Algorithms ROBERT SEDGEWICK | KEVIN WAYNE

Algorithms

FOURTH EDITION

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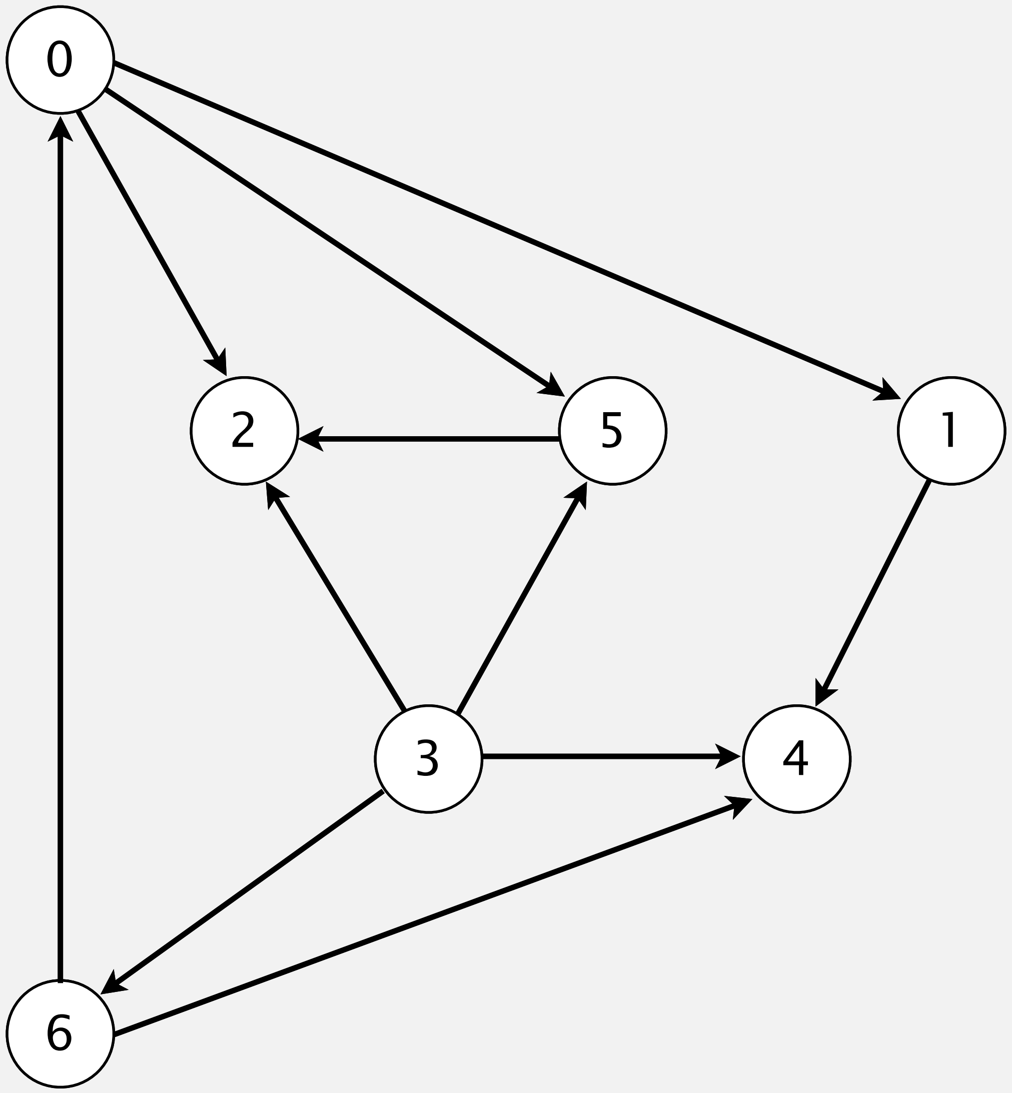
http://algs4.cs.princeton.edu

4.2 TOPOLOGICAL SORT

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



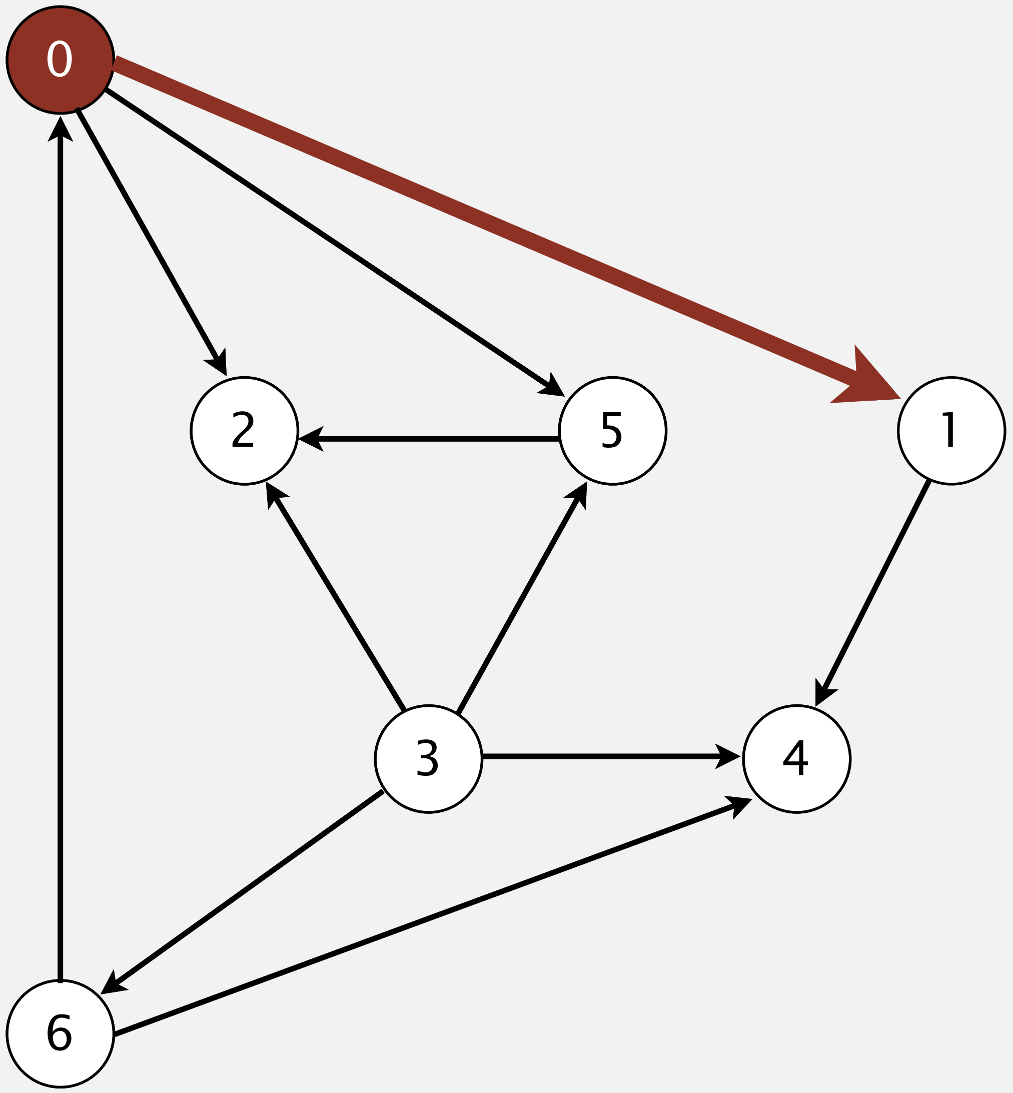
a directed acyclic graph

tinyDAG7.txt

```
7
11
  0   5
  0   2
  0   1
  3   6
  3   5
  3   4
  5   2
  6   4
  6   0
  3   2
```

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



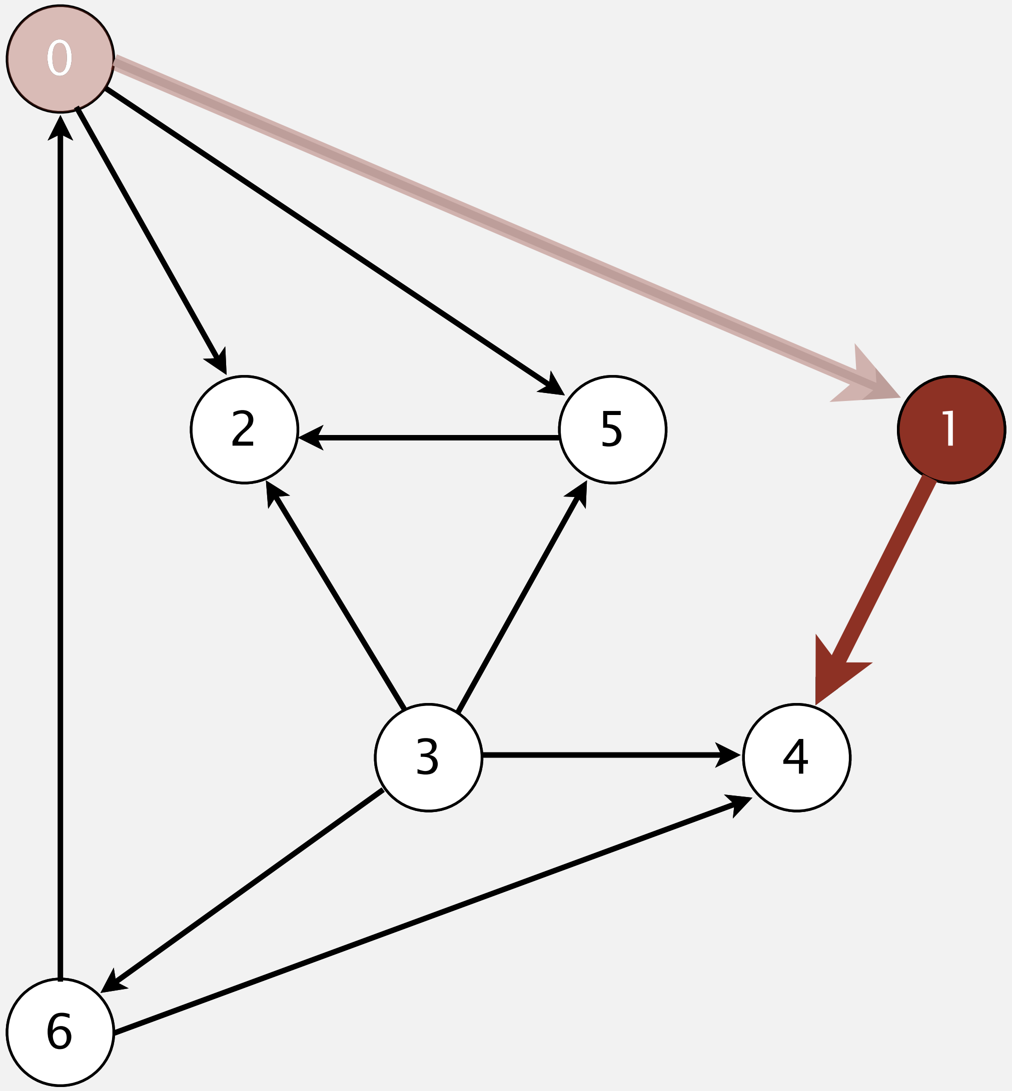
postorder

v	marked[]
0	T
1	F
2	F
3	F
4	F
5	F
6	F

visit 0: check 1, check 2, and check 5

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



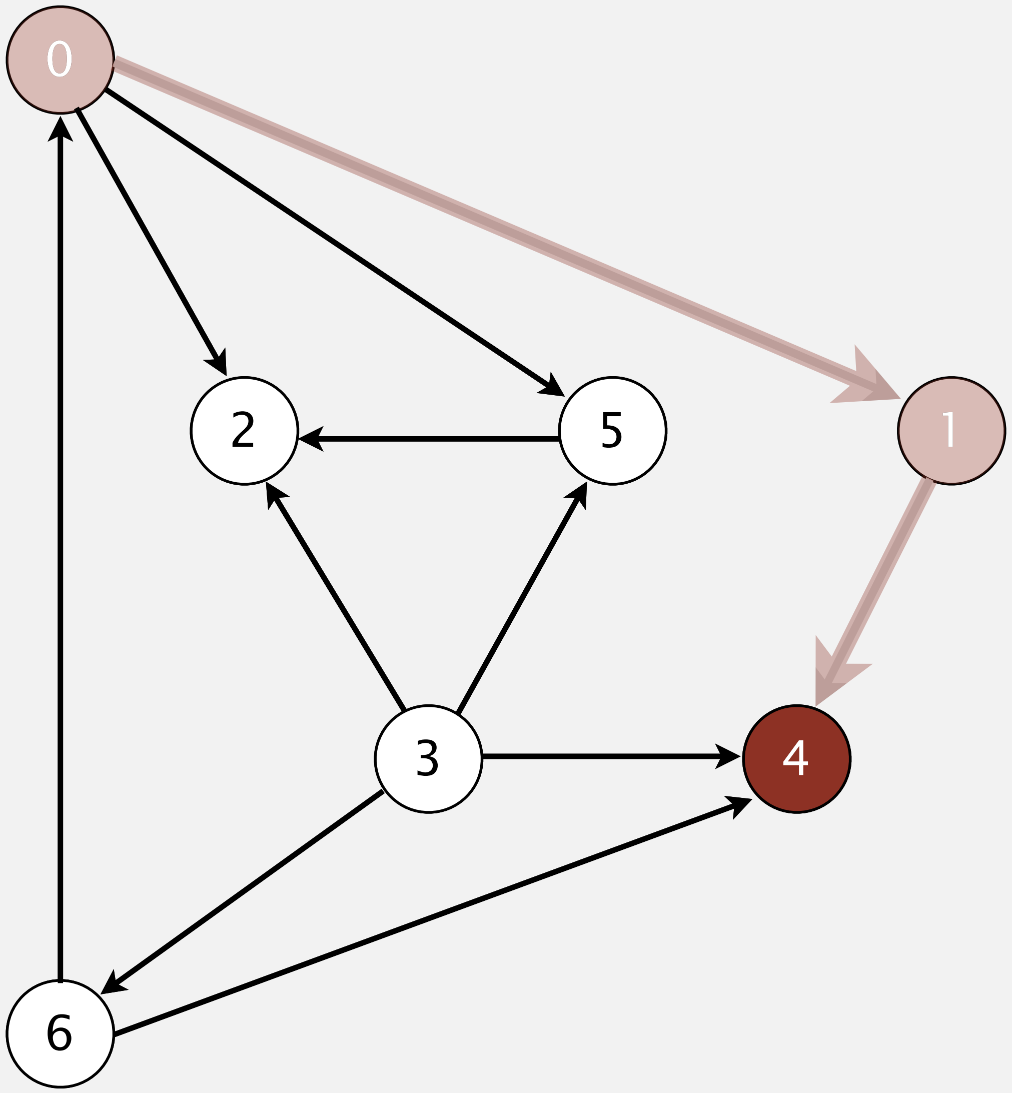
postorder

v	marked[]
0	T
1	T
2	F
3	F
4	F
5	F
6	F

visit 1: check 4

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



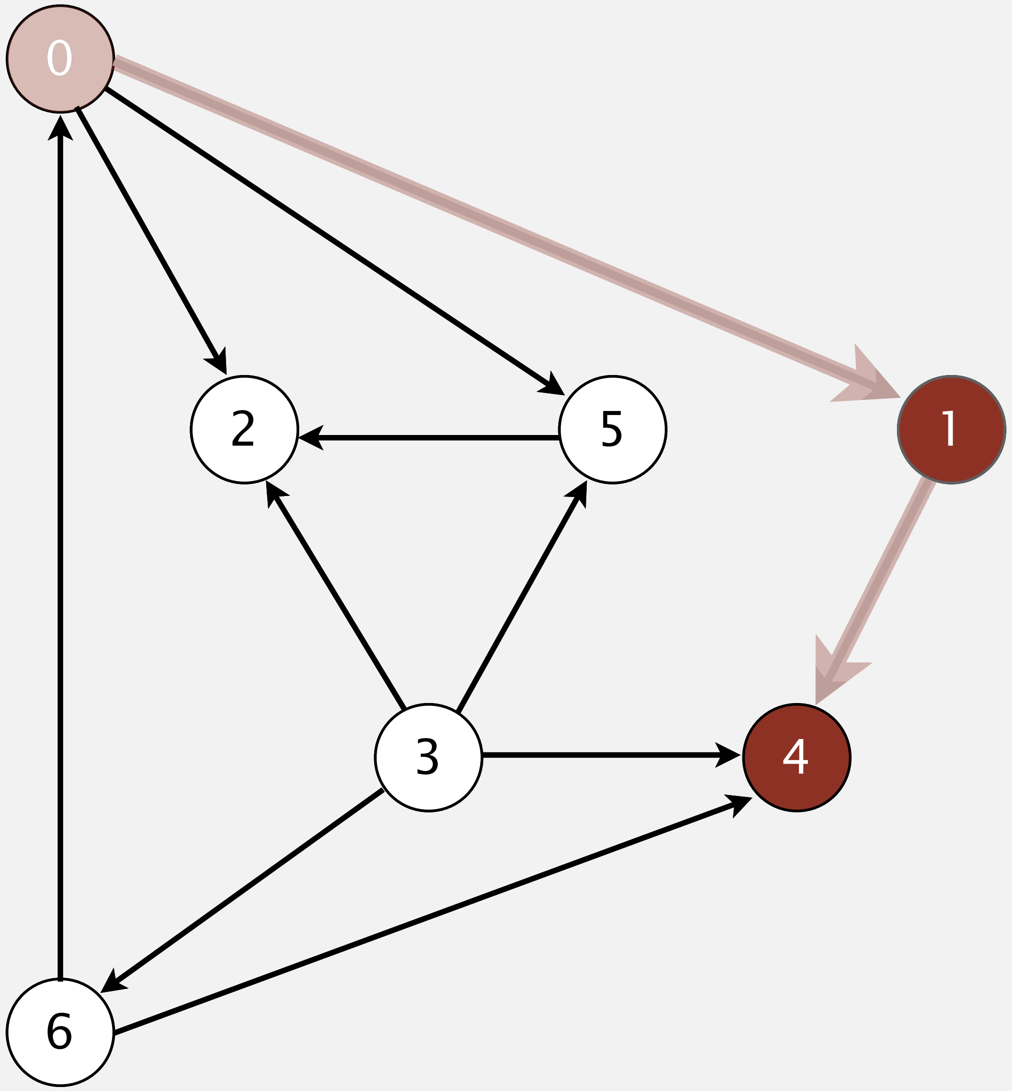
postorder

v	marked[]
0	T
1	T
2	F
3	F
4	T
5	F
6	F

visit 4

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

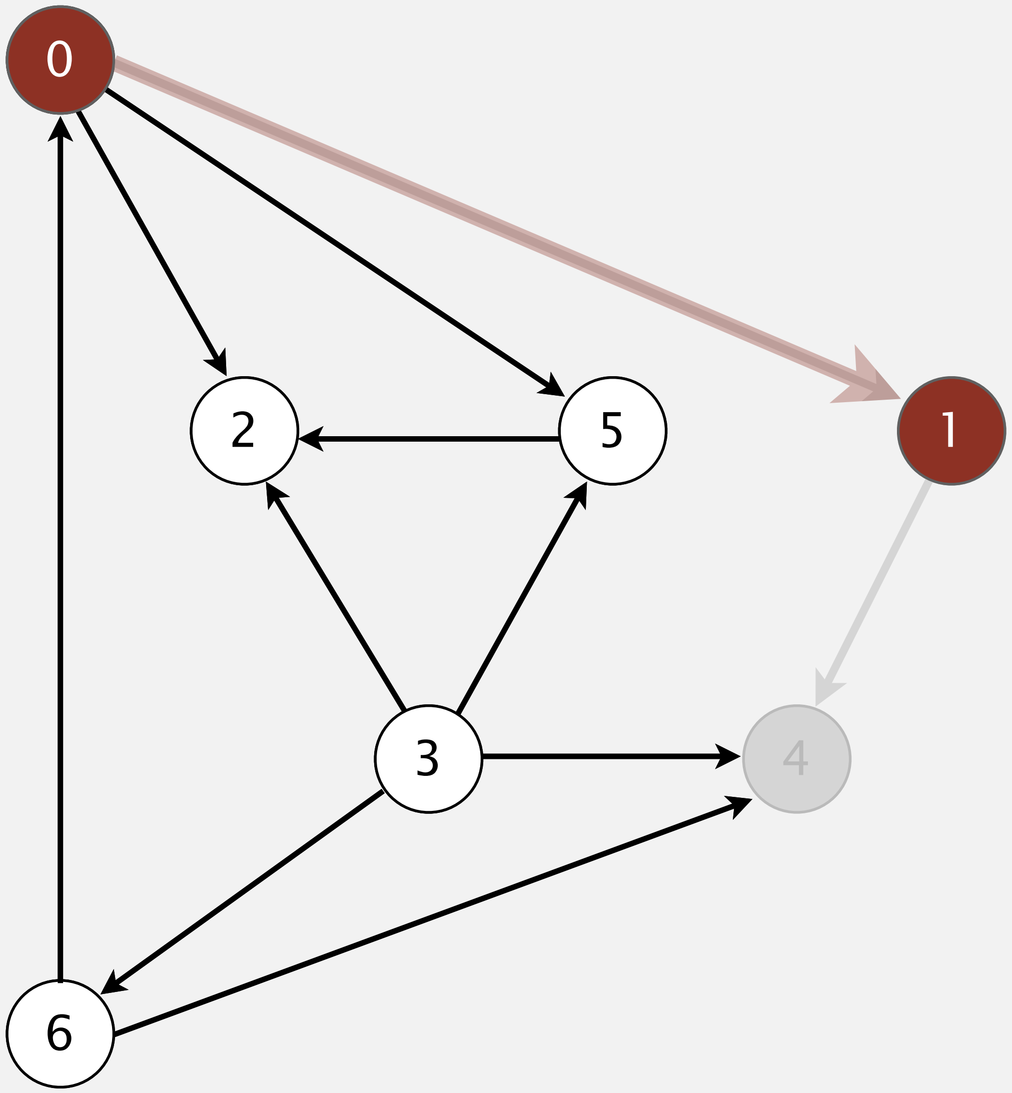
4

v	marked[]
0	T
1	T
2	F
3	F
4	T
5	F
6	F

4 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

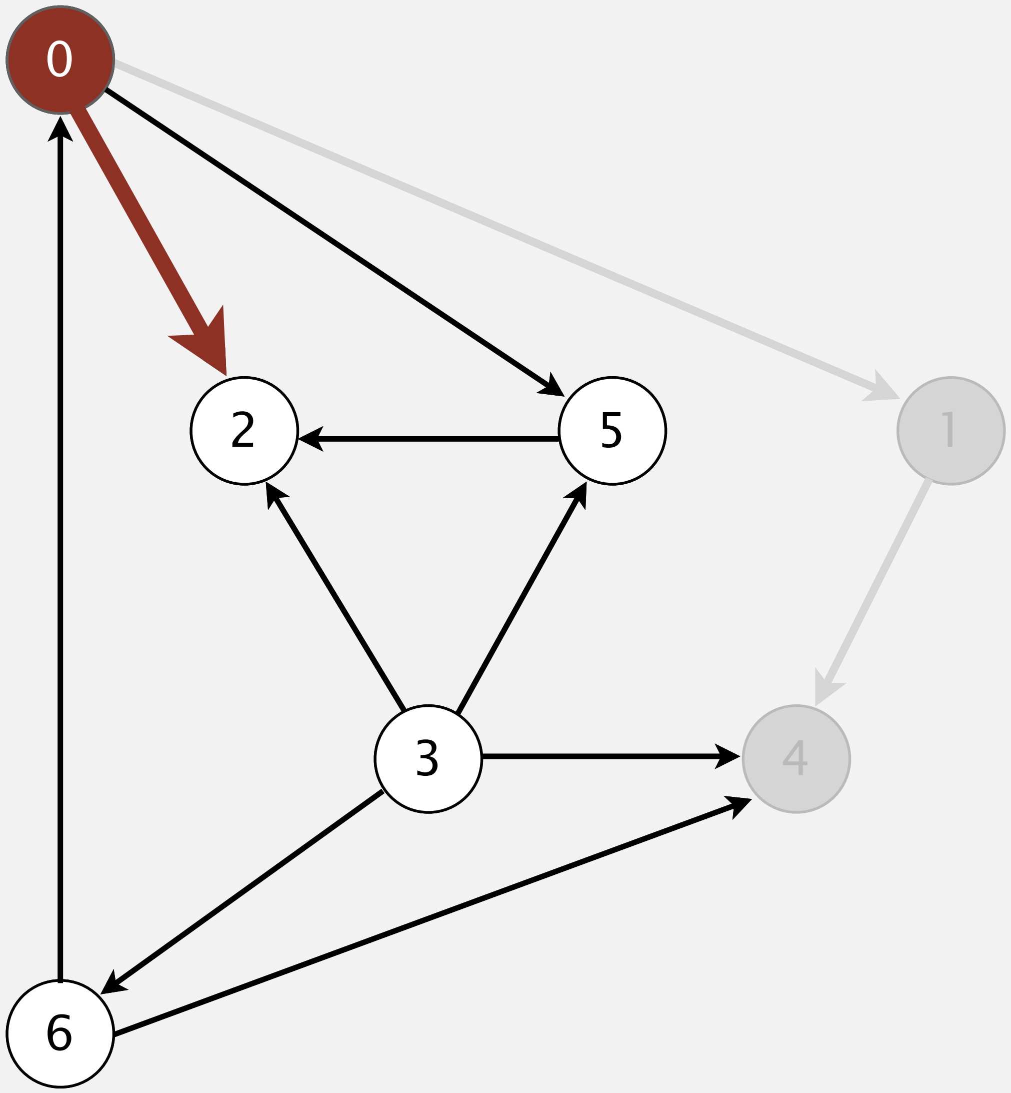
4 1

v	marked[]
0	T
1	T
2	F
3	F
4	T
5	F
6	F

1 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

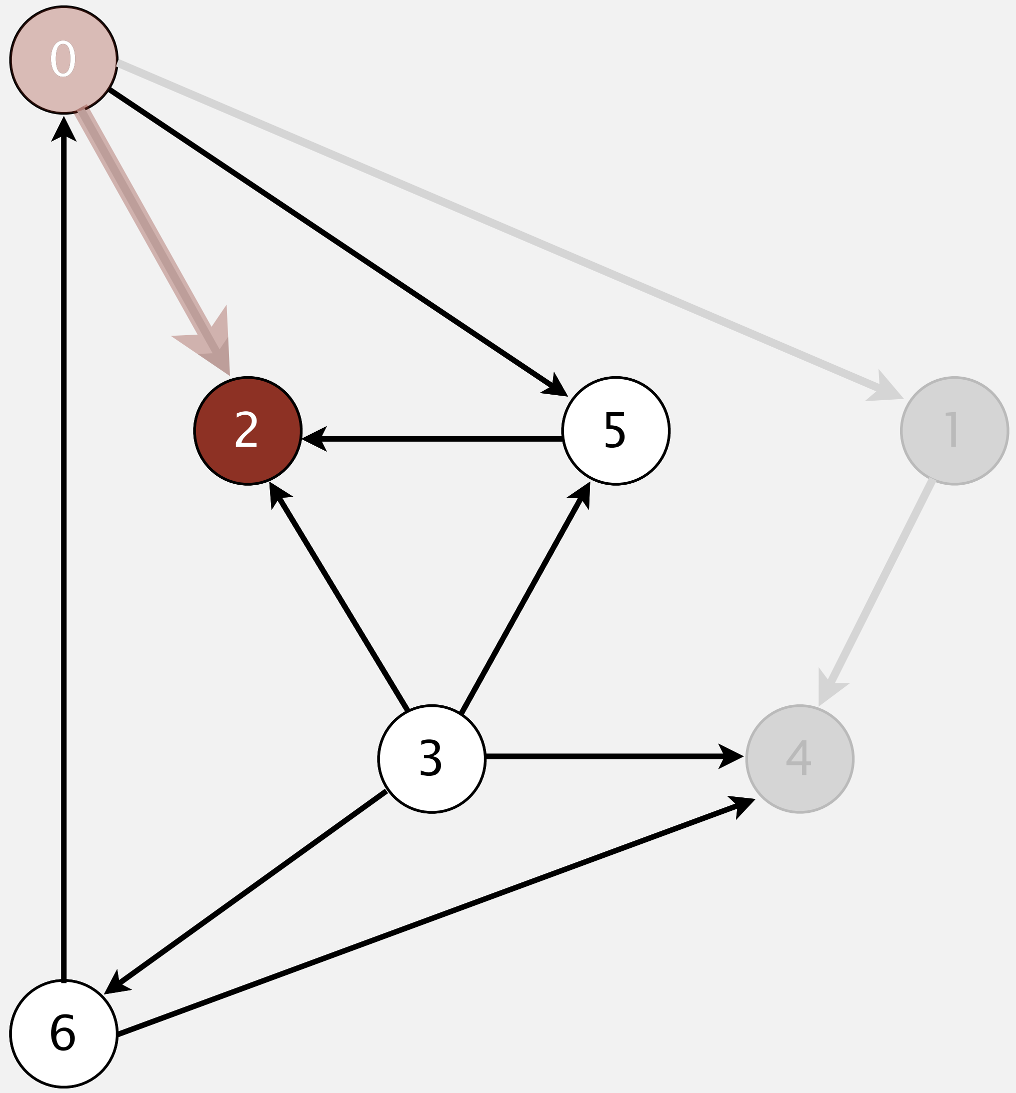
4 1

v	marked[]
0	T
1	T
2	F
3	F
4	T
5	F
6	F

visit 0: check 1, **check 2**, and check 5

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

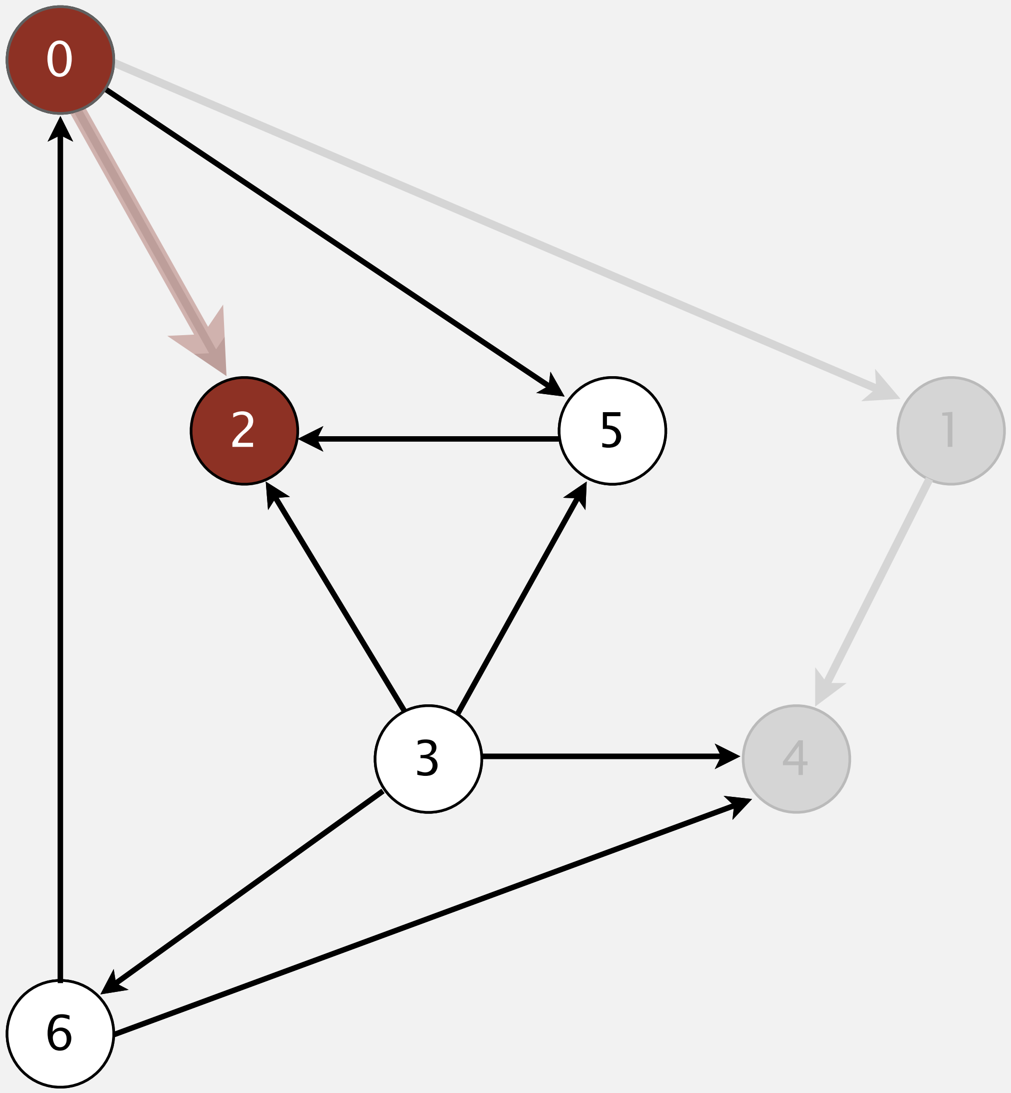
4 1

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	F
6	F

visit 2

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

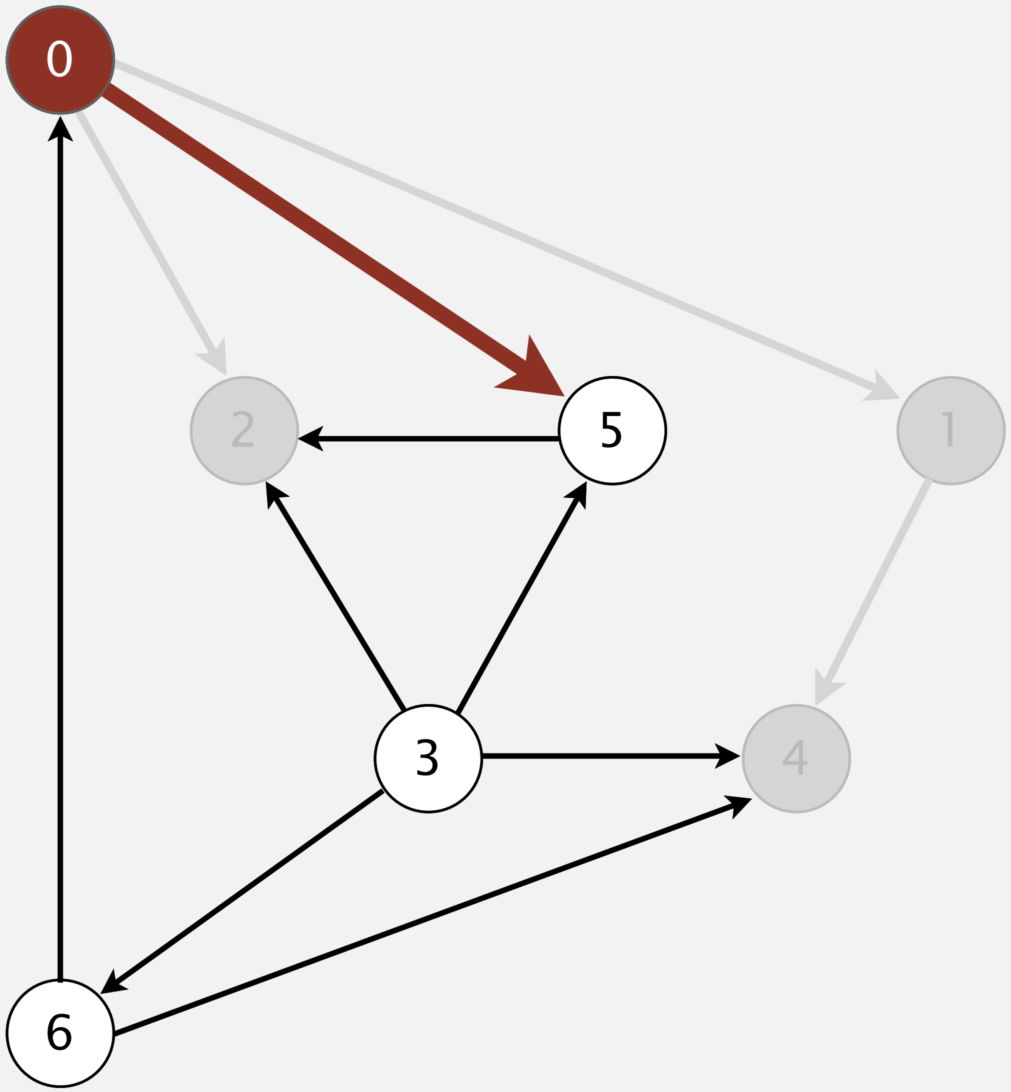
4 1 2

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	F
6	F

2 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

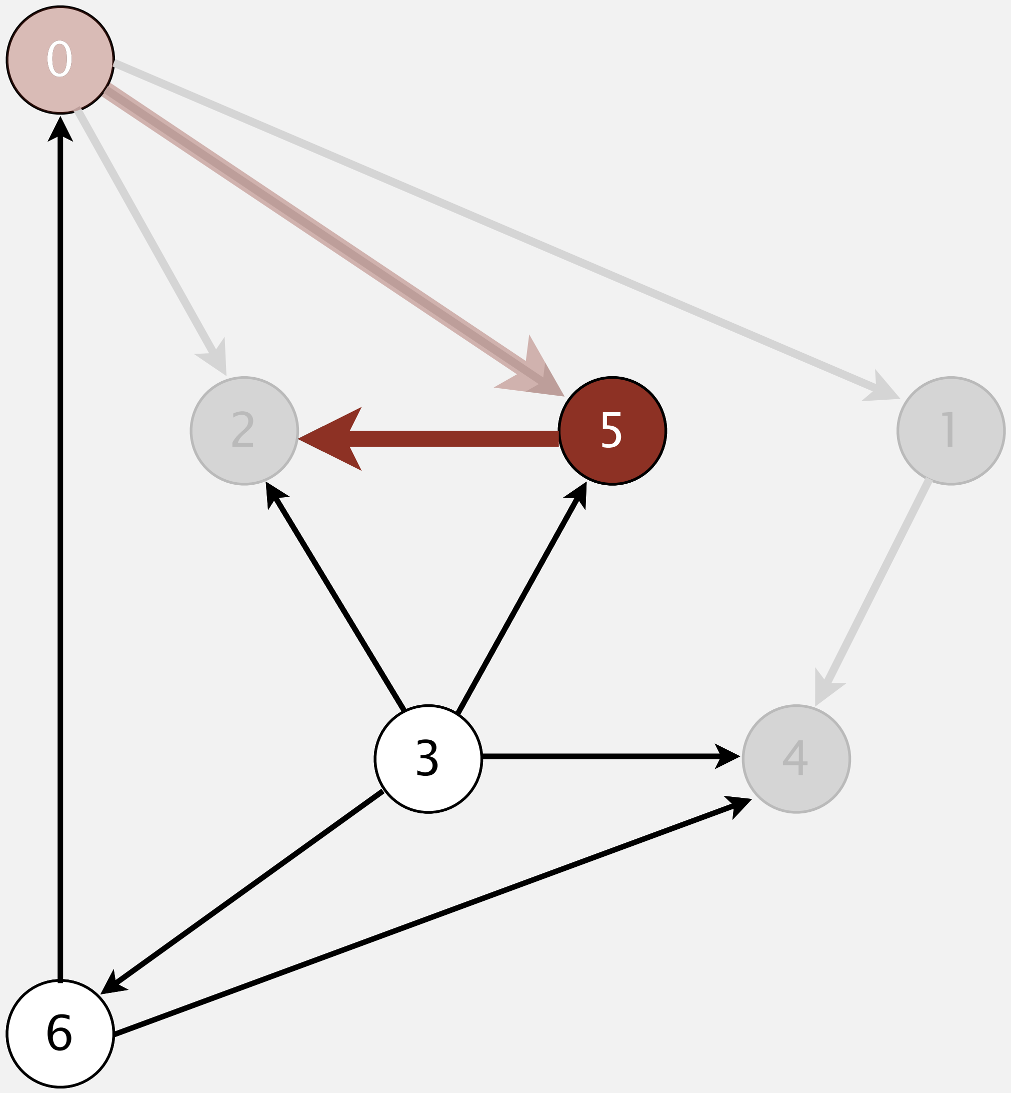
4 1 2

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	F
6	F

visit 0: check 1, check 2, and check 5

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

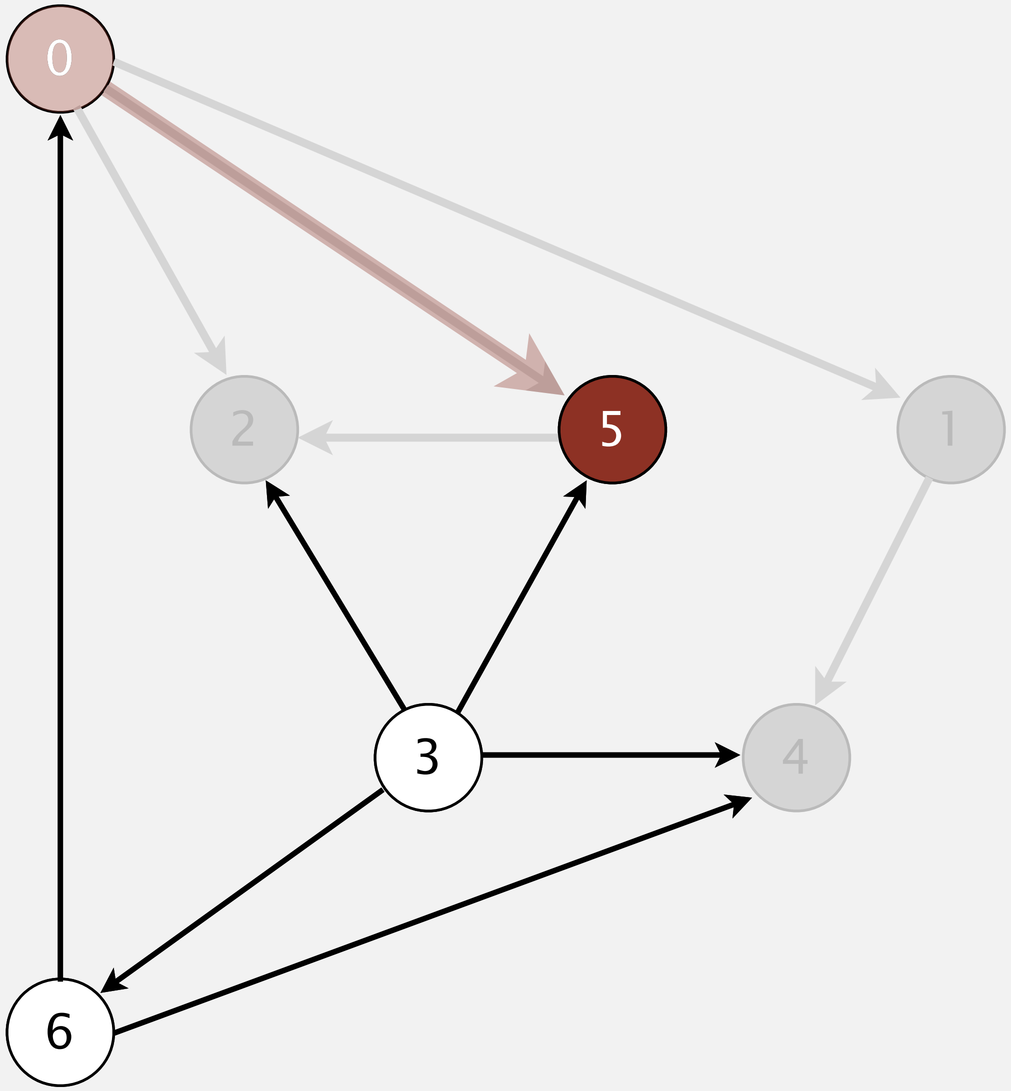
4 1 2

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	T
6	F

visit 5: check 2

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

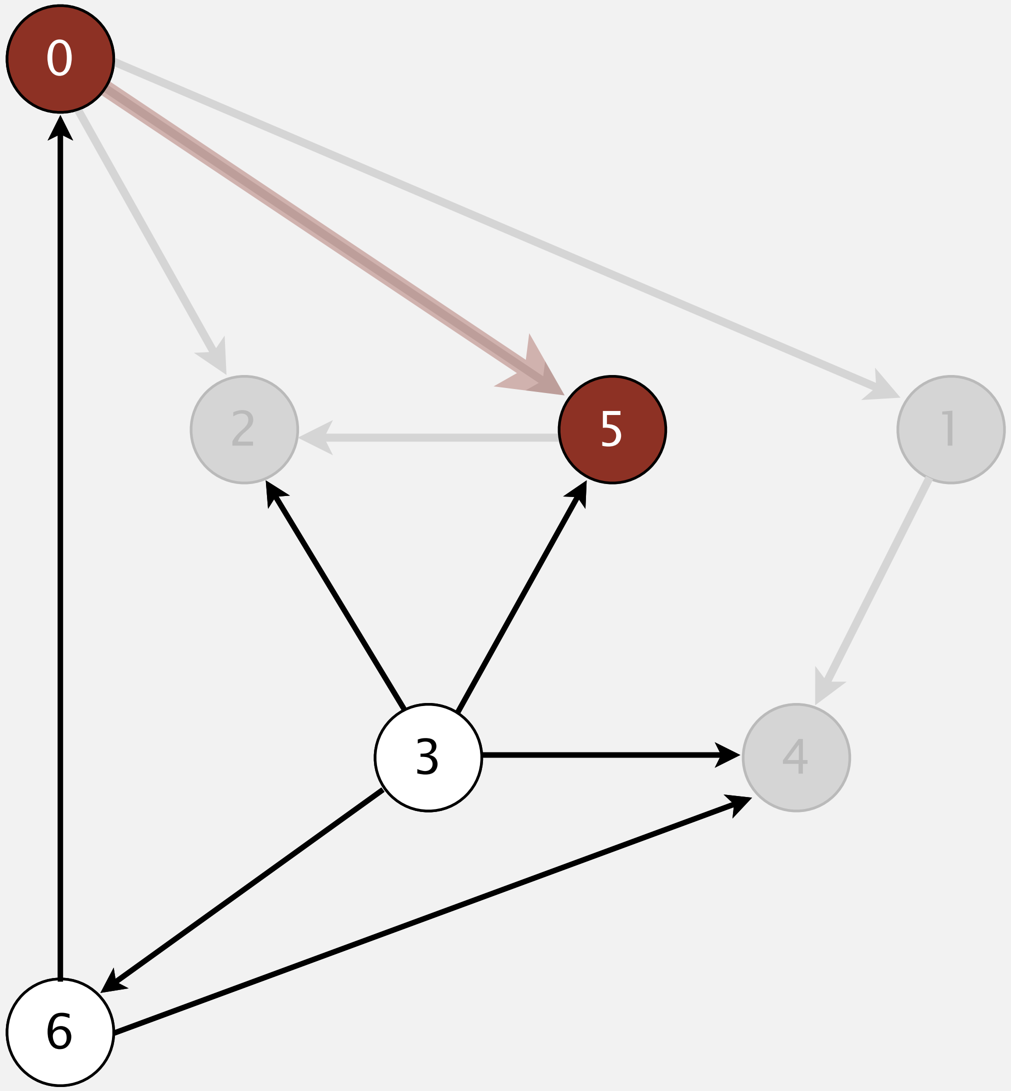
4 1 2

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	T
6	F

visit 5

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

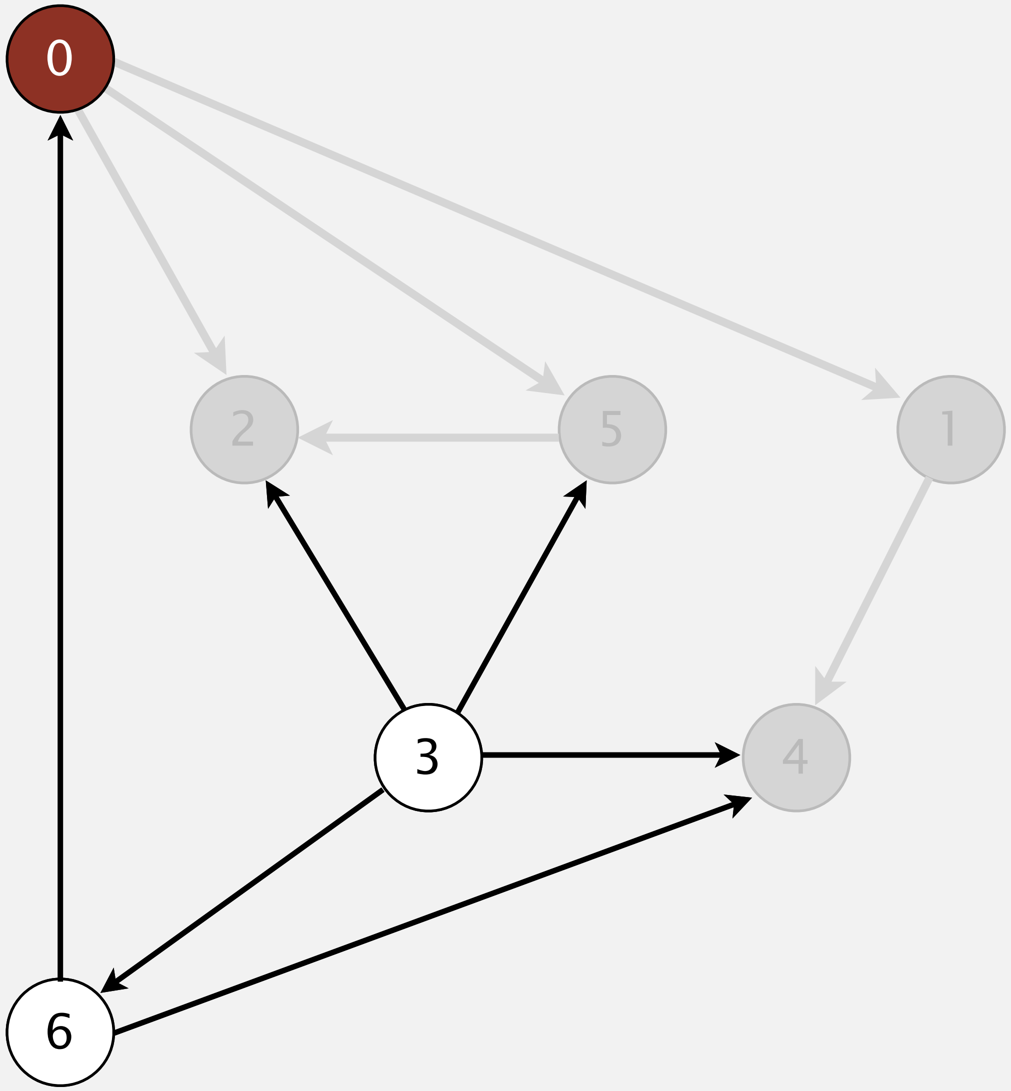
4 1 2 5

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	T
6	F

5 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

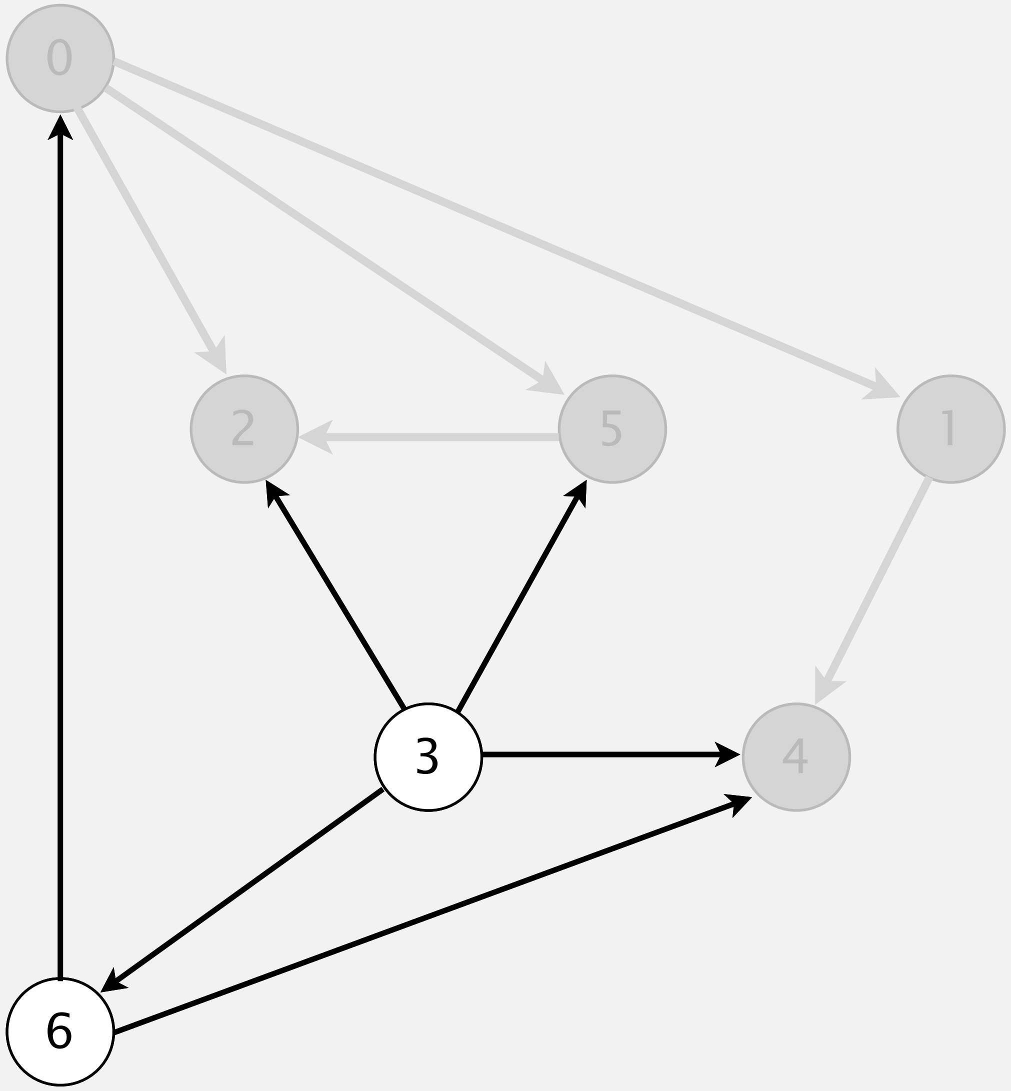
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	T
6	F

0 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

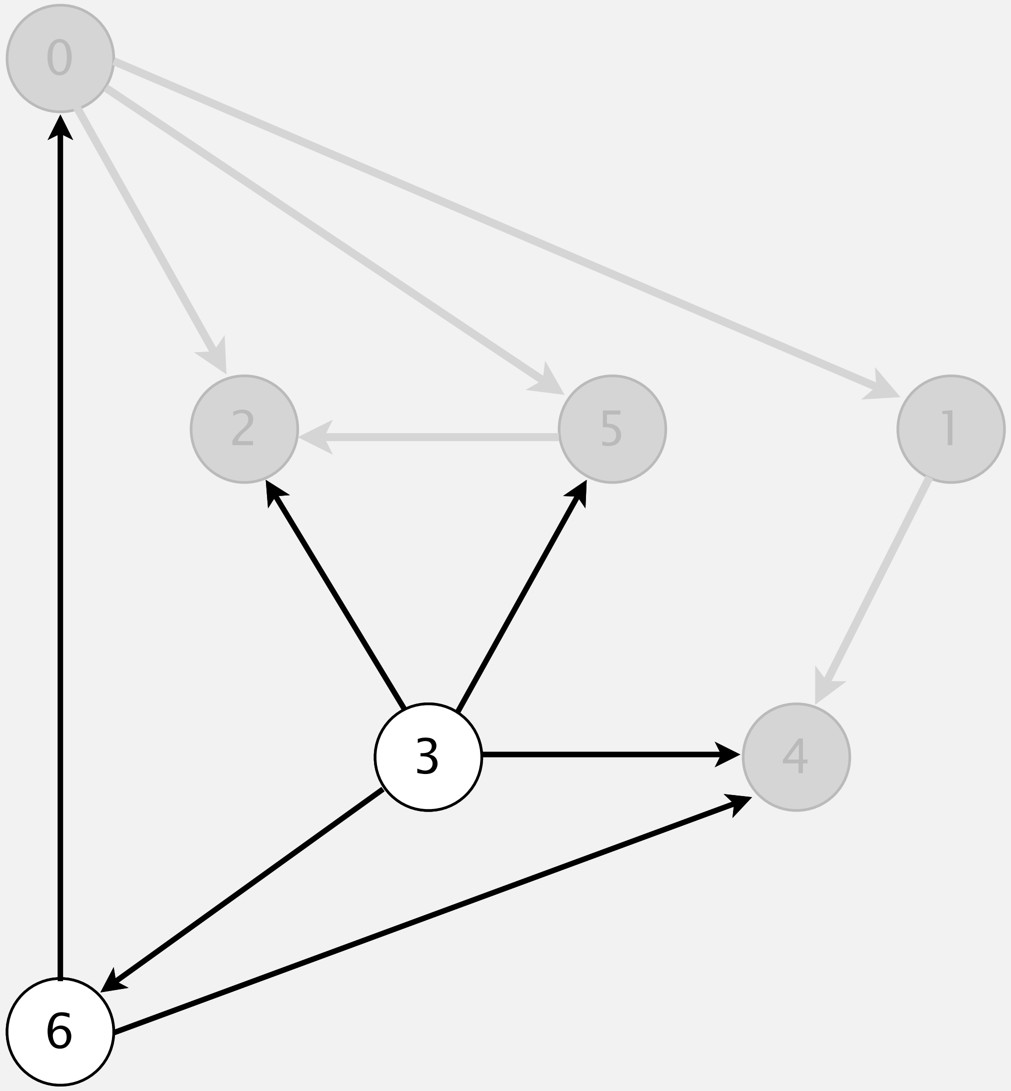
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	T
6	F

check 1

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

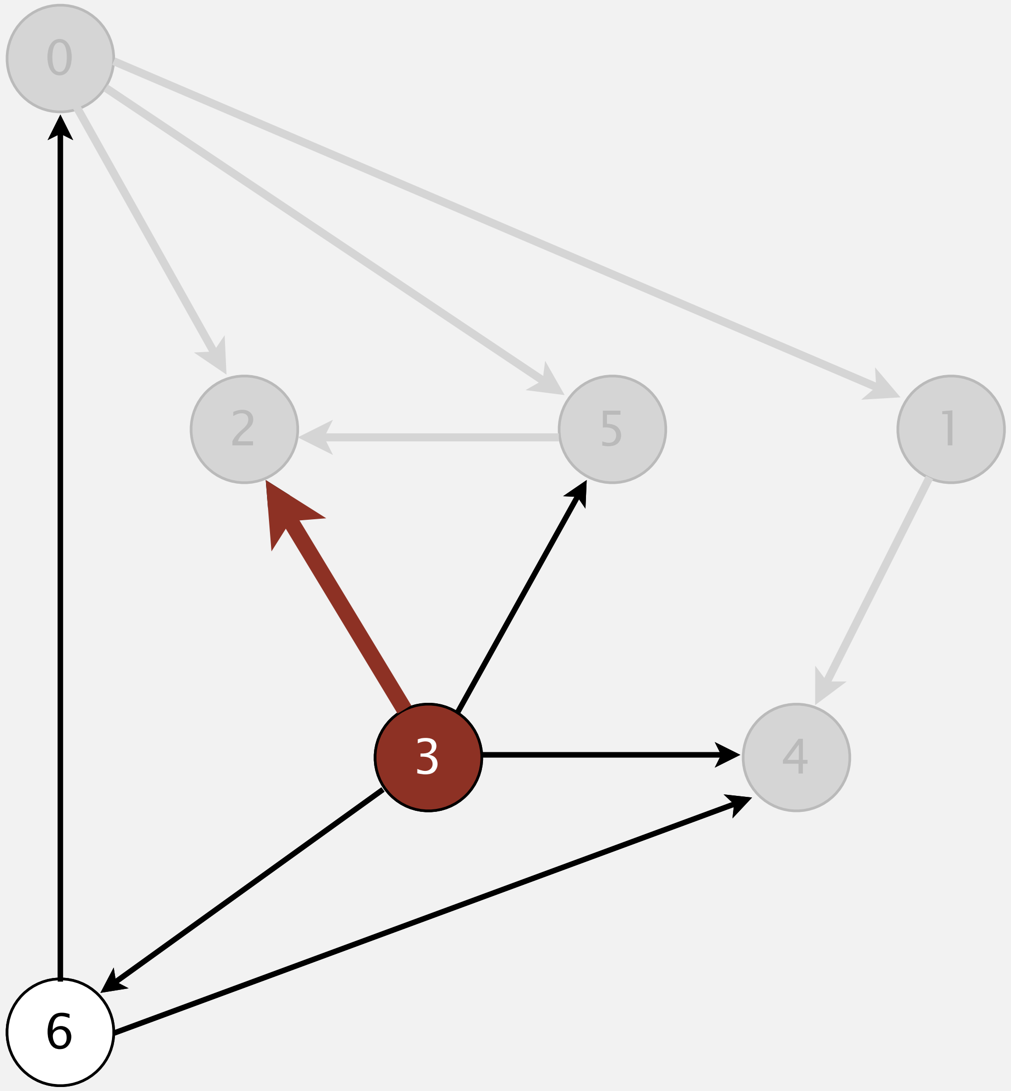
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	F
4	T
5	T
6	F

check 2

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

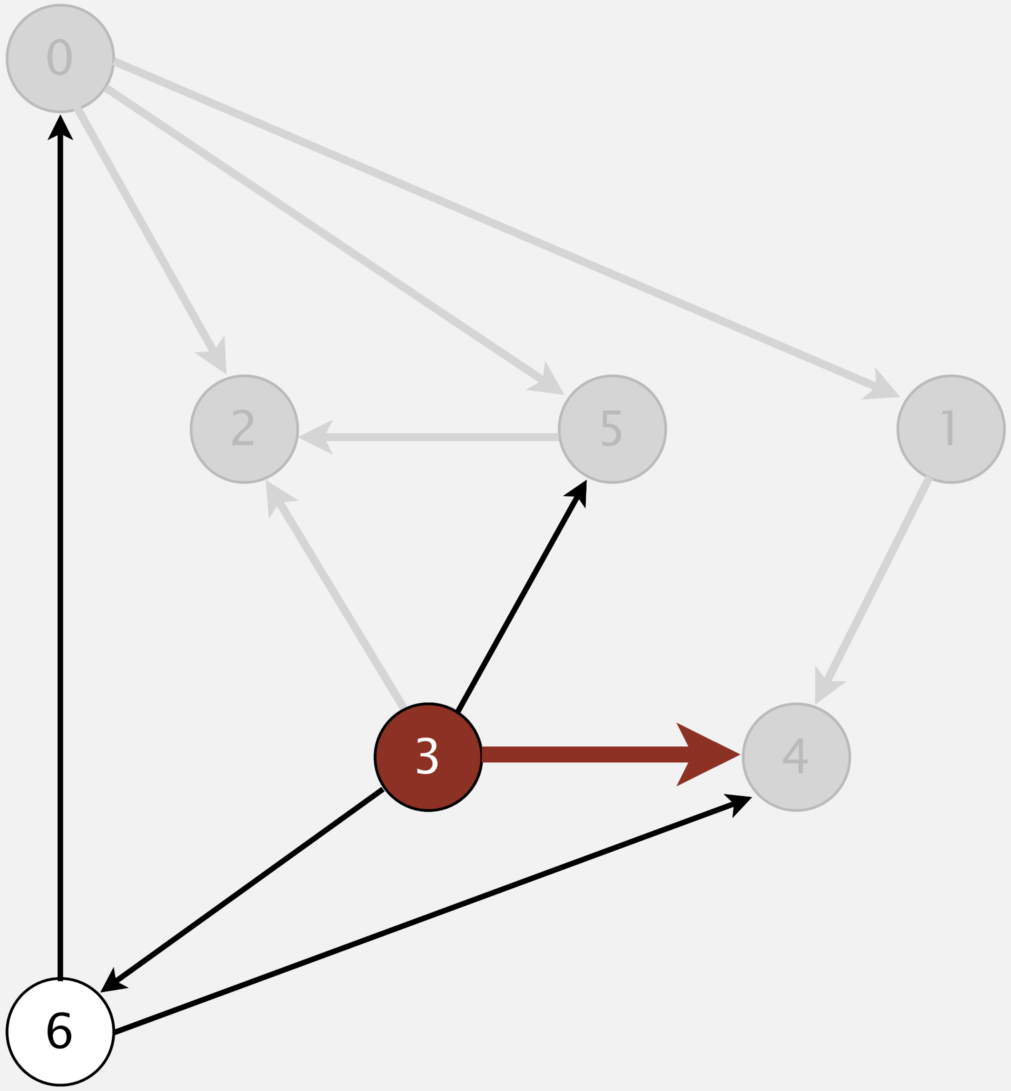
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	F

visit 3: check 2, check 4, check 5, and check 6

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

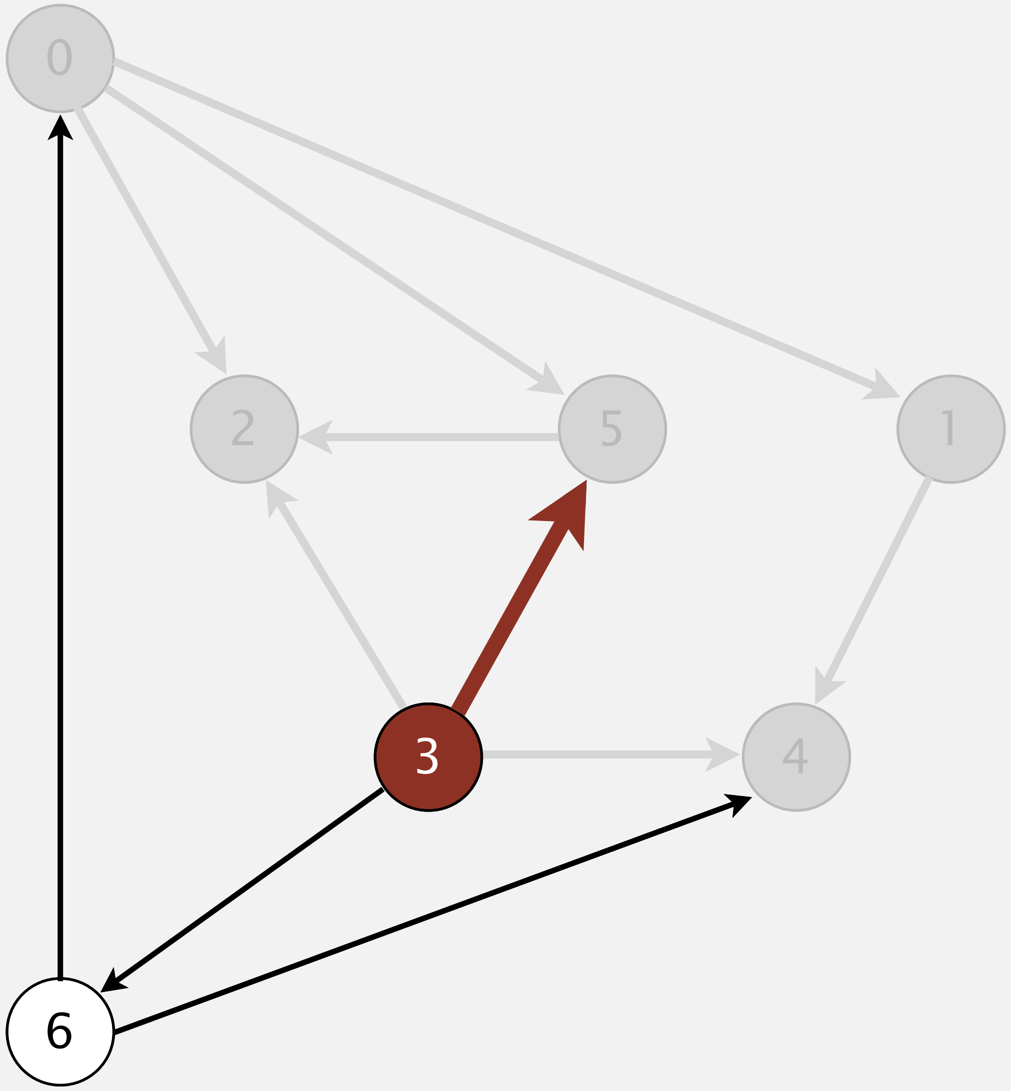
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	F

visit 3: check 2, **check 4**, check 5, and check 6

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

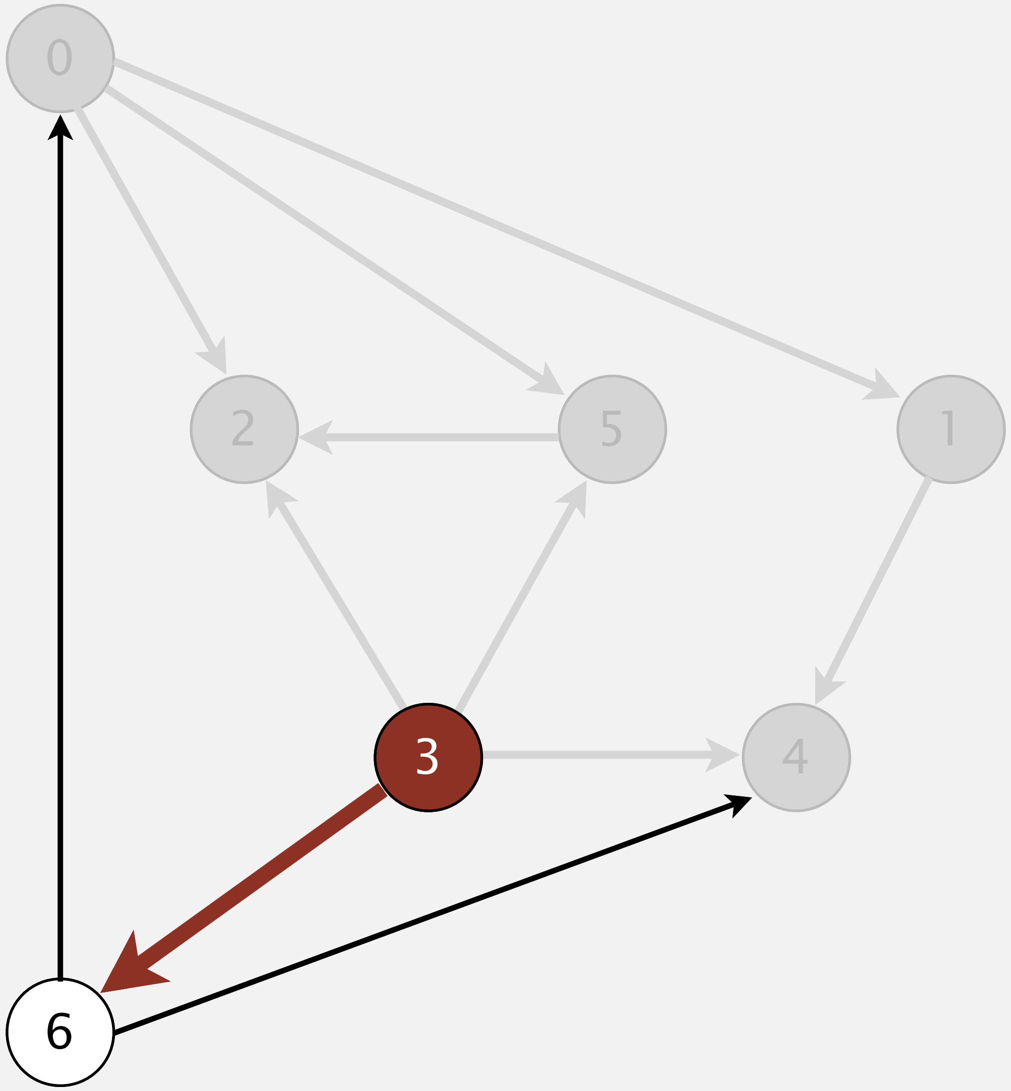
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	F

visit 3: check 2, check 4, **check 5**, and check 6

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

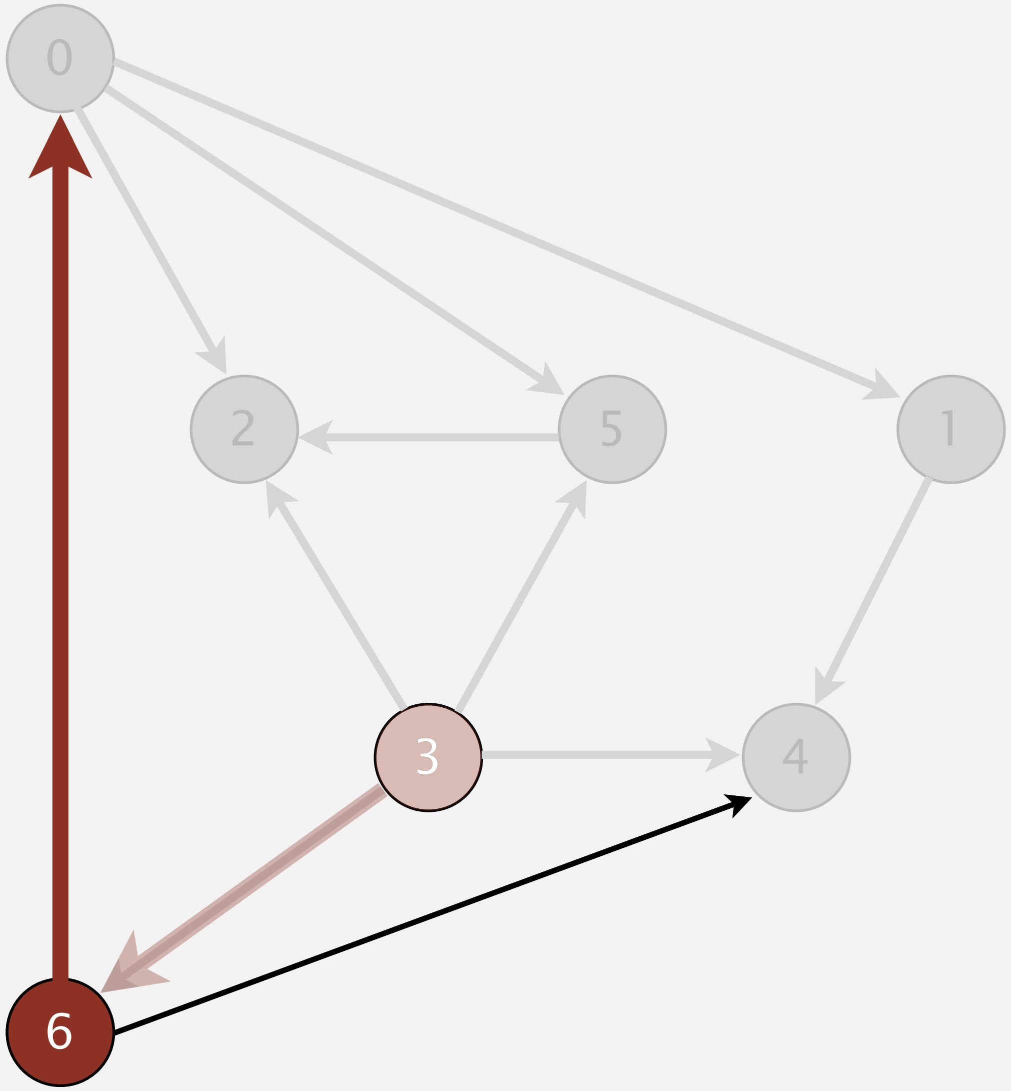
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	F

visit 3: check 2, check 4, check 5, and check 6

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

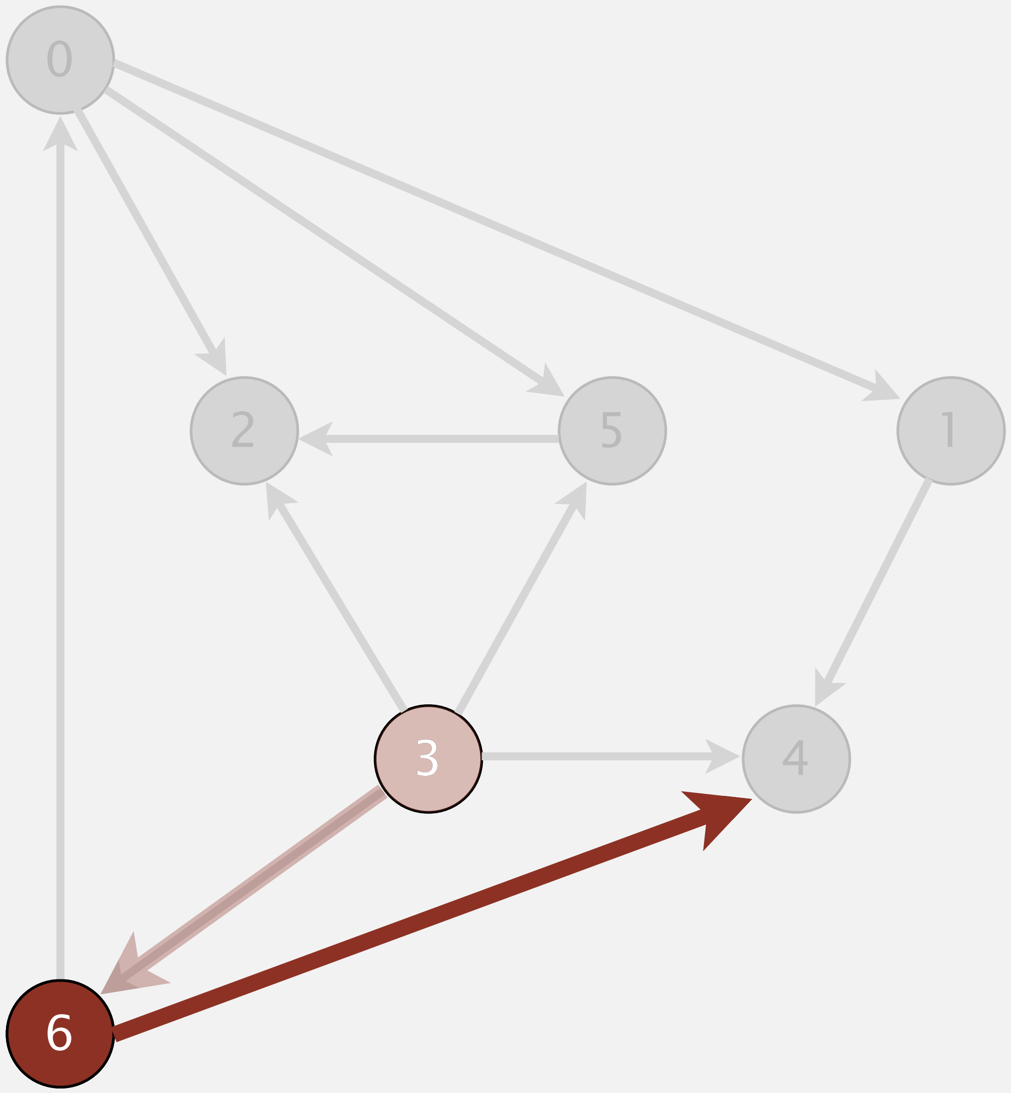
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

visit 6: check 0 and check 4

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

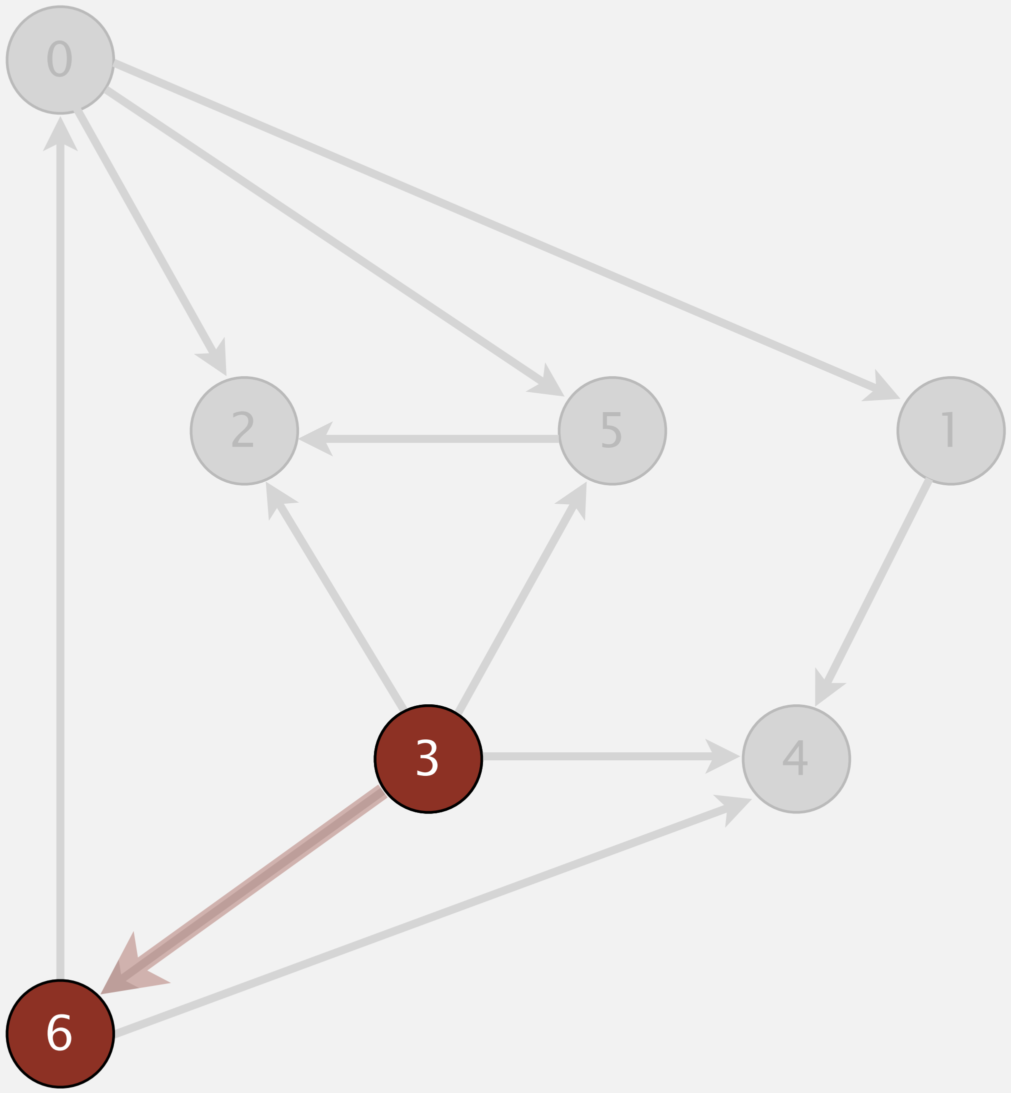
4 1 2 5 0

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

visit 6: check 0 and **check 4**

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

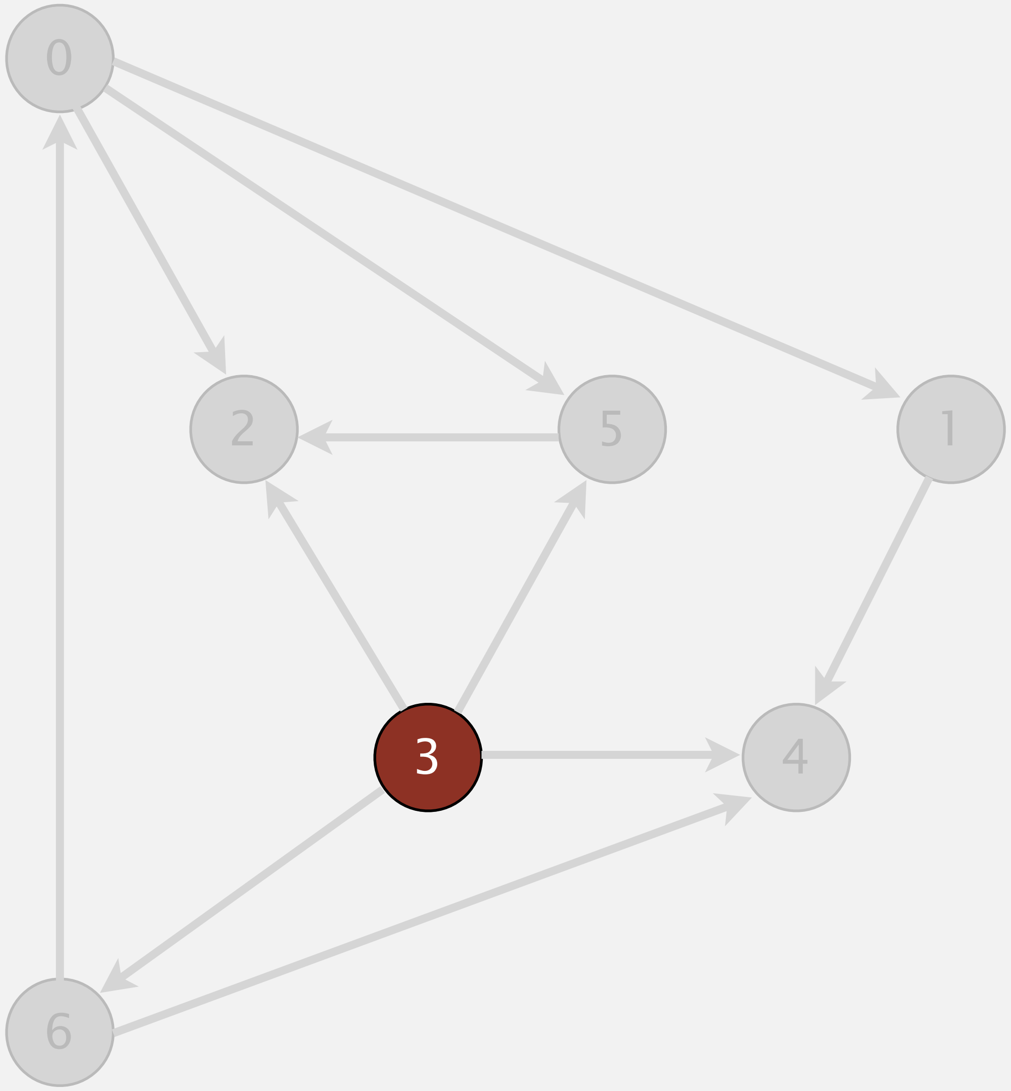
4 1 2 5 0 6

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

6 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

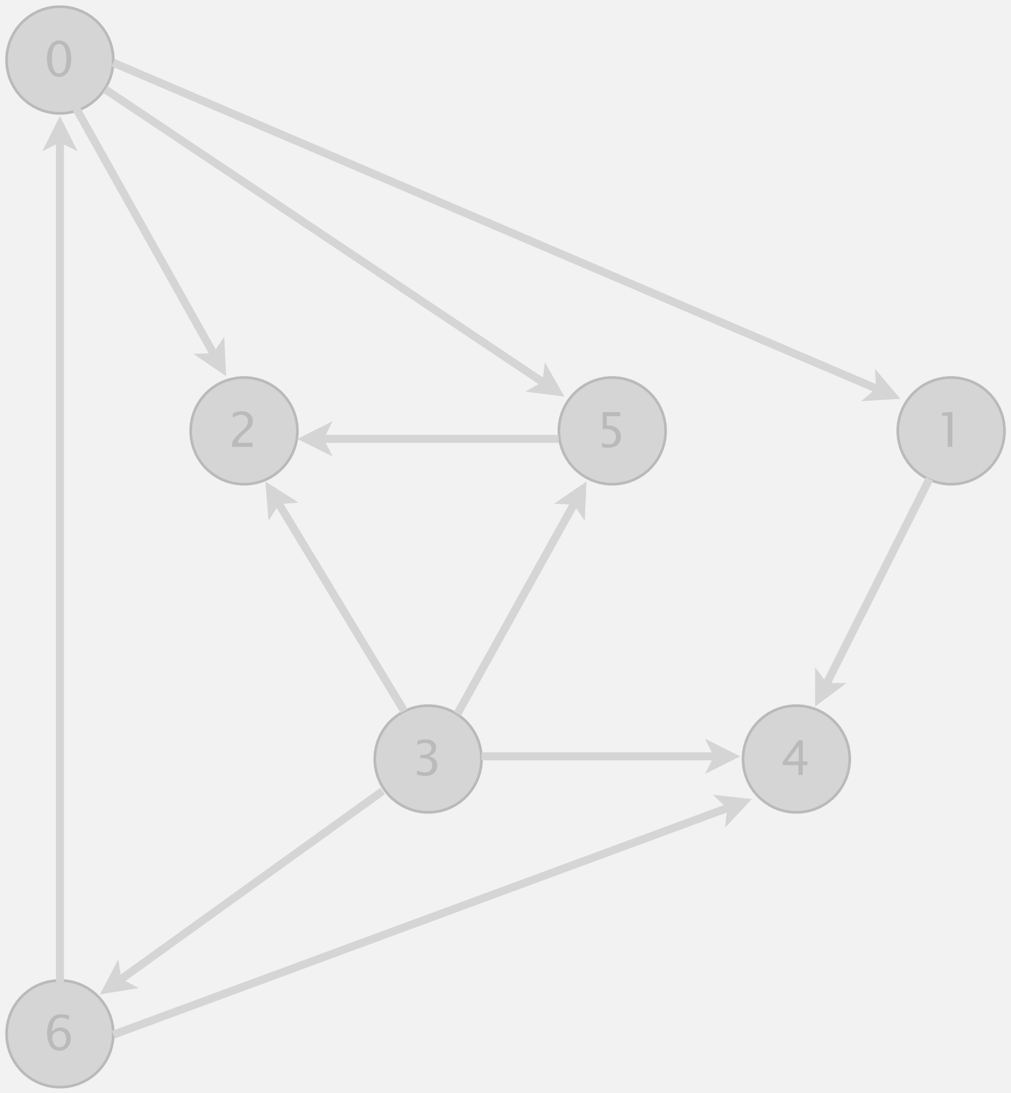
4 1 2 5 0 6 3

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

3 done

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

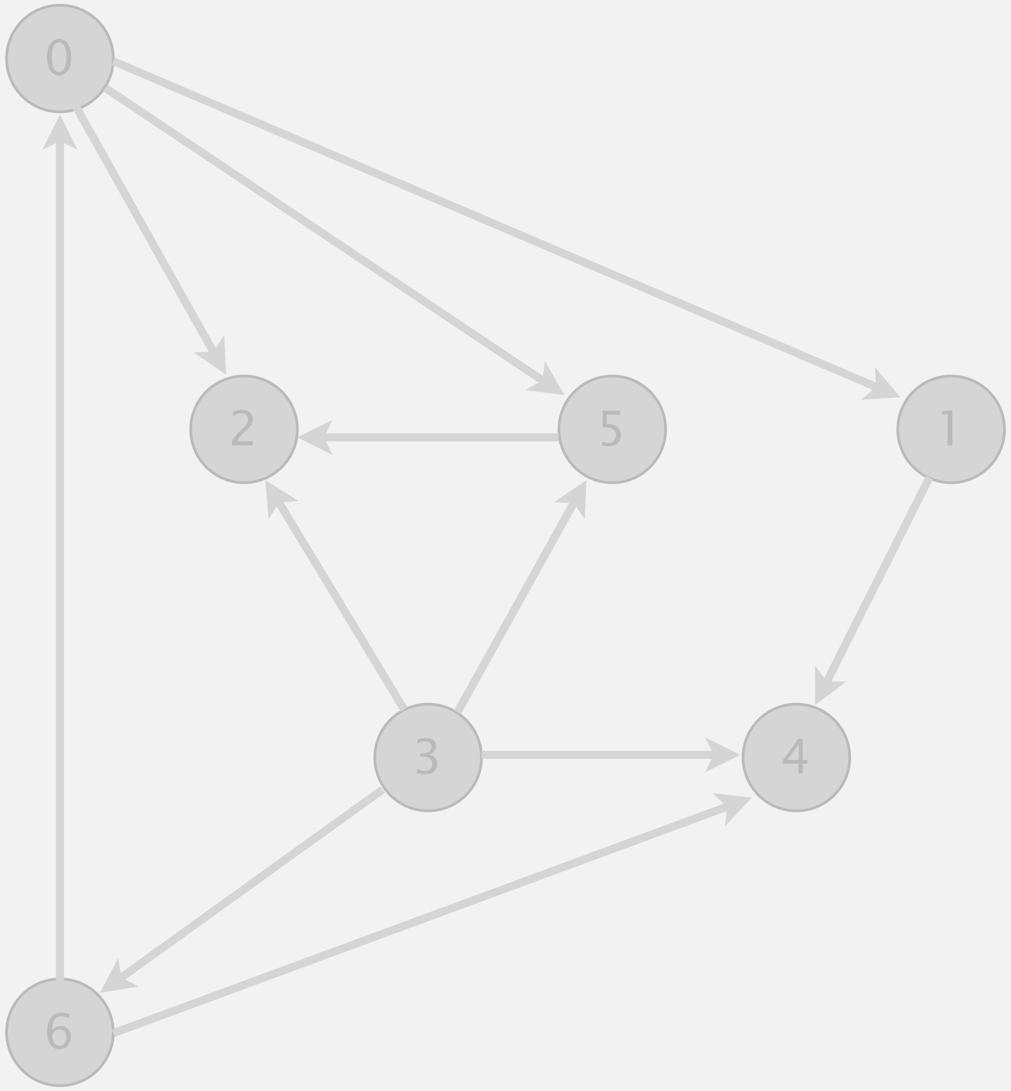
4 1 2 5 0 6 3

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

check 4

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

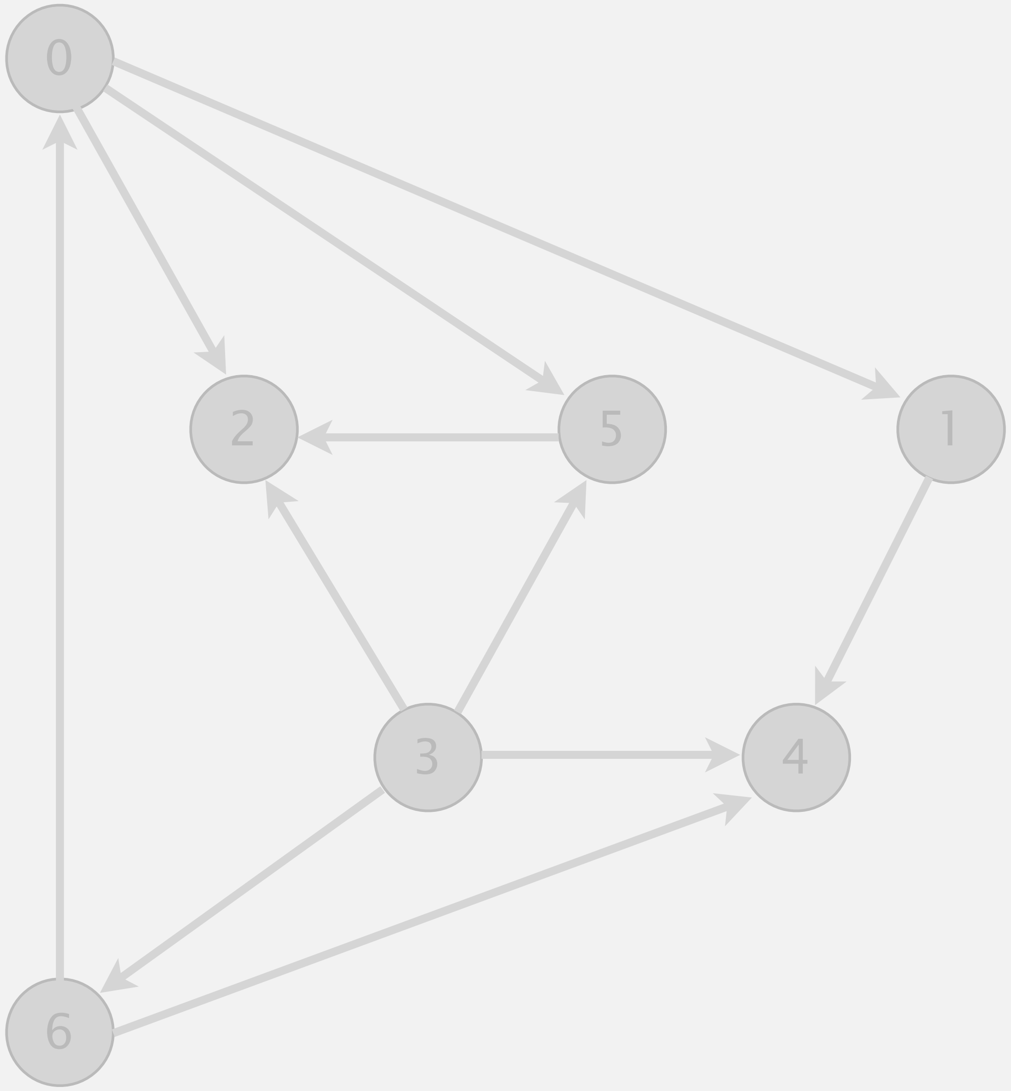
4 1 2 5 0 6 3

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

check 5

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

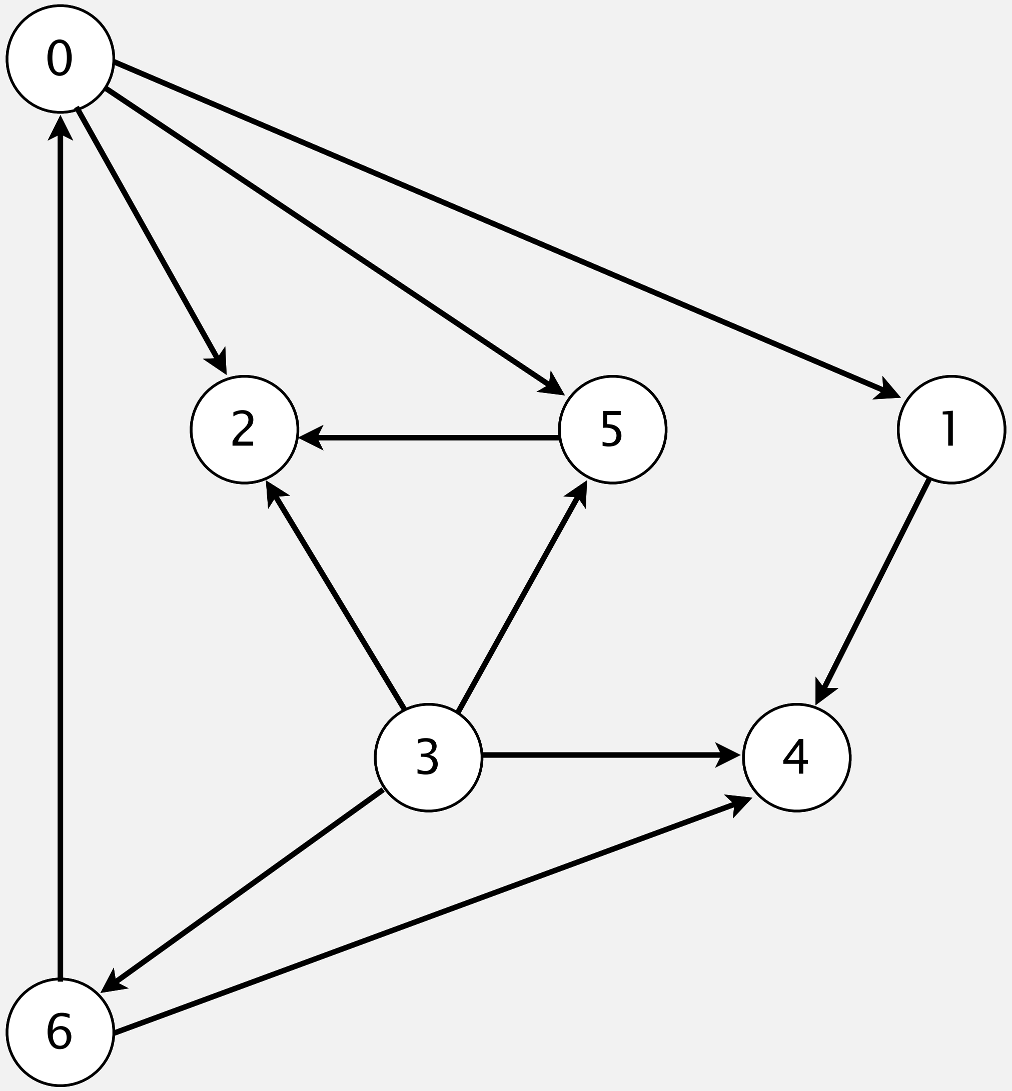
4 1 2 5 0 6 3

v	marked[]
0	T
1	T
2	T
3	T
4	T
5	T
6	T

check 6

Topological sort demo

- Run depth-first search.
- Return vertices in reverse postorder.



postorder

4 1 2 5 0 6 3

topological order

3 6 0 5 2 1 4

done