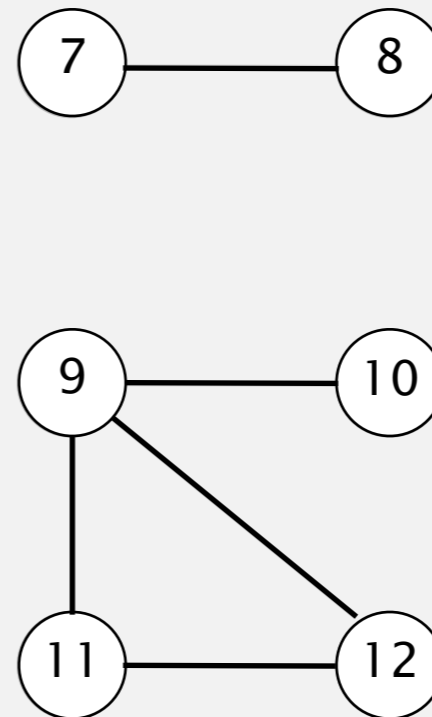
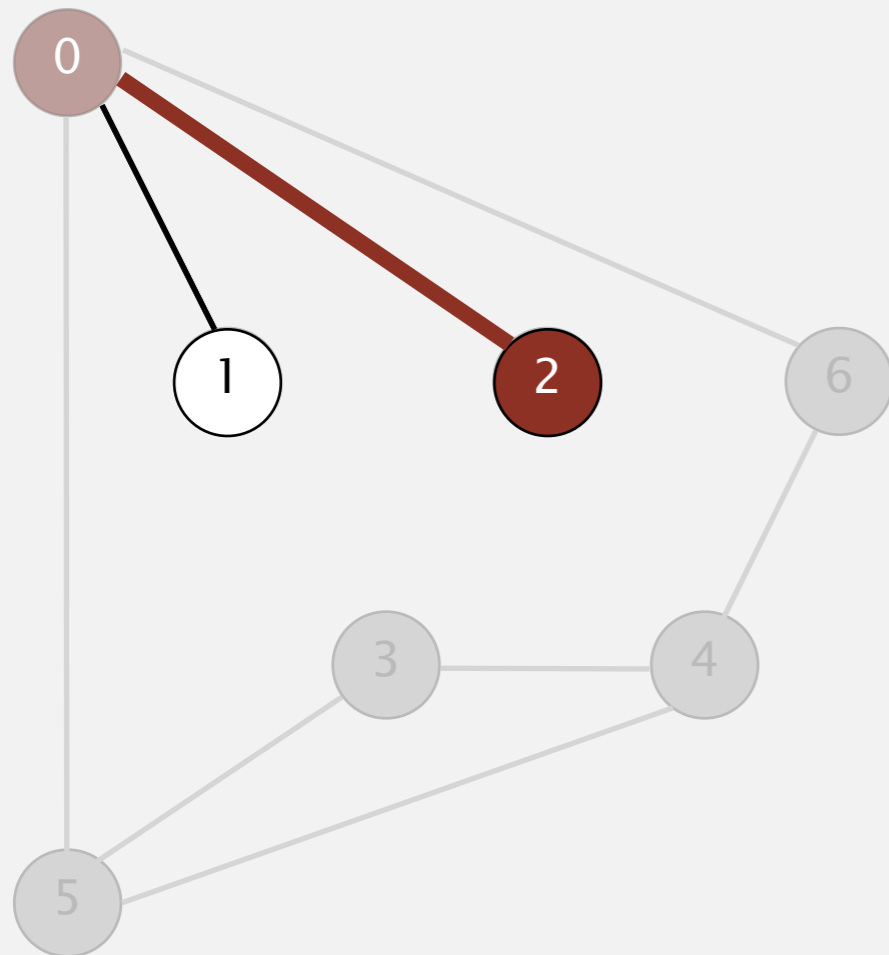
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	F	-
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 0

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



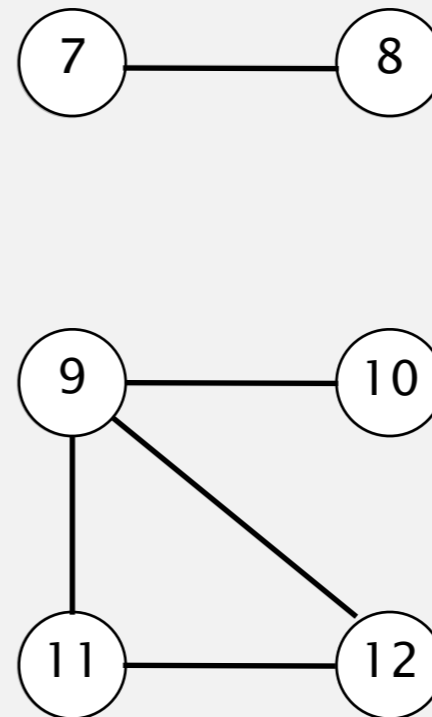
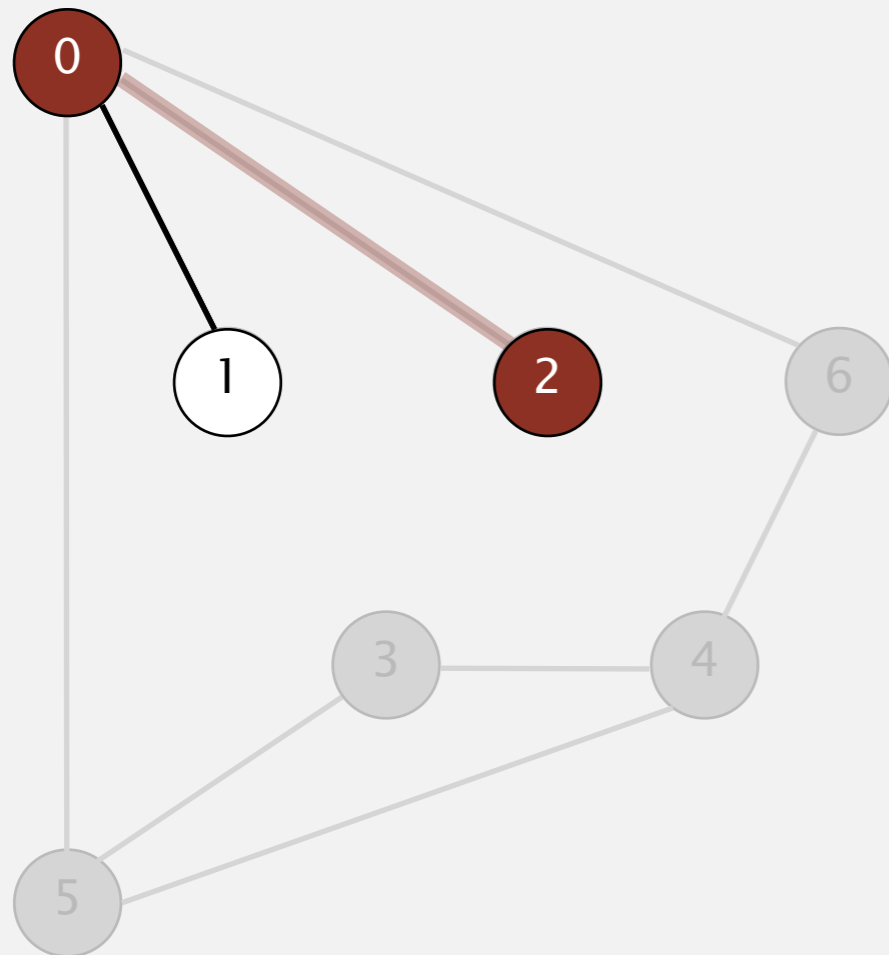
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 2

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



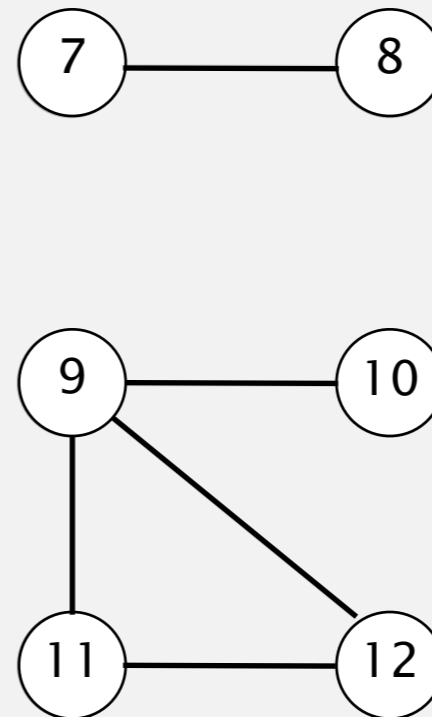
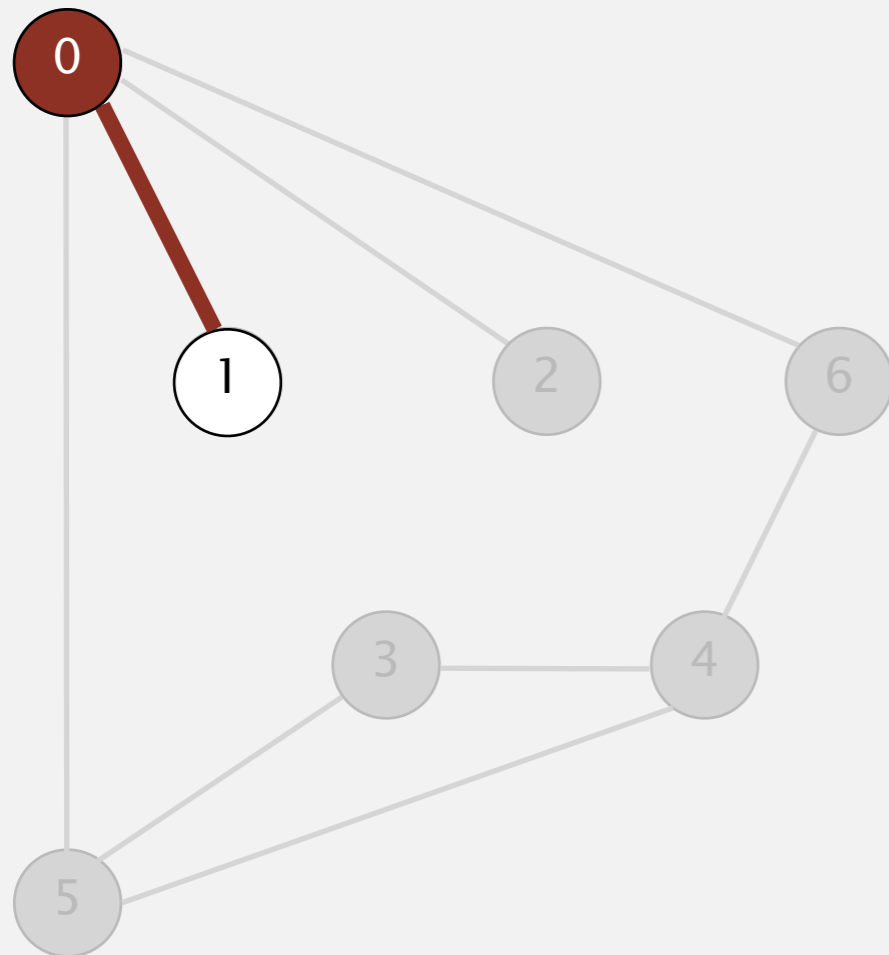
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

2 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



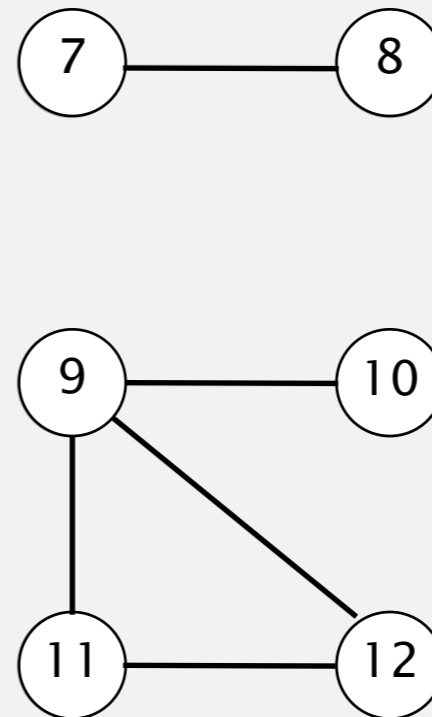
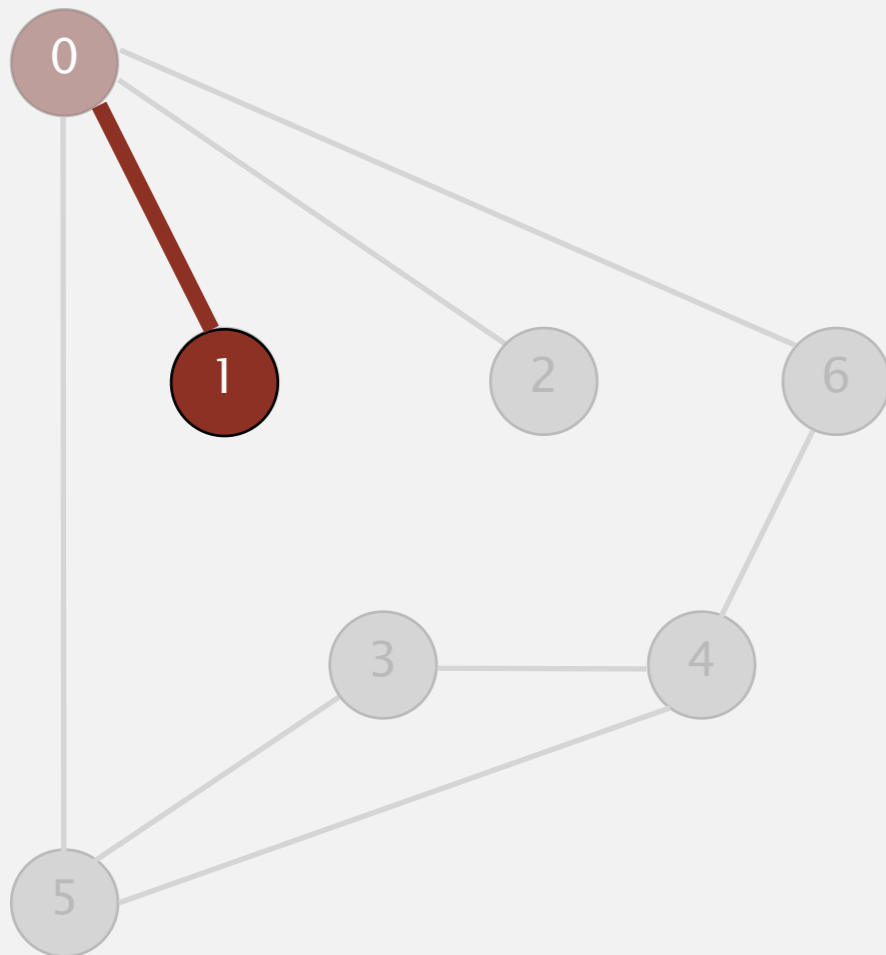
v	marked[]	edgeTo[]
0	T	-
1	F	-
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 0

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



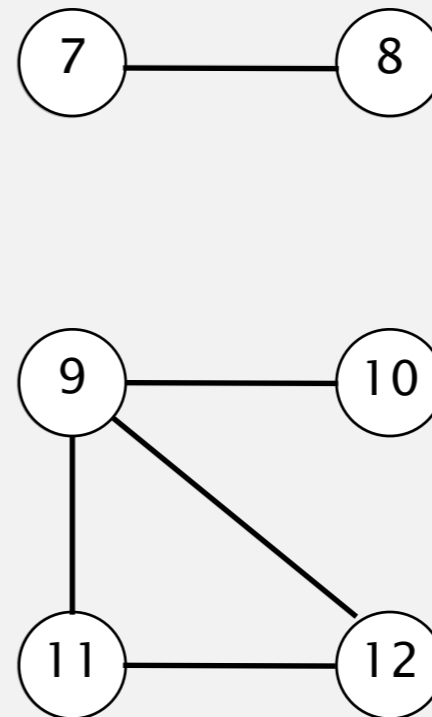
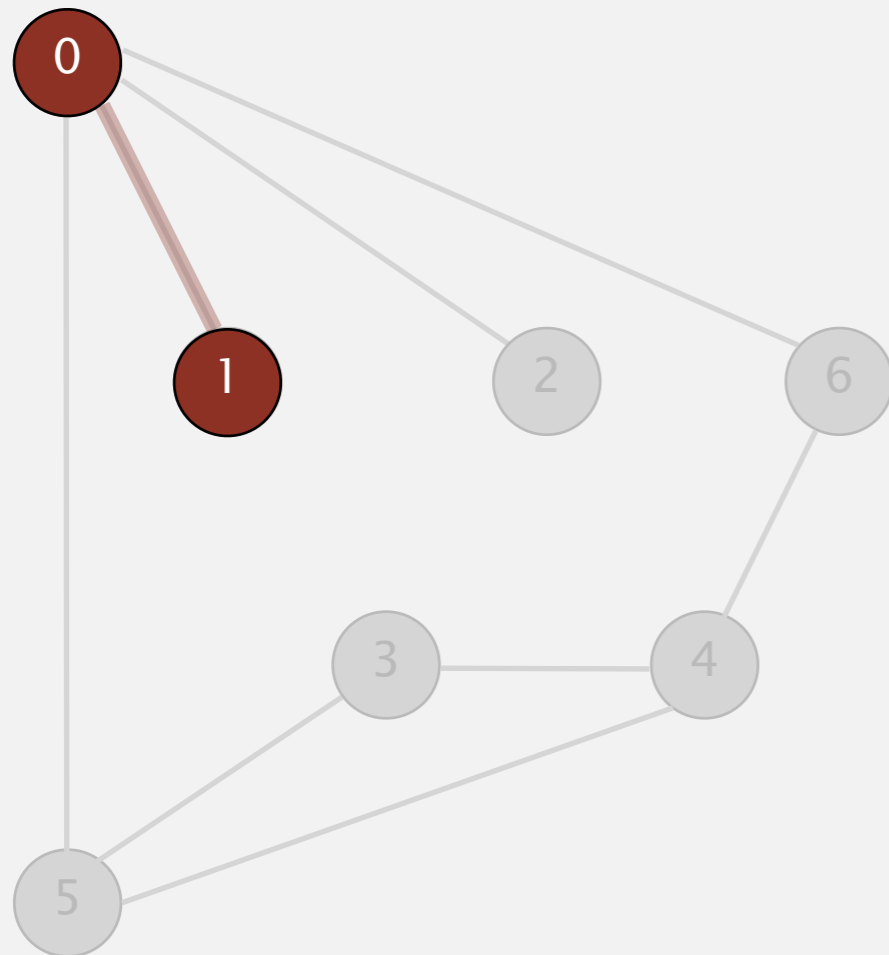
v	marked[]	edgeTo[]
0	T	-
1	T	0
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

visit 1

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



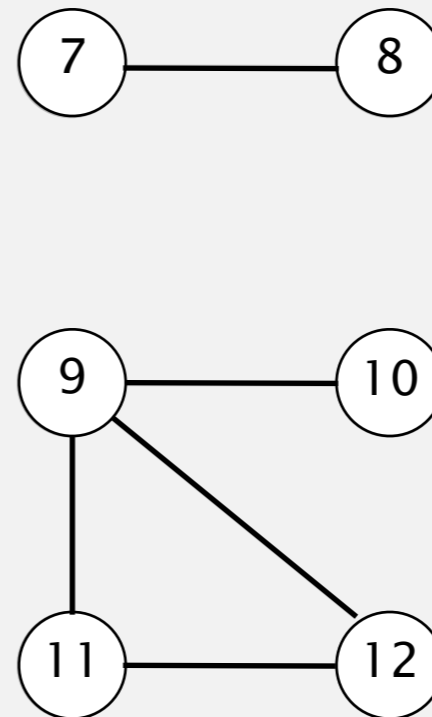
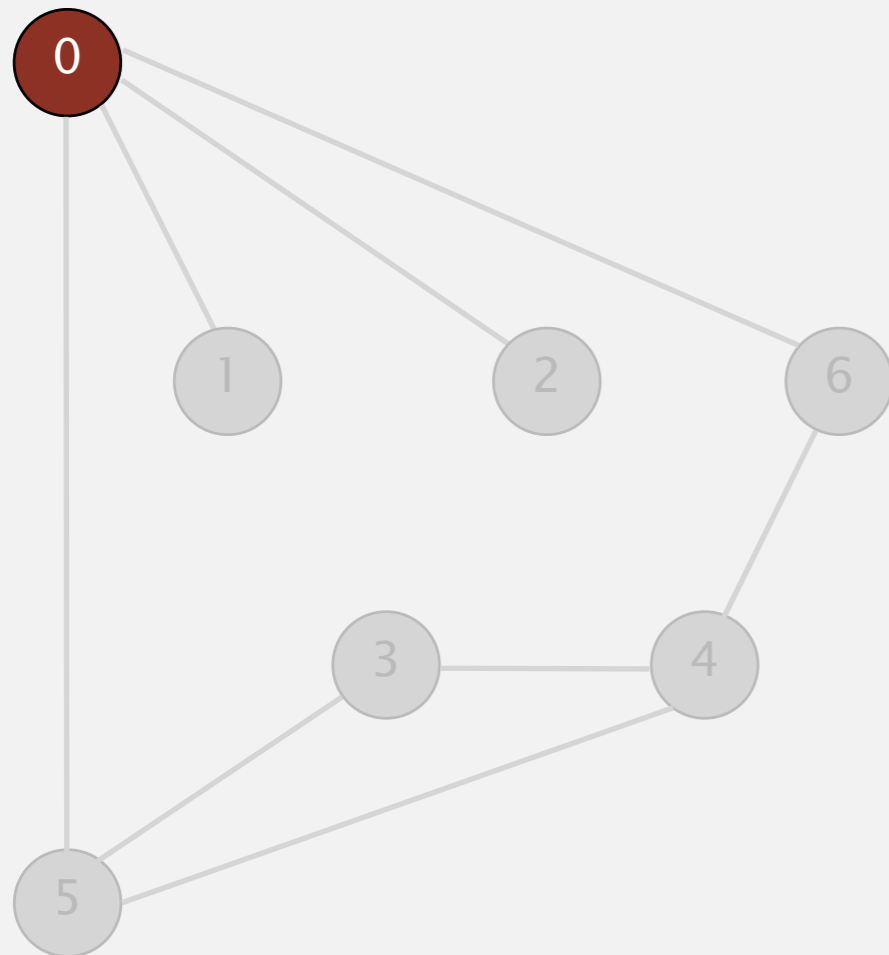
v	marked[]	edgeTo[]
0	T	-
1	T	0
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

1 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



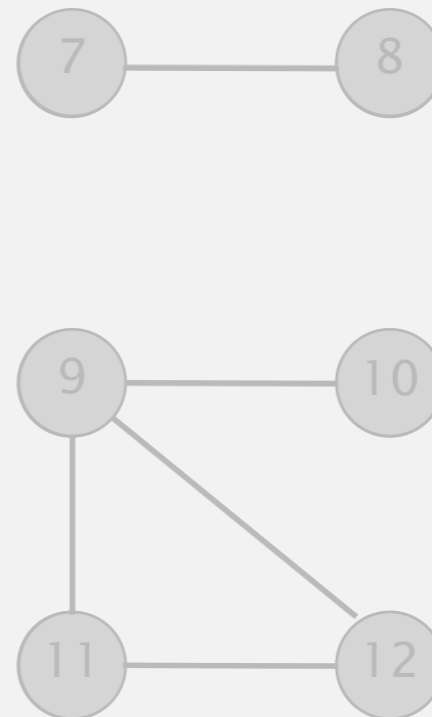
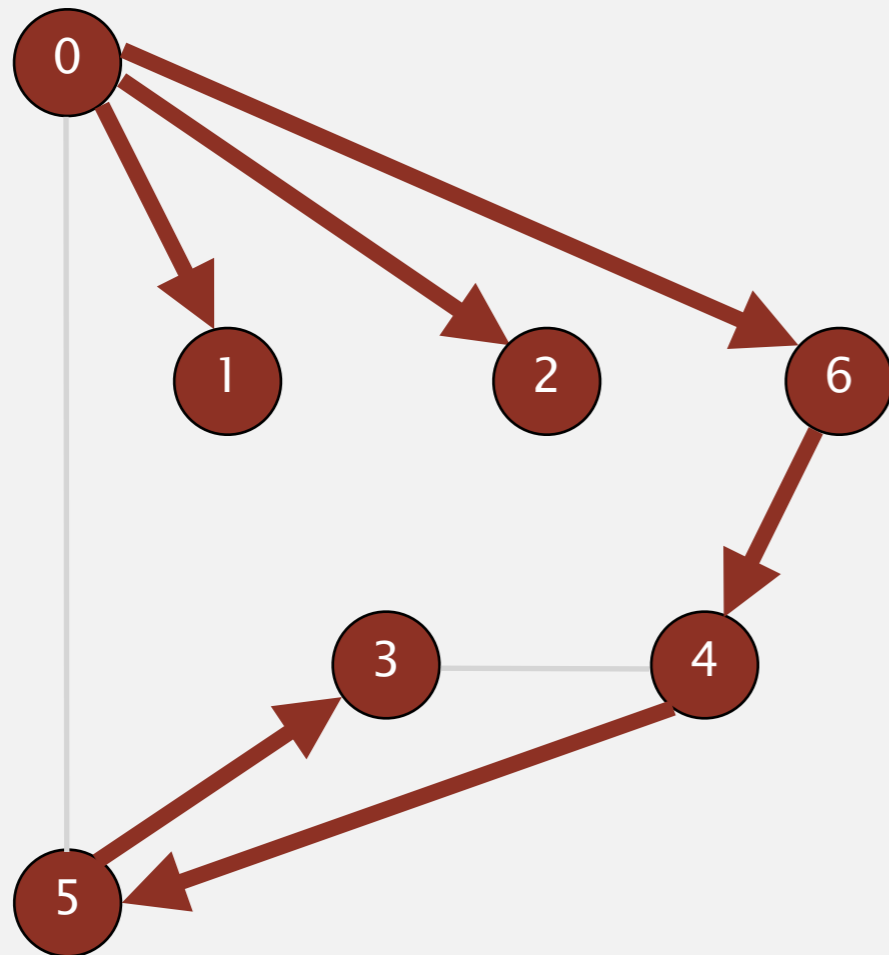
v	marked[]	edgeTo[]
0	T	-
1	T	0
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

0 done

Depth-first search demo

To visit a vertex v :

- Mark vertex v as visited.
- Recursively visit all unmarked vertices adjacent to v .



v	marked[]	edgeTo[]
0	T	-
1	T	0
2	T	0
3	T	5
4	T	6
5	T	4
6	T	0
7	F	-
8	F	-
9	F	-
10	F	-
11	F	-
12	F	-

vertices reachable from 0