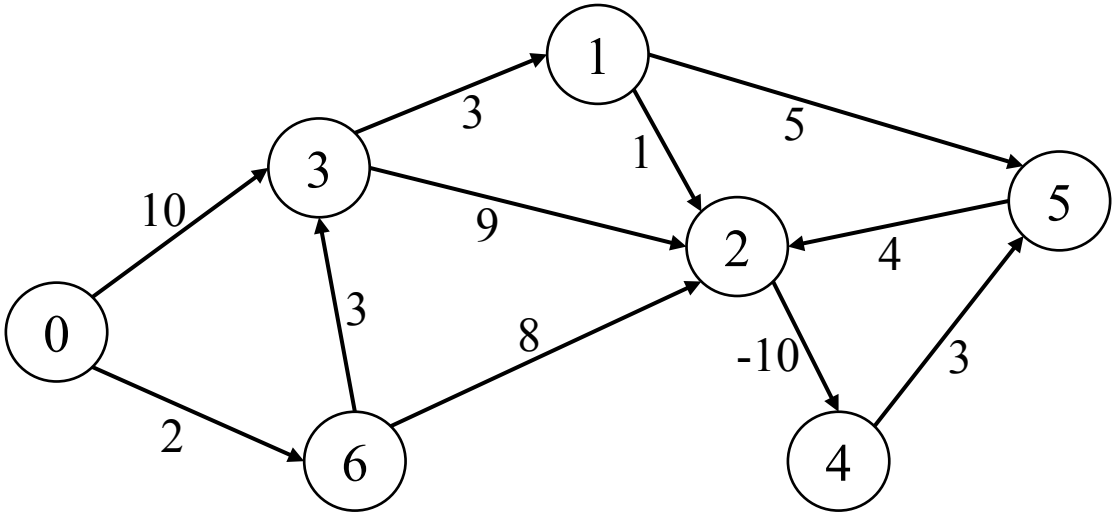
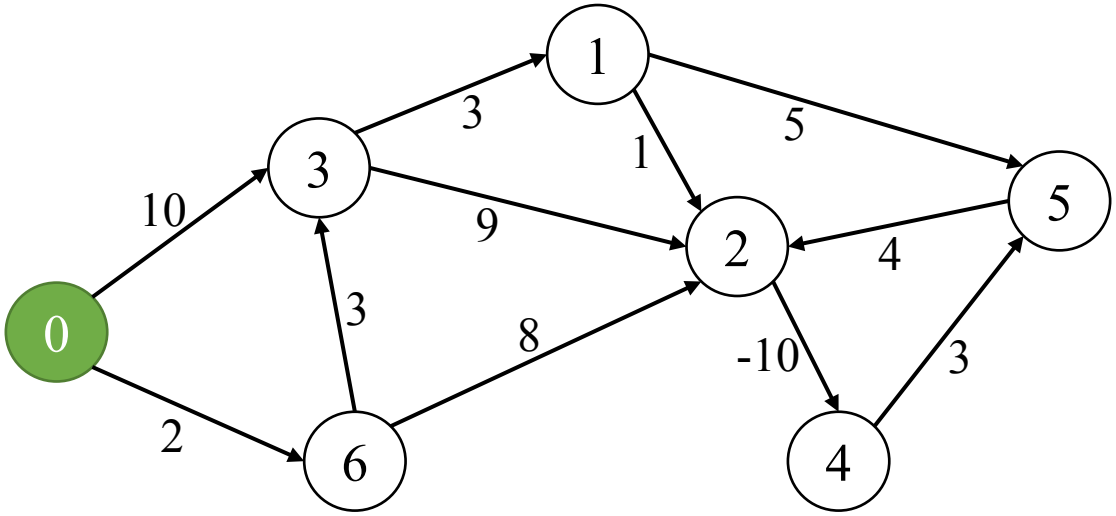
Dijkstra’s Algorithm

Dijkstra's Algorithm



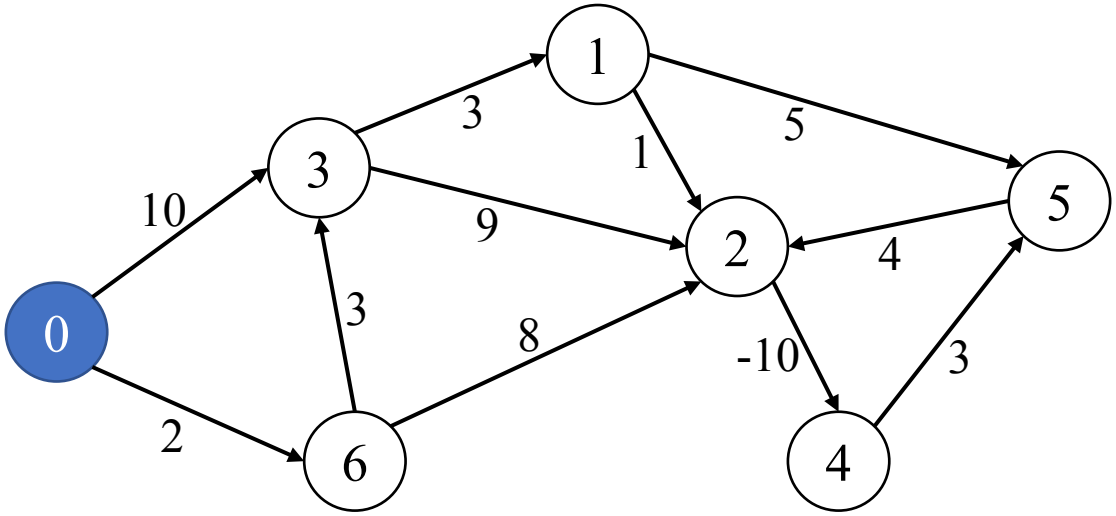
Node	0	1	2	3	4	5	6
d[·]	-	-	-	-	-	-	-
S	No	No	No	No	No	No	No
Pre	-	-	-	-	-	-	-

Dijkstra's Algorithm



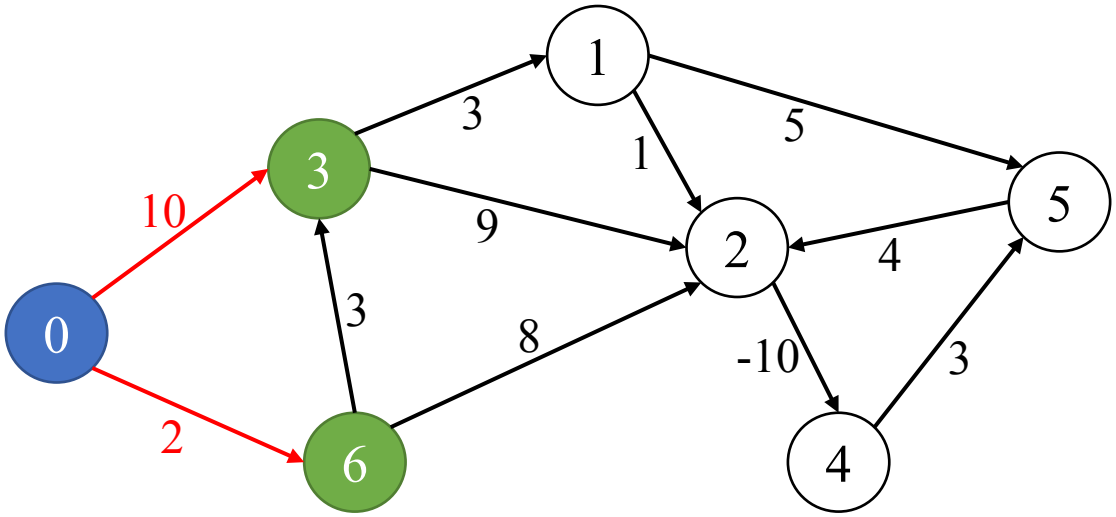
Node	0	1	2	3	4	5	6
d[·]	0	-	-	-	-	-	-
S	No	No	No	No	No	No	No
Pre	0	-	-	-	-	-	-

Dijkstra's Algorithm



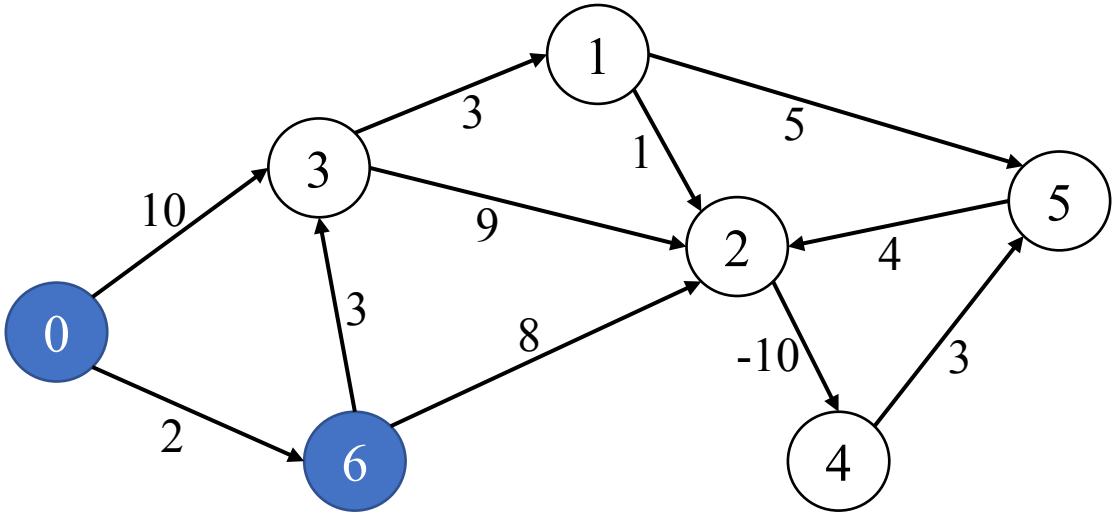
Node	0	1	2	3	4	5	6
d[·]	0	-	-	-	-	-	-
S	Yes	No	No	No	No	No	No
Pre	0	-	-	-	-	-	-

Dijkstra's Algorithm



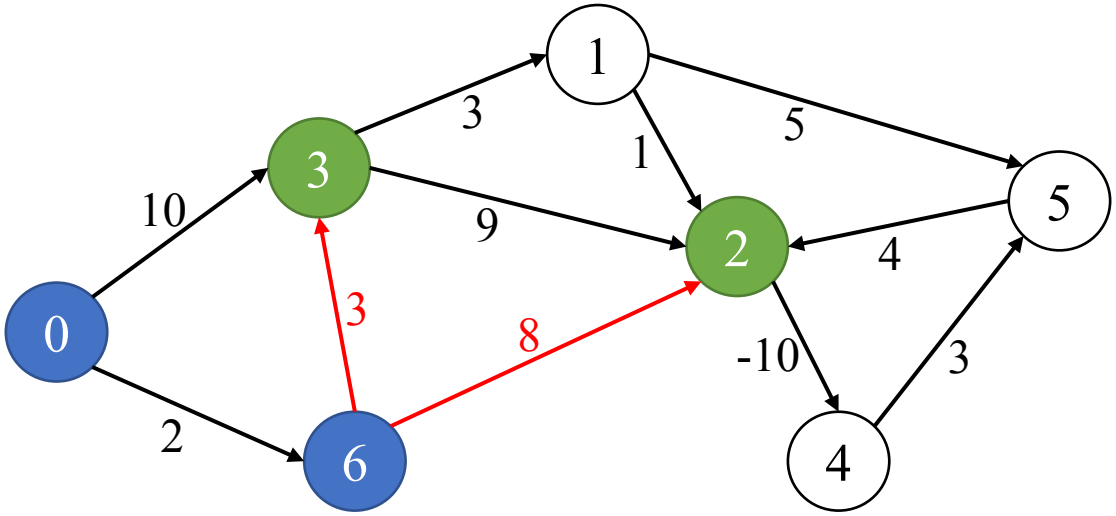
Node	0	1	2	3	4	5	6
d[·]	0	-	-	10	-	-	2
S	Yes	No	No	No	No	No	No
Pre	0	-	-	0	-	-	0

Dijkstra's Algorithm



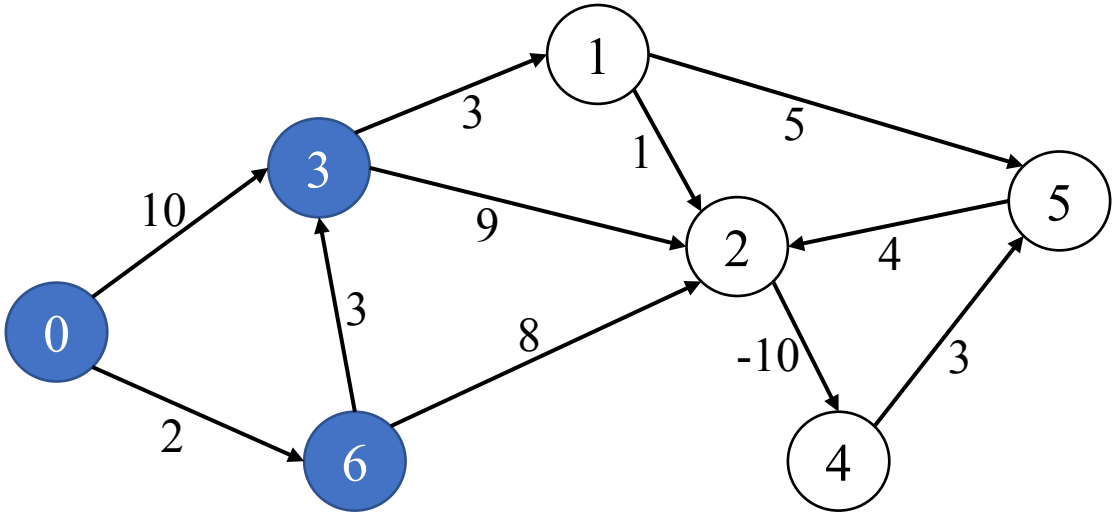
Node	0	1	2	3	4	5	6
d[·]	0	-	-	10	-	-	2
S	Yes	No	No	No	No	No	Yes
Pre	0	-	-	0	-	-	0

Dijkstra's Algorithm



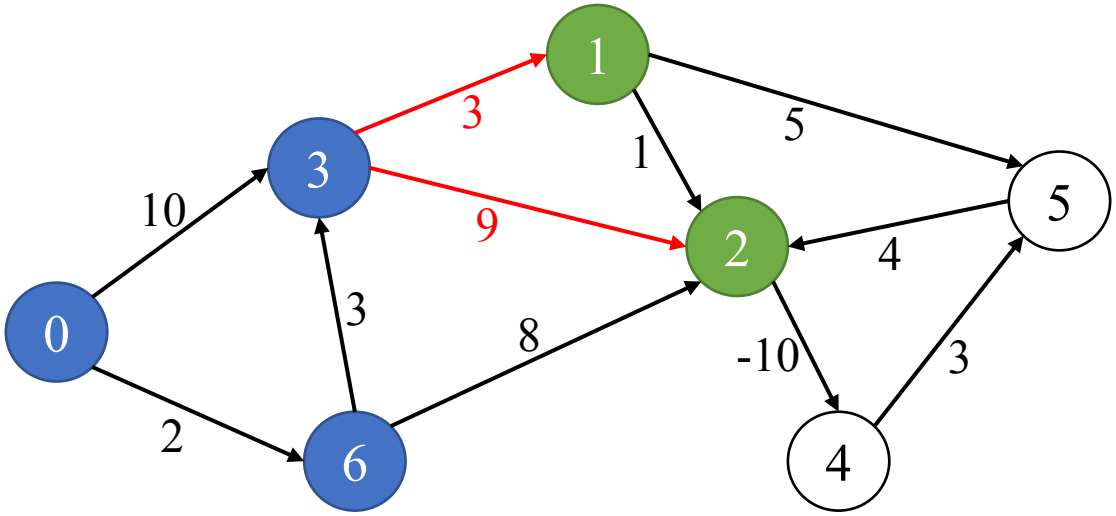
Node	0	1	2	3	4	5	6
d[·]	0	-	10	5	-	-	2
S	Yes	No	No	No	No	No	Yes
Pre	0	-	6	6	-	-	0

Dijkstra's Algorithm



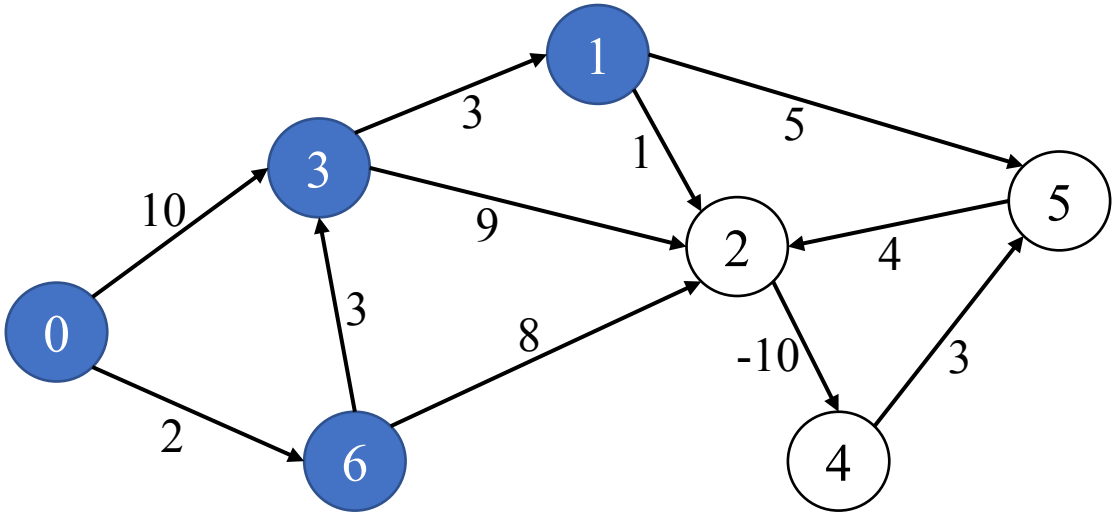
Node	0	1	2	3	4	5	6
d[·]	0	-	10	5	-	-	2
S	Yes	No	No	Yes	No	No	Yes
Pre	0	-	6	6	-	-	0

Dijkstra's Algorithm



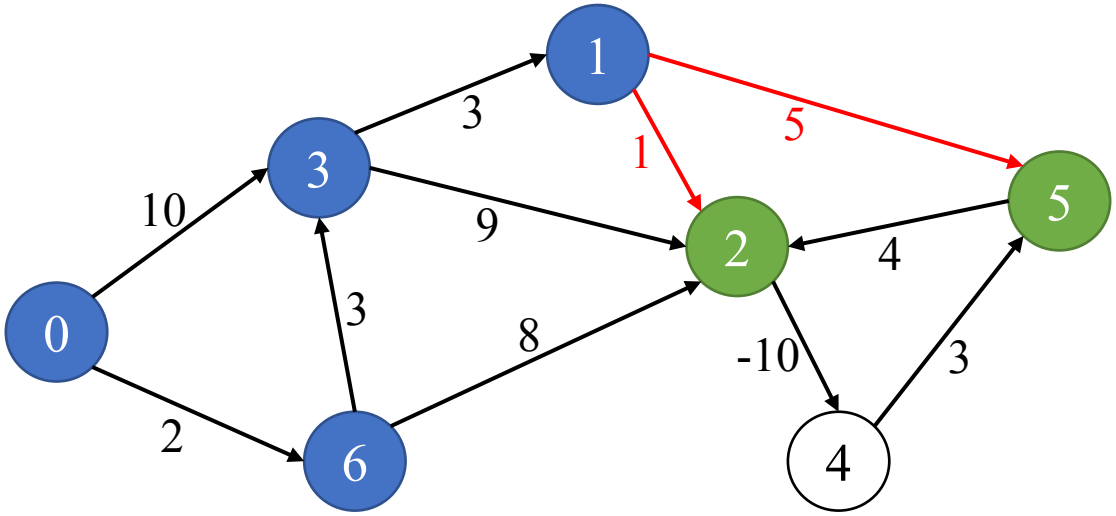
Node	0	1	2	3	4	5	6
d[·]	0	8	10	5	-	-	2
S	Yes	No	No	Yes	No	No	Yes
Pre	0	3	6	6	-	-	0

Dijkstra's Algorithm



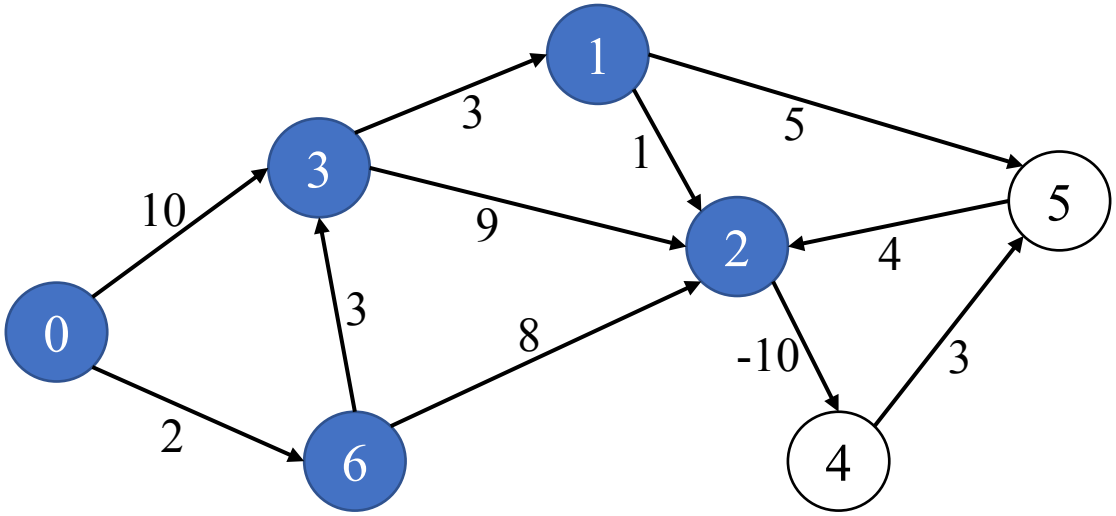
Node	0	1	2	3	4	5	6
d[·]	0	8	10	5	-	-	2
S	Yes	Yes	No	Yes	No	No	Yes
Pre	0	3	6	6	-	-	0

Dijkstra's Algorithm



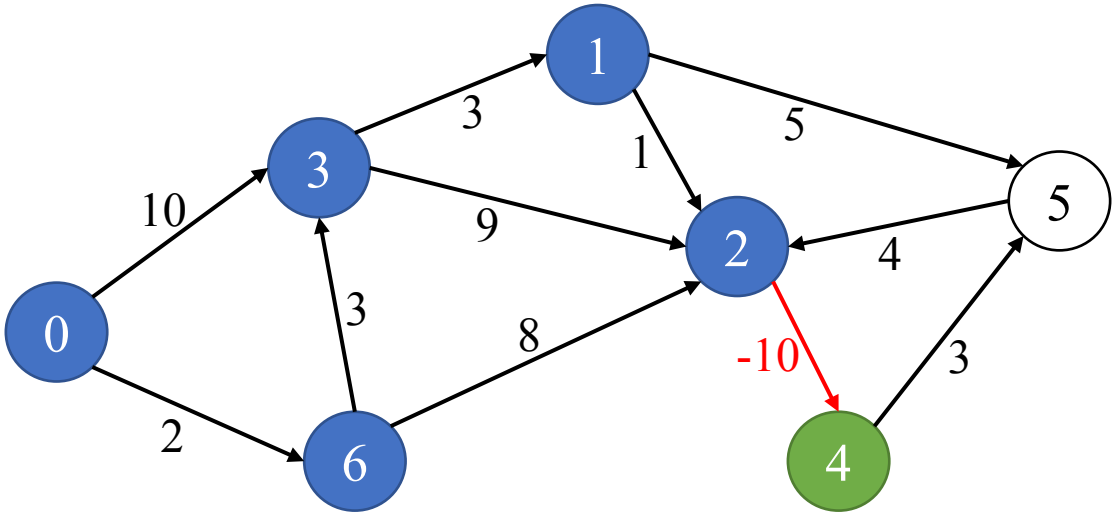
Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-	13	2
S	Yes	Yes	No	Yes	No	No	Yes
Pre	0	3	1	6	-	1	0

Dijkstra's Algorithm



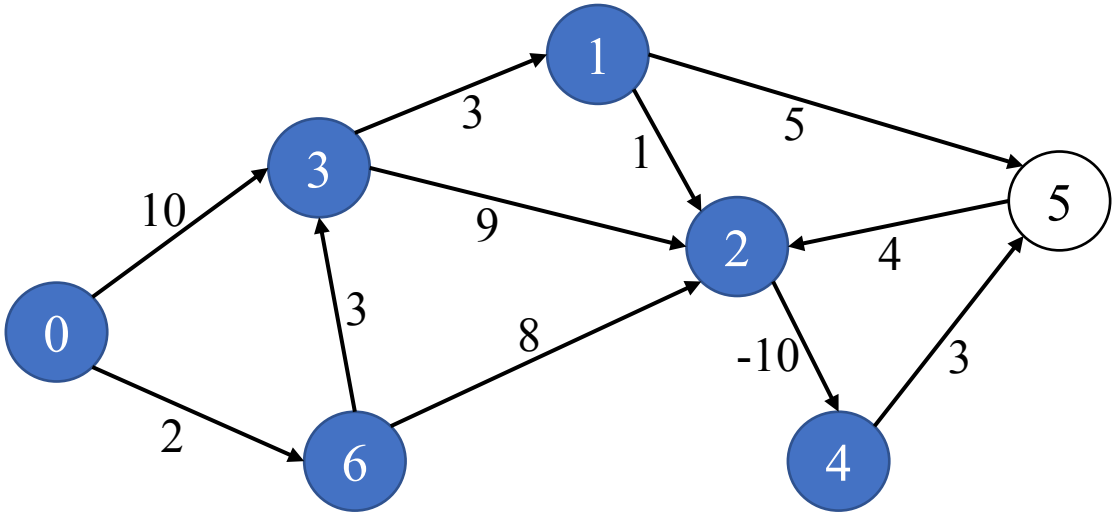
Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-	13	2
S	Yes	Yes	Yes	Yes	No	No	Yes
Pre	0	3	1	6	-	1	0

Dijkstra's Algorithm



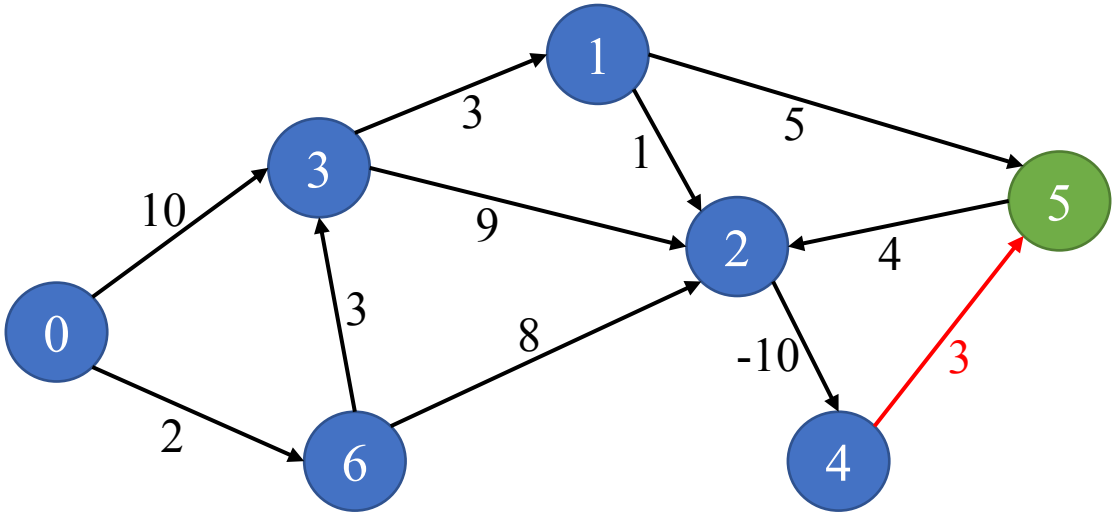
Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-1	13	2
S	Yes	Yes	Yes	Yes	No	No	Yes
Pre	0	3	1	6	2	1	0

Dijkstra's Algorithm



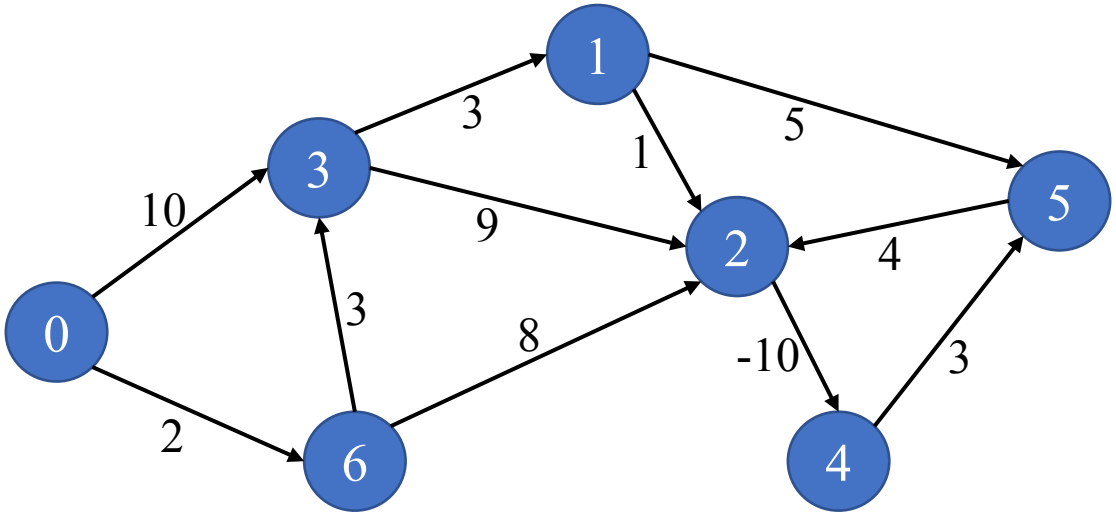
Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-1	13	2
S	Yes	Yes	Yes	Yes	Yes	No	Yes
Pre	0	3	1	6	2	1	0

Dijkstra's Algorithm



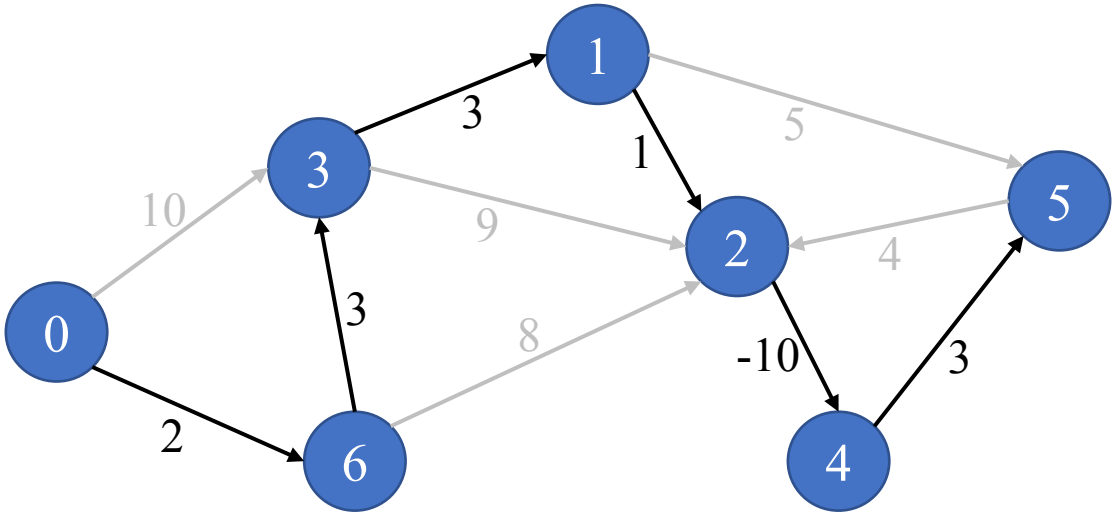
Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-1	2	2
S	Yes	Yes	Yes	Yes	Yes	No	Yes
Pre	0	3	1	6	2	4	0

Dijkstra's Algorithm



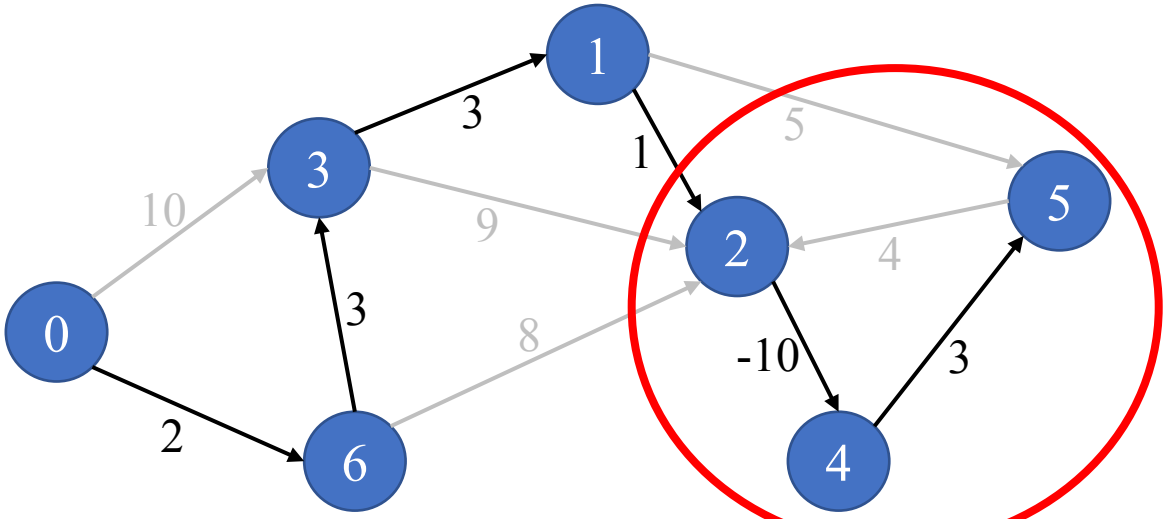
Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-1	2	2
S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre	0	3	1	6	2	4	0

Dijkstra's Algorithm



Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-1	2	2
S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre	0	3	1	6	2	4	0

Dijkstra's Algorithm

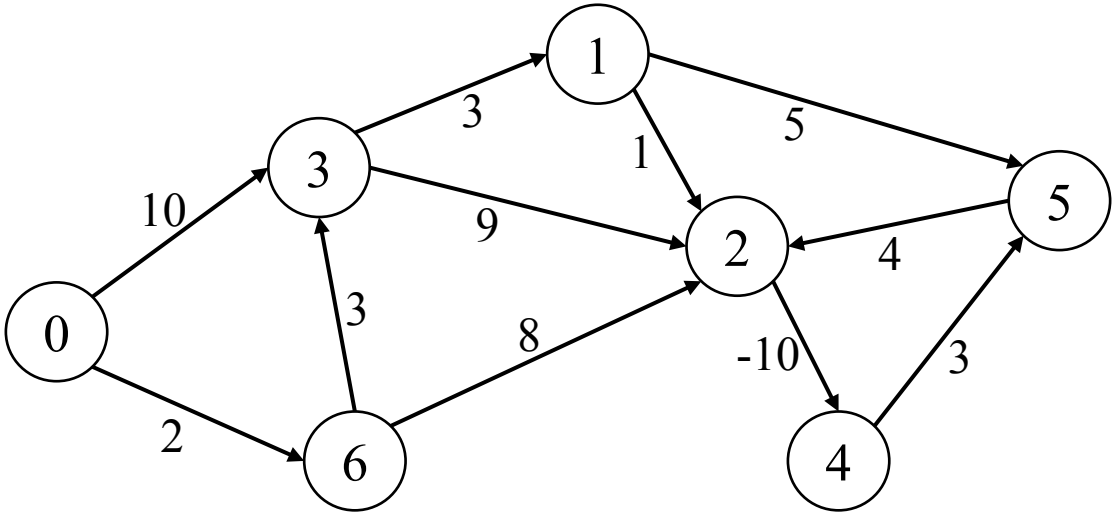


Wrong Answer

Node	0	1	2	3	4	5	6
d[·]	0	8	9	5	-1	2	2
S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre	0	3	1	6	2	4	0

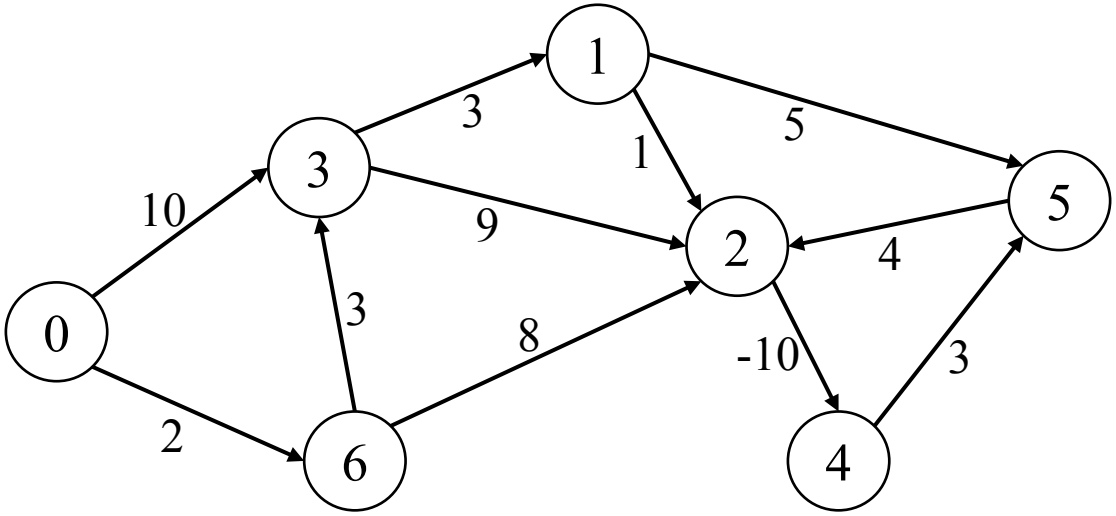
Bellman-Ford Algorithm

Bellman-Ford Algorithm



Node	0	1	2	3	4	5	6
M[·]	-	-	-	-	-	-	-
Pre	-	-	-	-	-	-	-

Bellman-Ford Algorithm

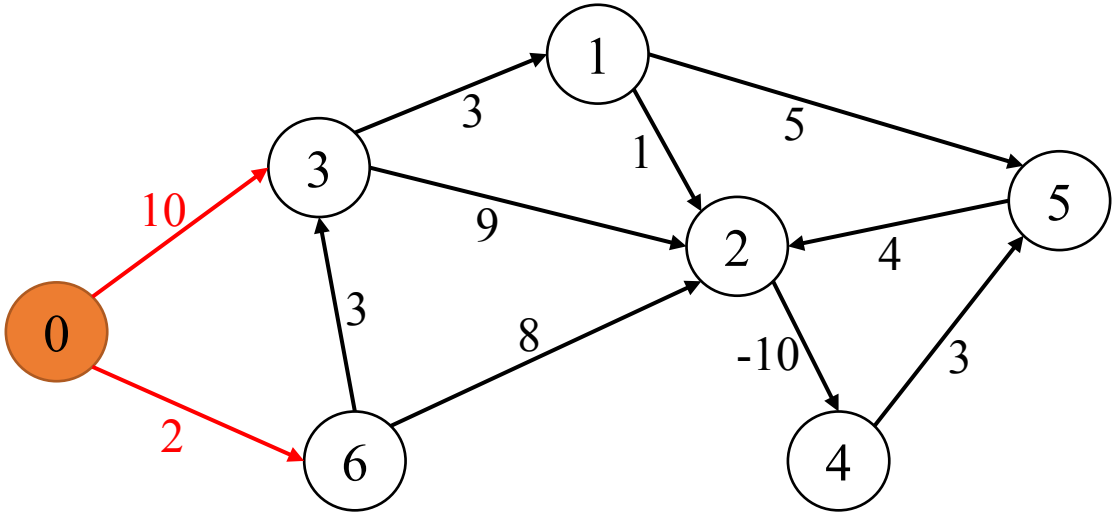


Initialization

Node	0	1	2	3	4	5	6
M[·]	0	-	-	-	-	-	-
Pre	0	-	-	-	-	-	-

Bellman-Ford Algorithm

(0, 3)

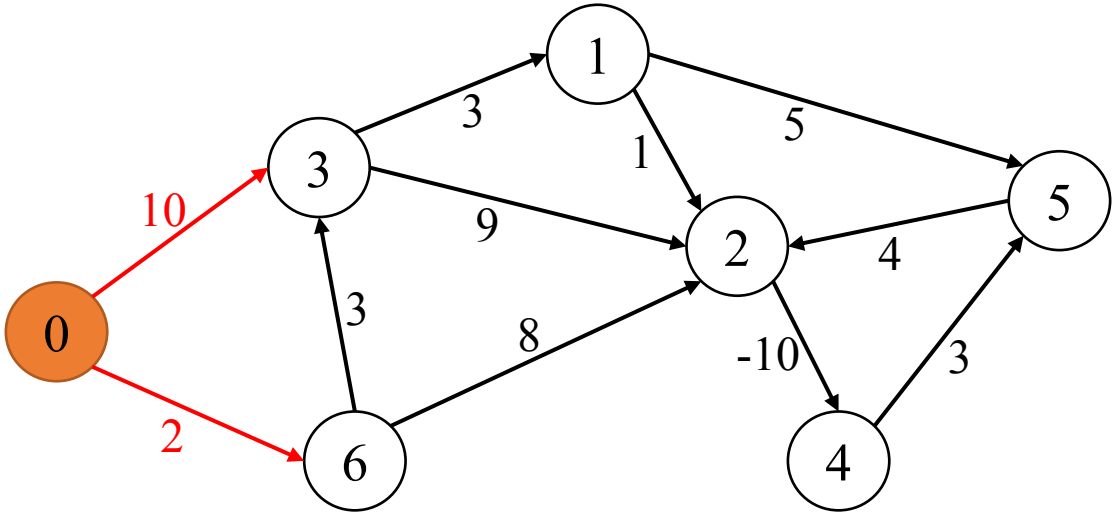


i = 1

Node	0	1	2	<u>3</u>	4	5	6
M[·]	0	-	-	10	-	-	-
Pre	0	-	-	0	-	-	-

Bellman-Ford Algorithm

(0, 3)
(0, 6)

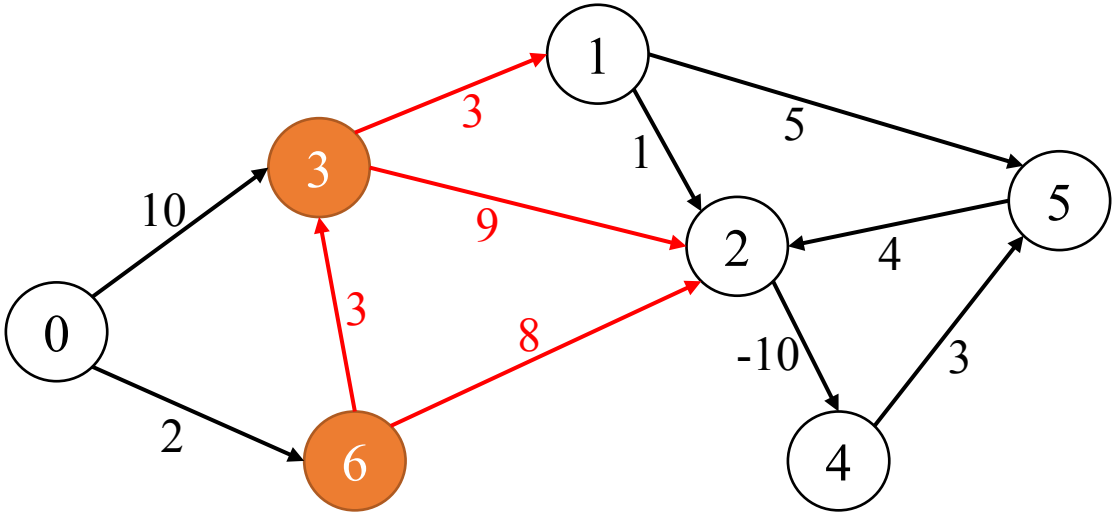


i = 1

Node	0	1	2	3	4	5	6
M[·]	0	-	-	10	-	-	2
Pre	0	-	-	0	-	-	0

Bellman-Ford Algorithm

(3, 1)

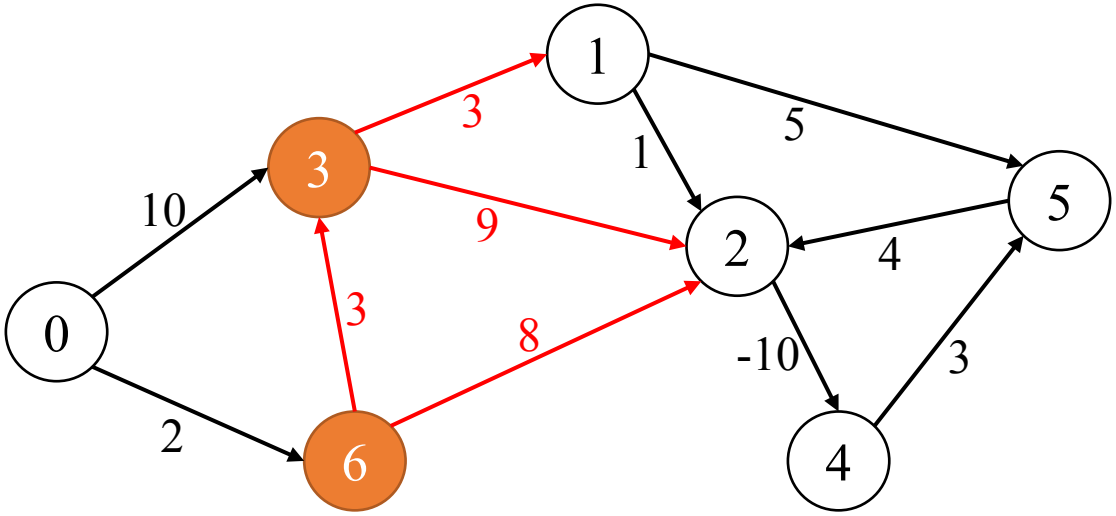


i = 2

Node	0	1	2	3	4	5	6
M[·]	0	13	-	10	-	-	2
Pre	0	3	-	0	-	-	0

Bellman-Ford Algorithm

(3, 1)
(3, 2)

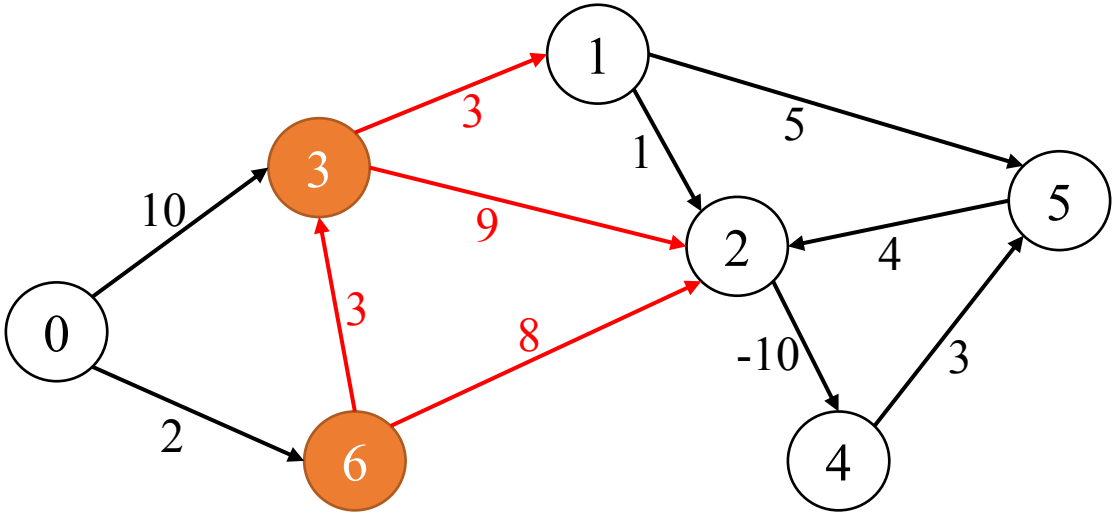


i = 2

Node	0	1	2	3	4	5	6
M[·]	0	13	19	10	-	-	2
Pre	0	3	3	0	-	-	0

Bellman-Ford Algorithm

(3, 1)
(3, 2)
(6, 2)

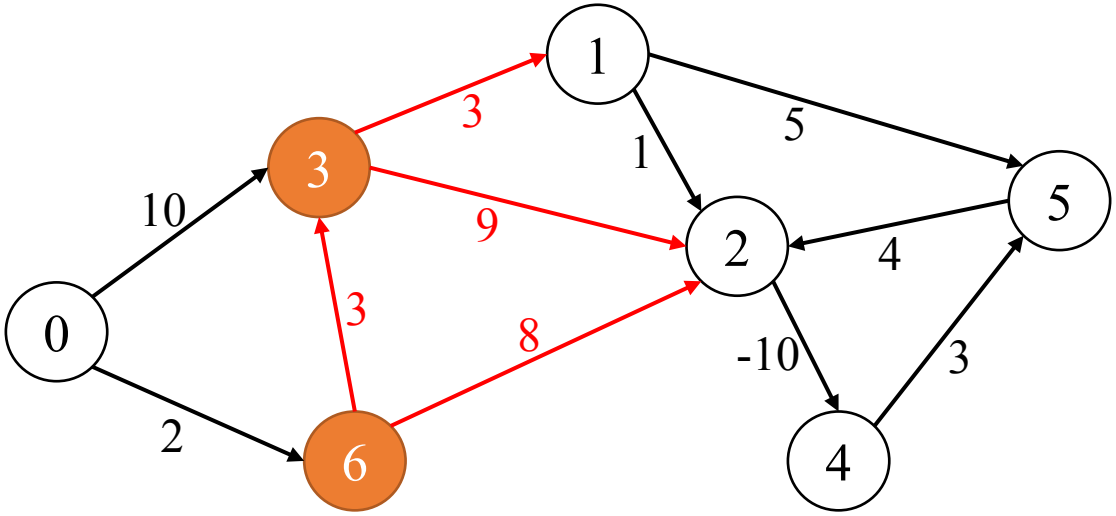


i = 2

Node	0	1	2	3	4	5	6
M[·]	0	13	~~19~~ 10	10	-	-	2
Pre	0	3	~~3~~ 6	0	-	-	0

Bellman-Ford Algorithm

(3, 1)
(3, 2)
(6, 2)
(6, 3)

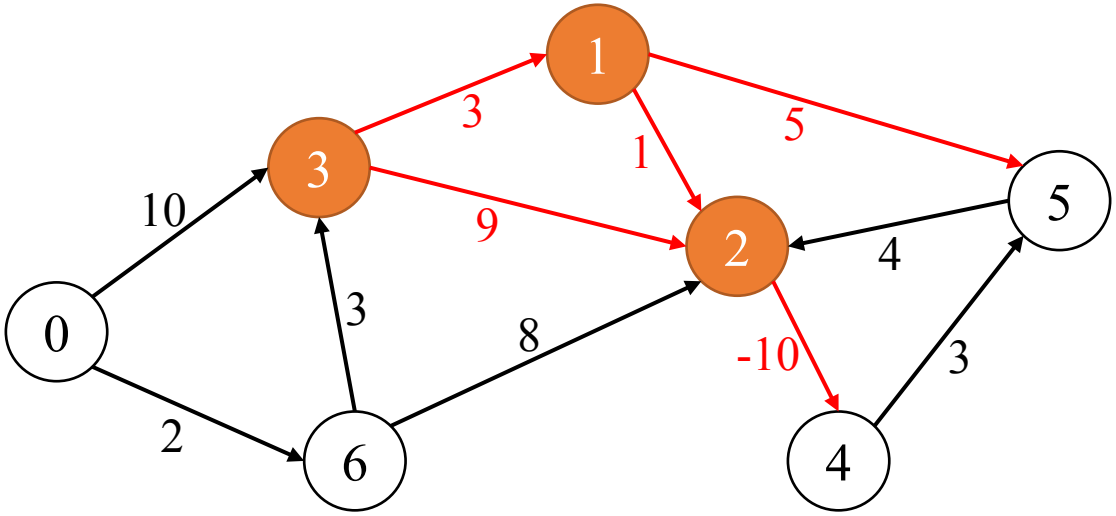


i = 2

Node	0	1	2	3	4	5	6
M[·]	0	13	~~19~~ 10	5	-	-	2
Pre	0	3	~~3~~ 6	6	-	-	0

Bellman-Ford Algorithm

(1, 2)

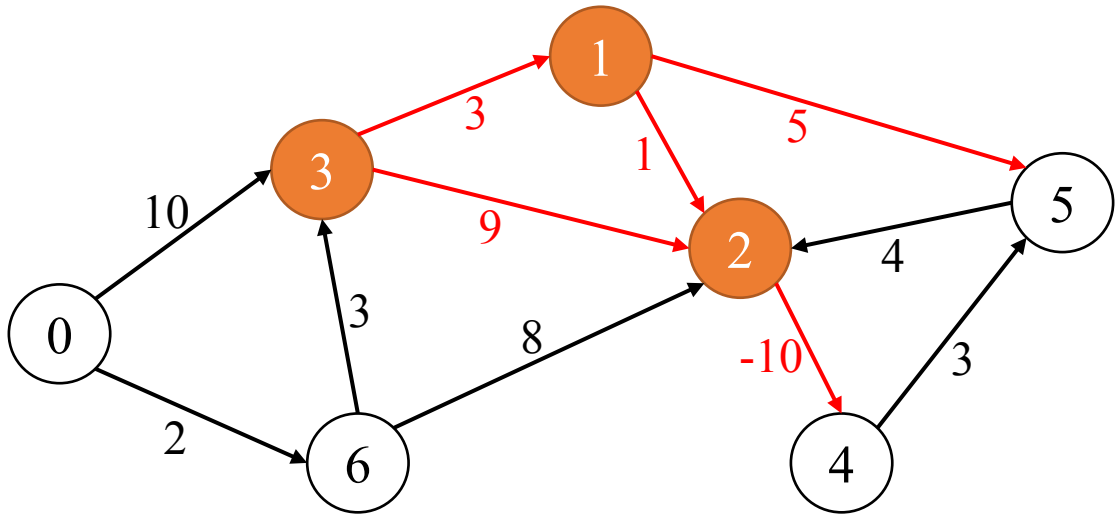


i = 3

Node	0	1	2	3	4	5	6
M[·]	0	13	10	5	-	-	2
Pre	0	3	6	6	-	-	0

Bellman-Ford Algorithm

(1, 2)
(1, 5)

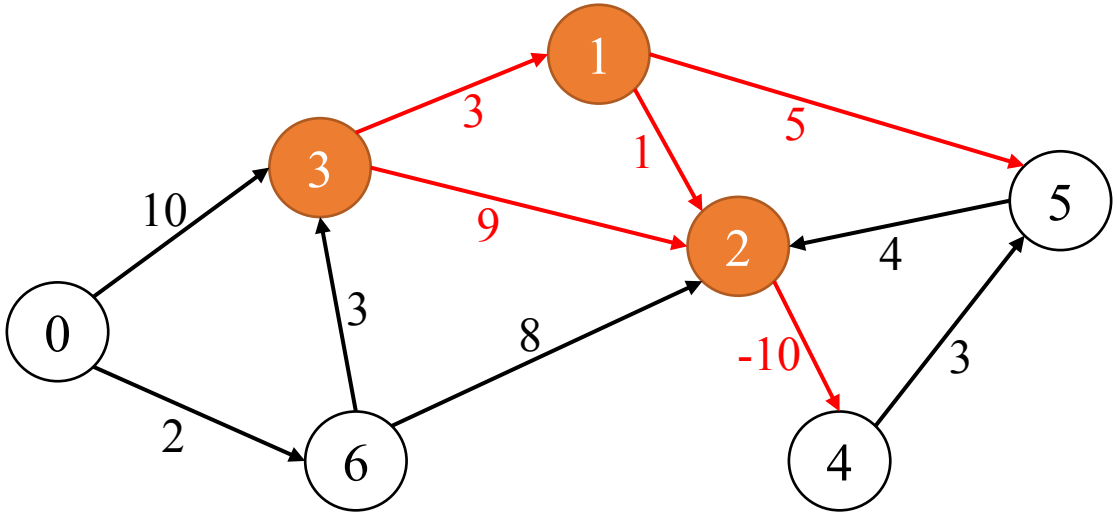


i = 3

Node	0	1	2	3	4	5	6
M[·]	0	13	10	5	-	18	2
Pre	0	3	6	6	-	1	0

Bellman-Ford Algorithm

(1, 2)
(1, 5)
(2, 4)

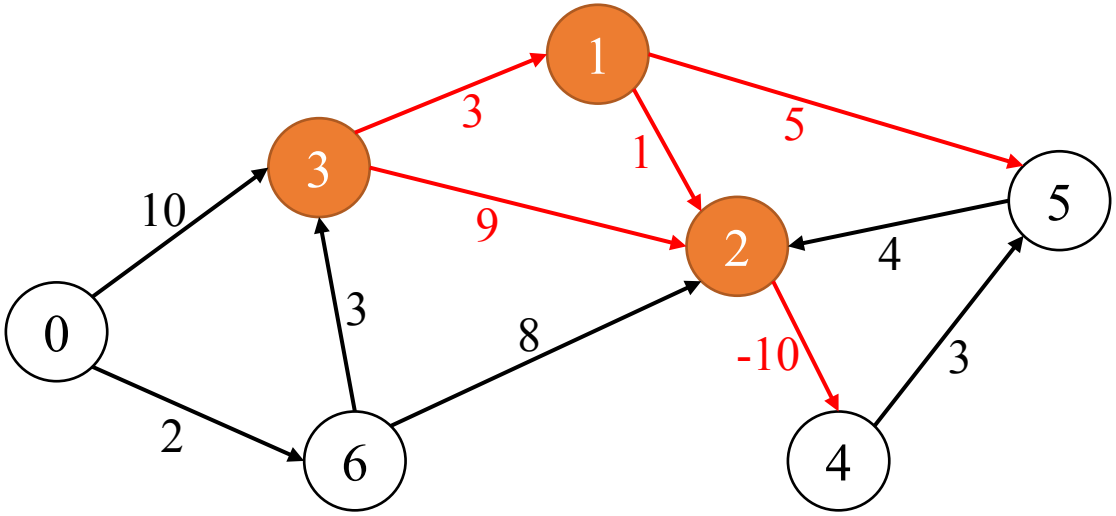


i = 3

Node	0	1	2	3	4	5	6
M[·]	0	13	10	5	0	18	2
Pre	0	3	6	6	2	1	0

Bellman-Ford Algorithm

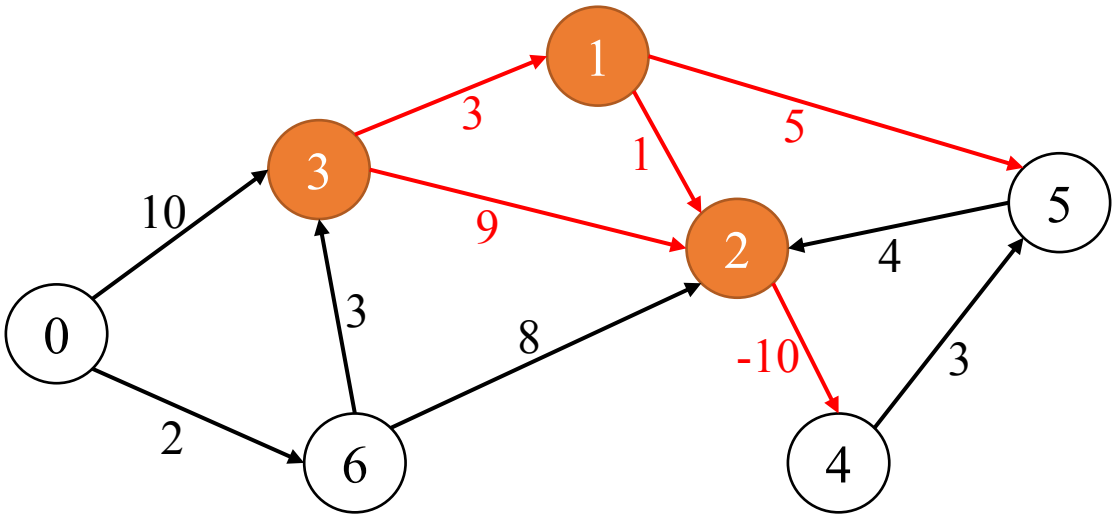
(1, 2)
(1, 5)
(2, 4)
(3, 1)



i = 3

Node	0	1	2	3	4	5	6
M[·]	0	8	10	5	0	18	2
Pre	0	3	6	6	2	1	0

Bellman-Ford Algorithm



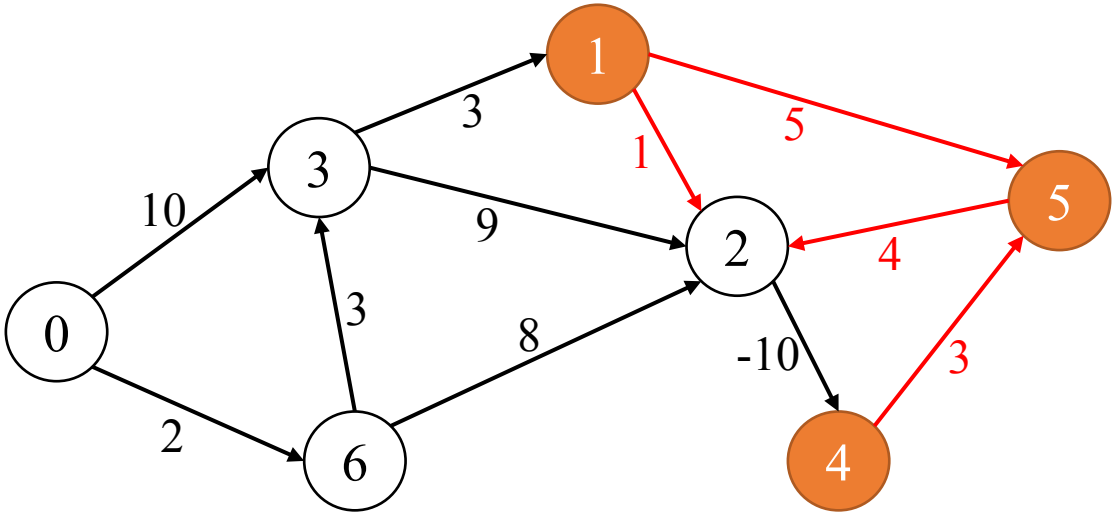
(1, 2)
(1, 5)
(2, 4)
(3, 1)
(3, 2)

i = 3

Node	0	1	2	3	4	5	6
M[·]	0	8	10	5	0	18	2
Pre	0	3	6	6	2	1	0

Bellman-Ford Algorithm

(1, 2)

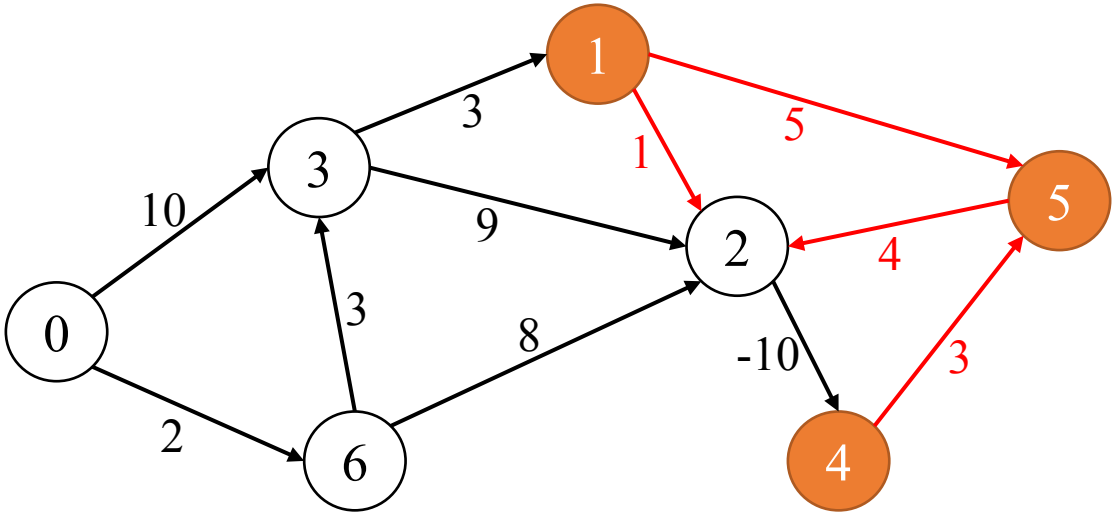


i = 4

Node	0	1	2	3	4	5	6
M[·]	0	8	9	5	0	18	2
Pre	0	3	1	6	2	1	0

Bellman-Ford Algorithm

(1, 2)
(1, 5)

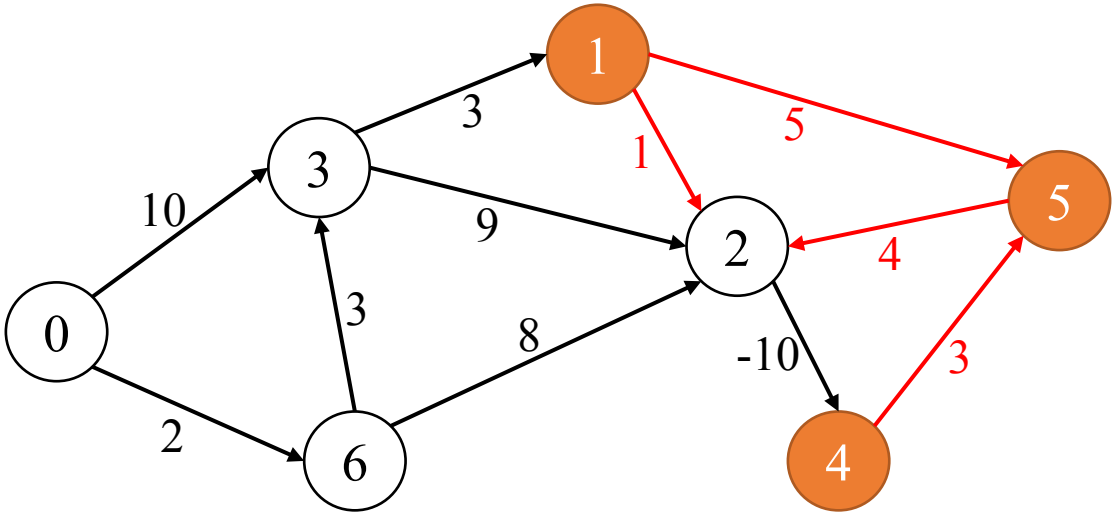


i = 4

Node	0	1	2	3	4	5	6
M[·]	0	8	9	5	0	13	2
Pre	0	3	1	6	2	1	0

Bellman-Ford Algorithm

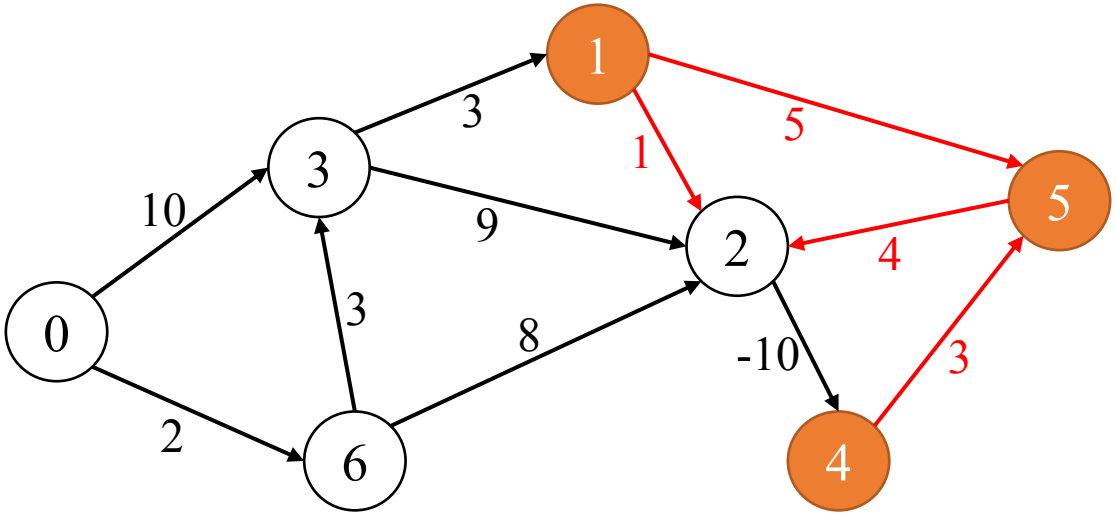
(1, 2)
(1, 5)
(4, 5)



i = 4

Node	0	1	2	3	4	5	6
M[·]	0	8	9	5	0	~~13~~ 3	2
Pre	0	3	1	6	2	~~1~~ 4	0

Bellman-Ford Algorithm



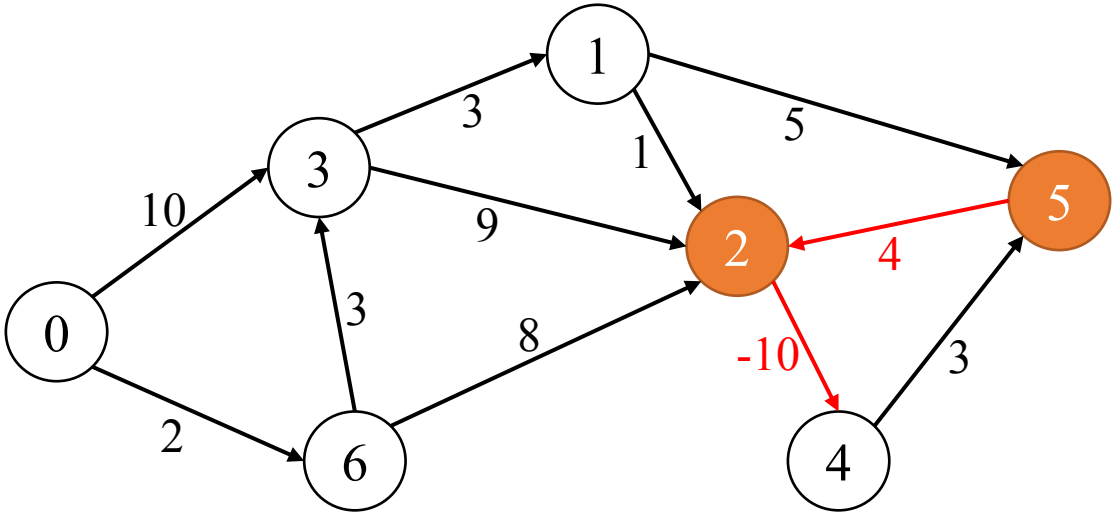
(1, 2)
(1, 5)
(4, 5)
(5, 2)

i = 4

Node	0	1	2	3	4	5	6
M[·]	0	8	7	5	0	~~13~~ 3	2
Pre	0	3	5	6	2	~~1~~ 4	0

Bellman-Ford Algorithm

(2, 4)

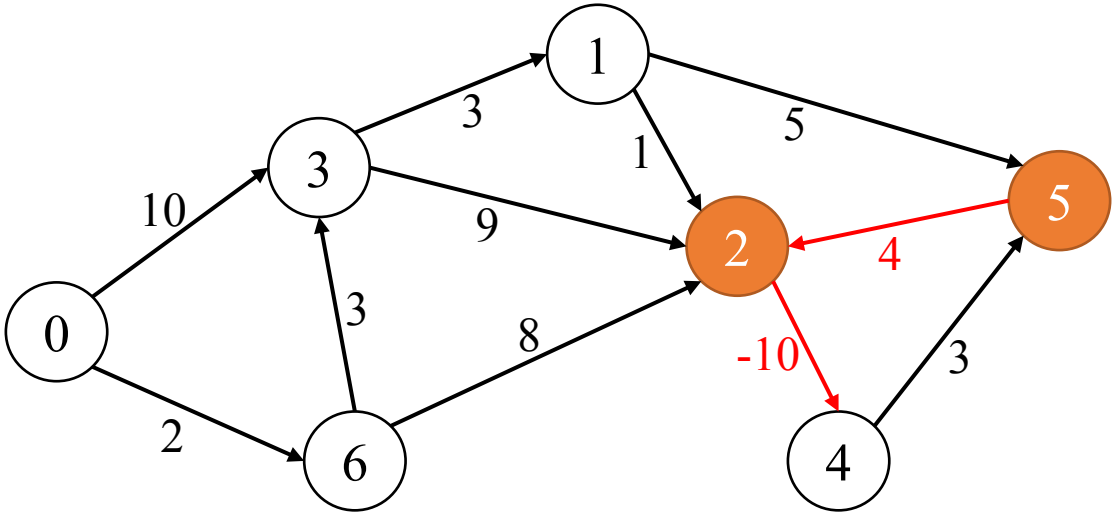


i = 5

Node	0	1	2	3	4	5	6
M[·]	0	8	7	5	-3	3	2
Pre	0	3	5	6	2	4	0

Bellman-Ford Algorithm

(2, 4)
(5, 2)

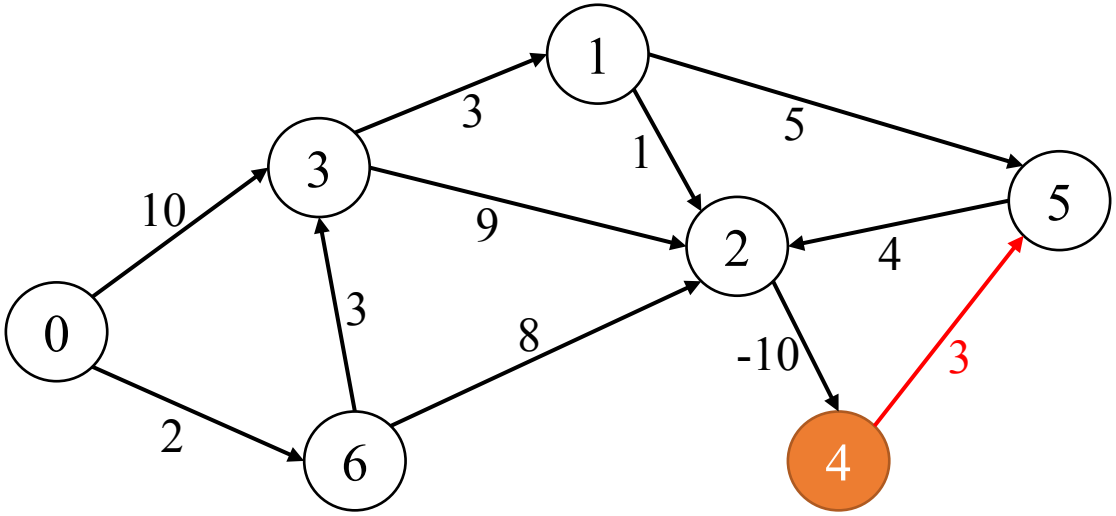


i = 5

Node	0	1	2	3	<u>4</u>	5	6
M[·]	0	8	7	5	-3	3	2
Pre	0	3	5	6	2	4	0

Bellman-Ford Algorithm

(4, 5)

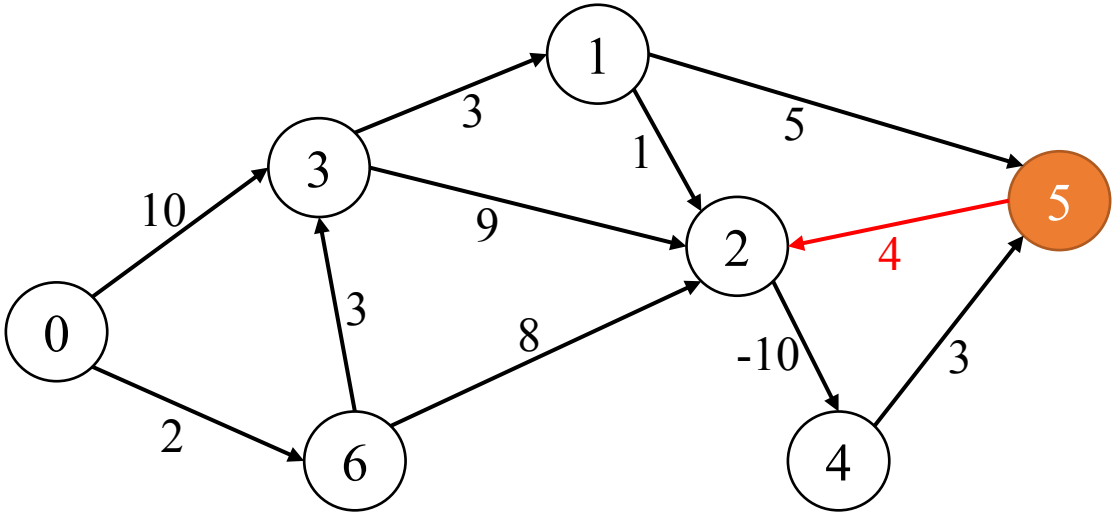


i = 6

Node	0	1	2	3	4	5	6
M[·]	0	8	7	5	-3	0	2
Pre	0	3	5	6	2	4	0

Bellman-Ford Algorithm

(5, 2)

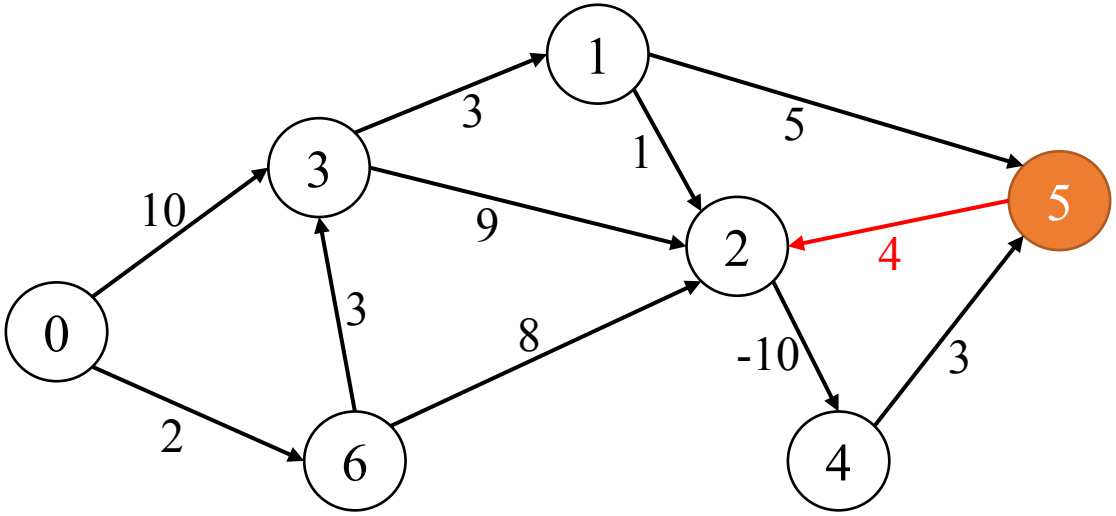


i = 7

Node	0	1	2	3	4	5	6
M[·]	0	8	4	5	-3	0	2
Pre	0	3	5	6	2	4	0

Bellman-Ford Algorithm

(5, 2)



N = 7

i = 7

Node	0	1	2	3	4	5	6
M[·]	0	8	4	5	-3	0	2
Pre	0	3	5	6	2	4	0

Negative Cycle Detected