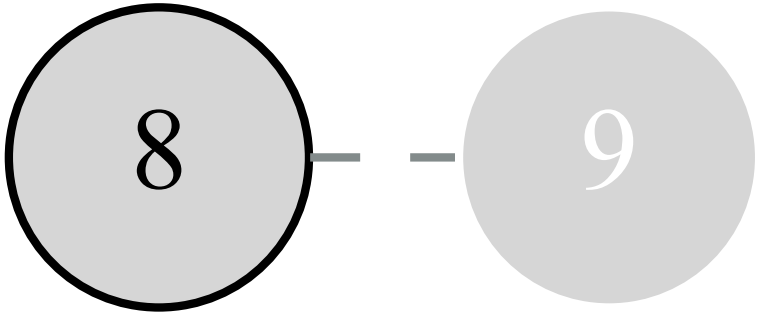
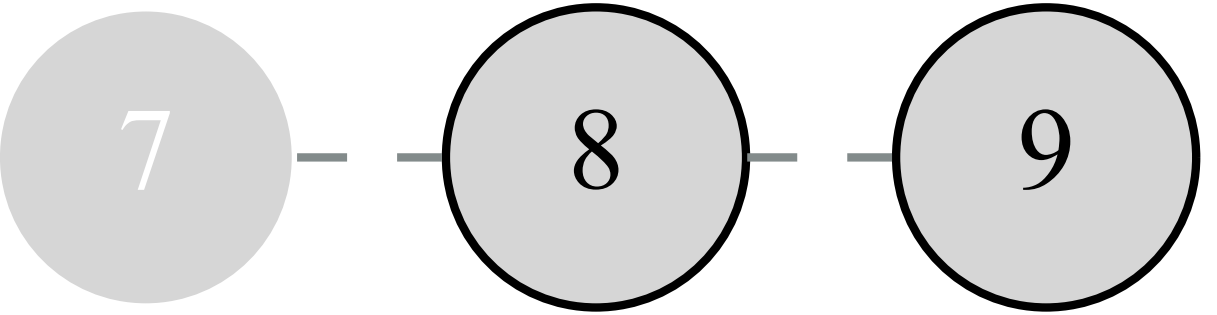
Inserting
Inserted node with key 8.

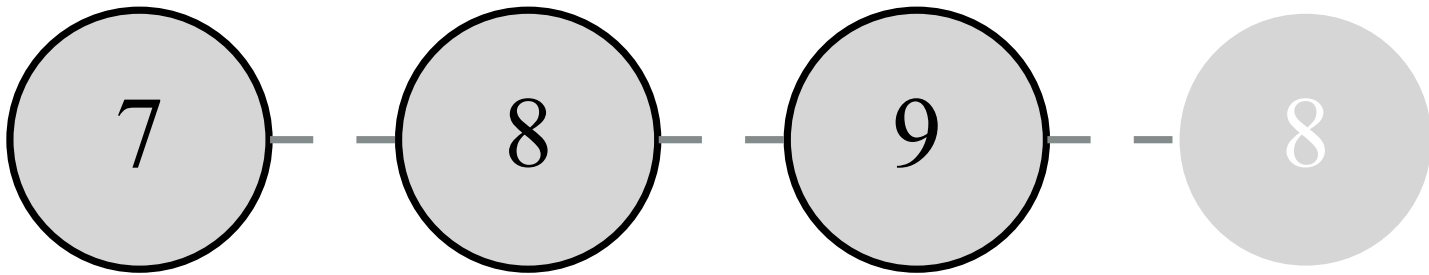
Inserting
Inserted node with key 9.



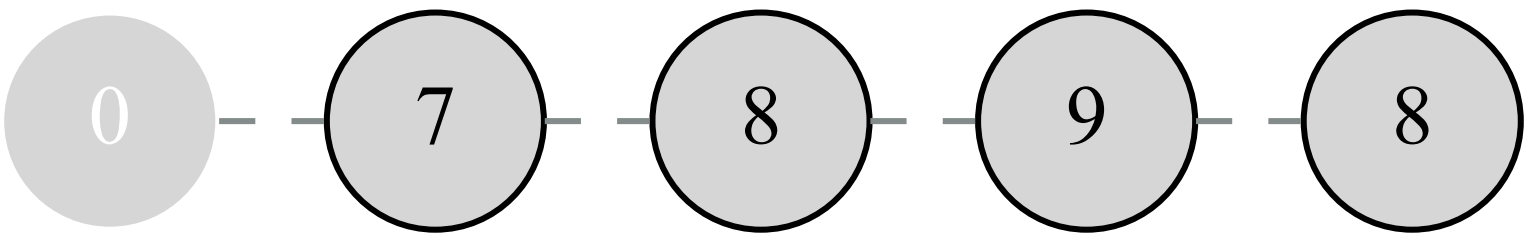
Inserting
Inserted node with key 7.



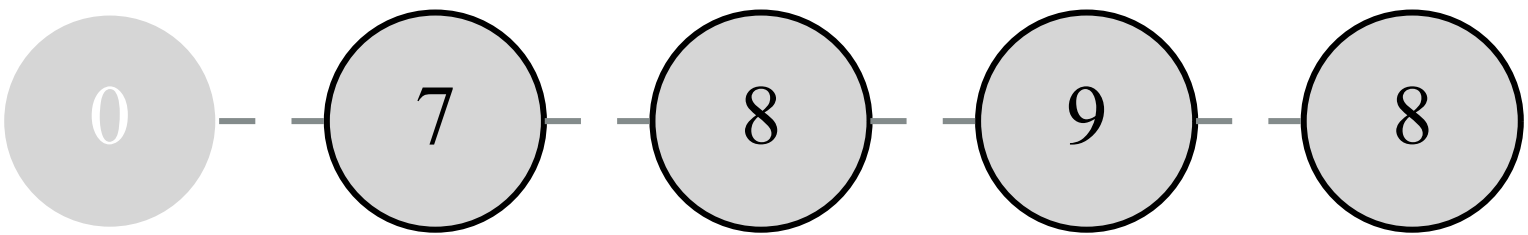
Inserting
Inserted node with key 8.



Inserting
Inserted node with key 0.

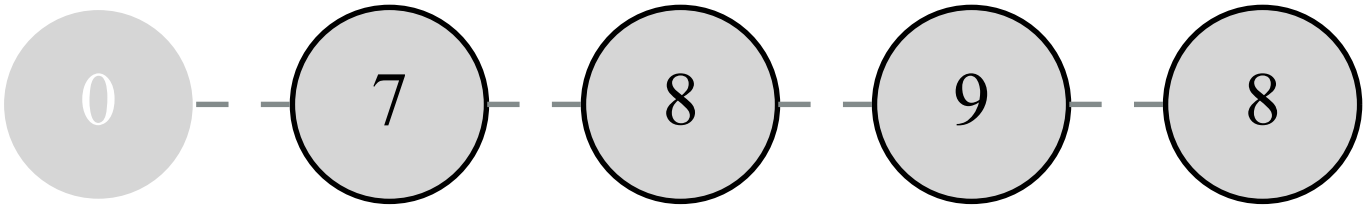


Extracting Minimum
Extracting node with key 0;



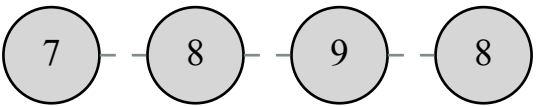
Extracting Minimum

We first meld the child list of 0 into the root list...



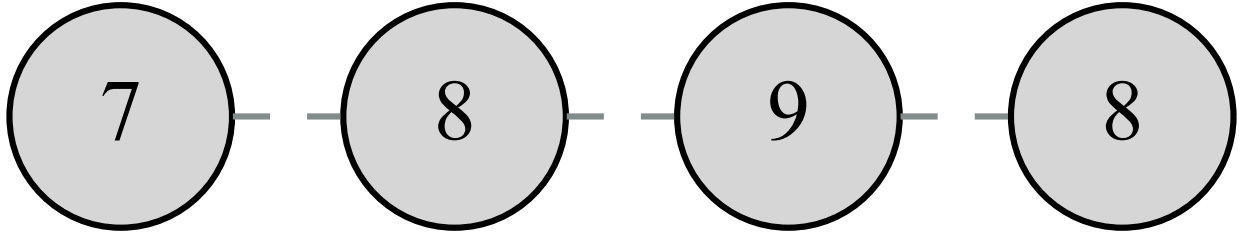
Extracting Minimum

... and remove the minimum node form the root list;

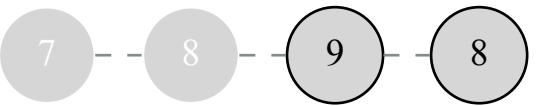


Extracting Minimum

Now we consolidate the Fibonacci heap;

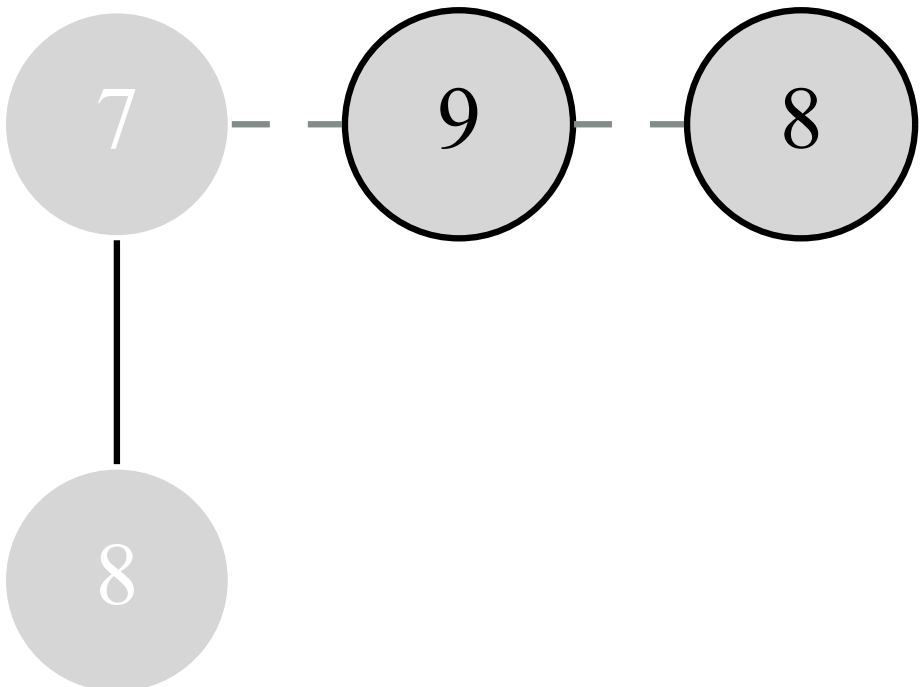


Extracting Minimum
Trees with roots 8 and 7 have the same degree (0)...

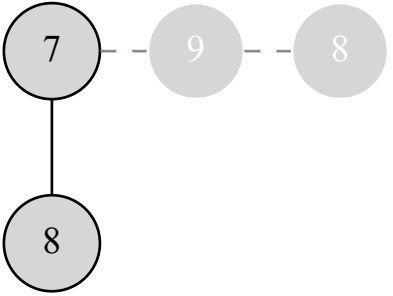


Extracting Minimum

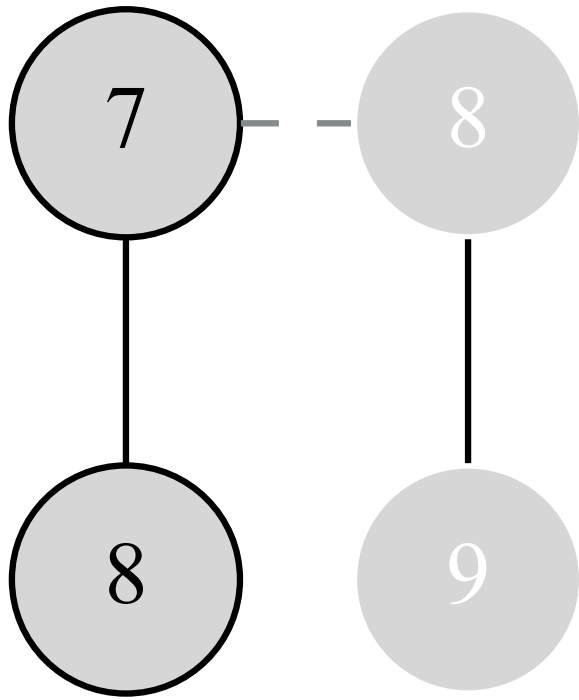
... so we append 8 to the child list of 7;



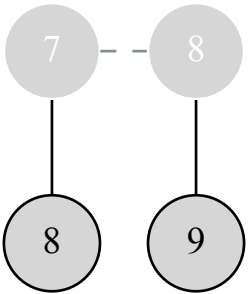
Extracting Minimum
Trees with roots 8 and 9 have the same degree (0)...



Extracting Minimum
... so we append 9 to the child list of 8;

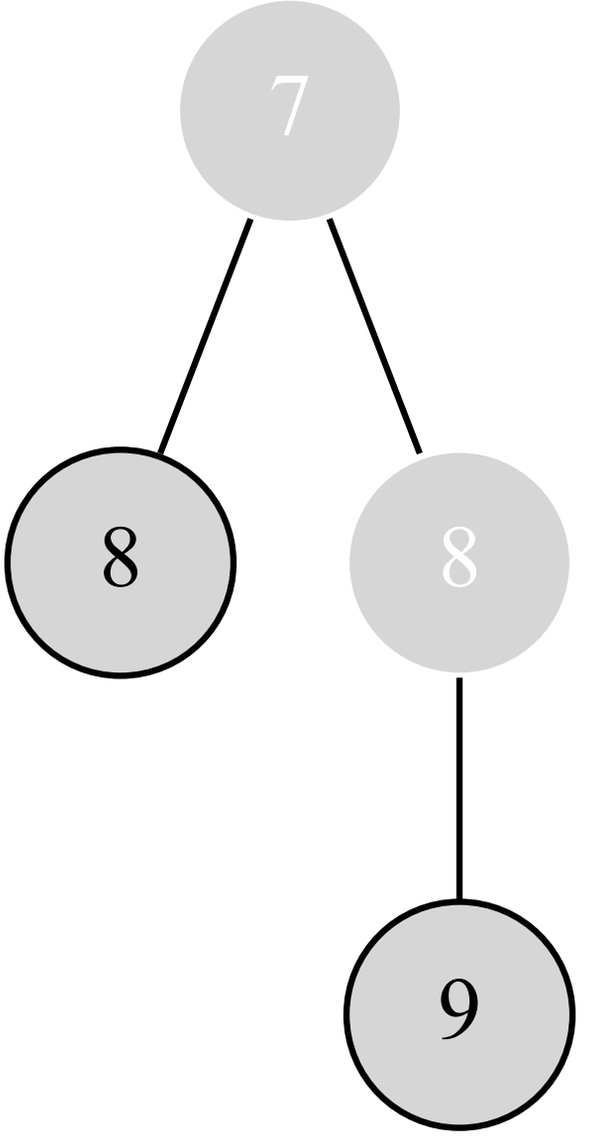


Extracting Minimum
Trees with roots 8 and 7 have the same degree (1)...

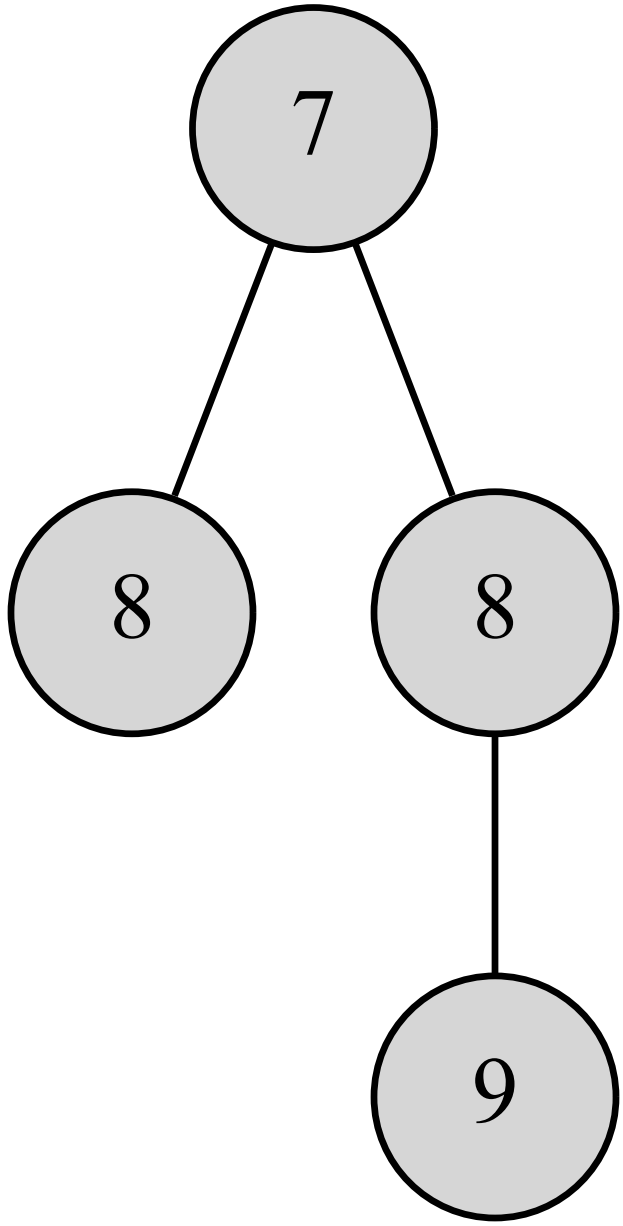


Extracting Minimum

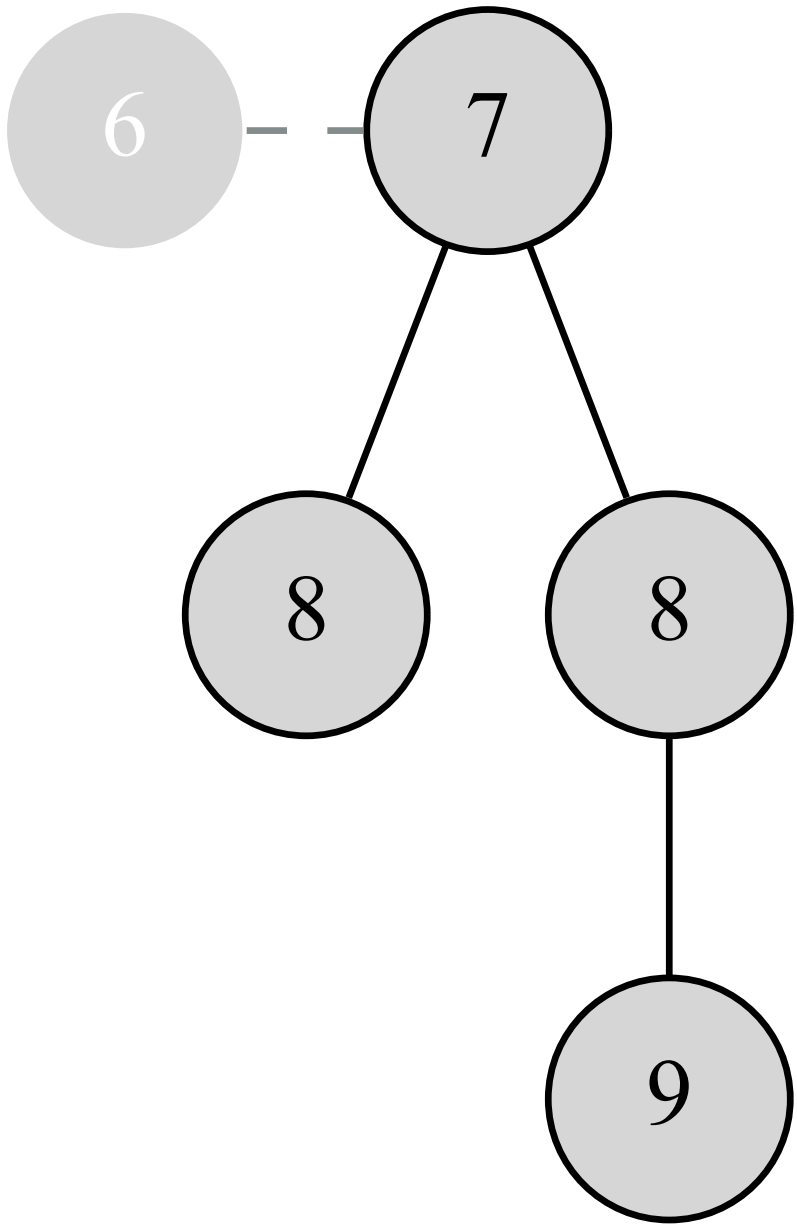
... so we append 8 to the child list of 7;



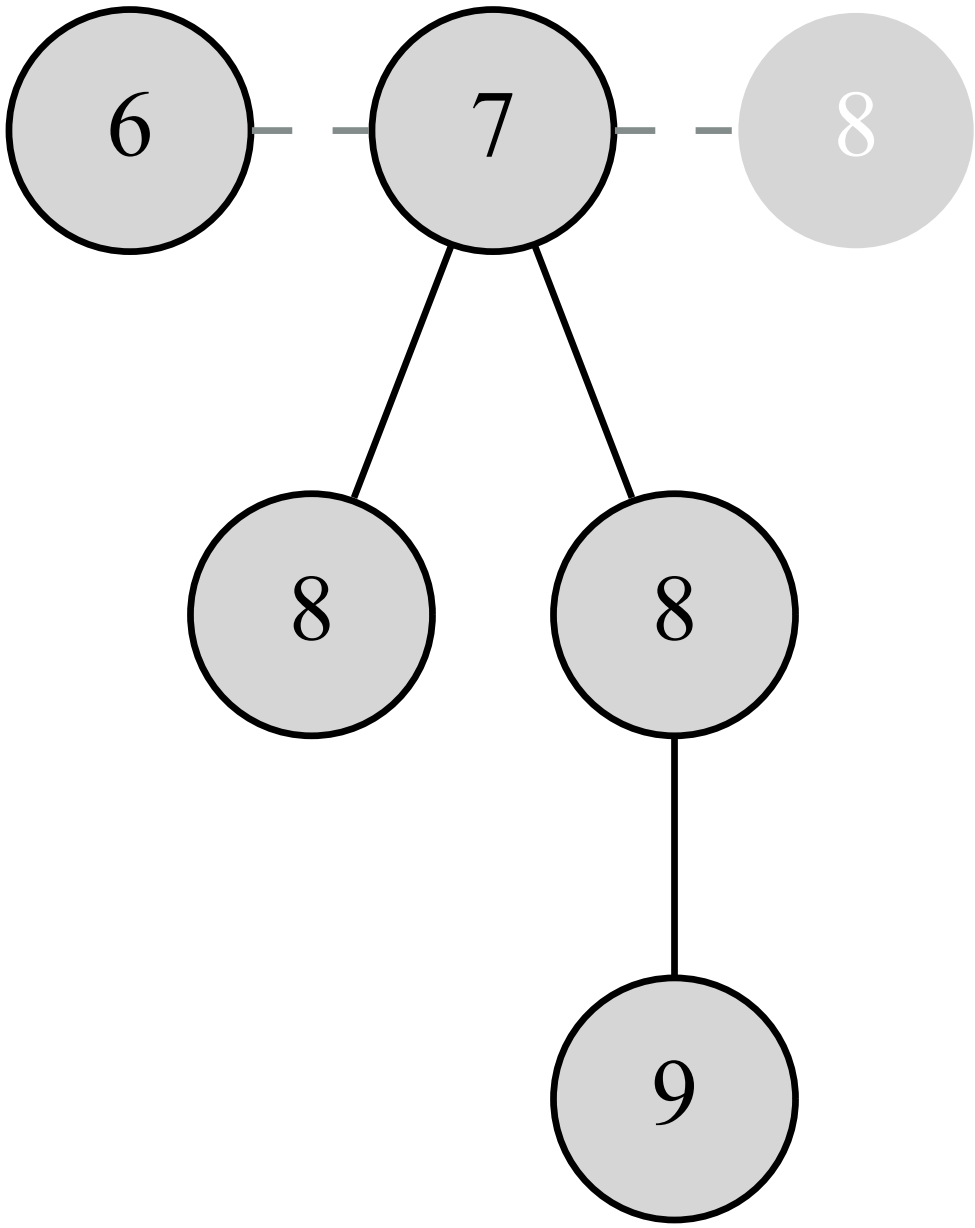
Extracting Minimum
And we are done.



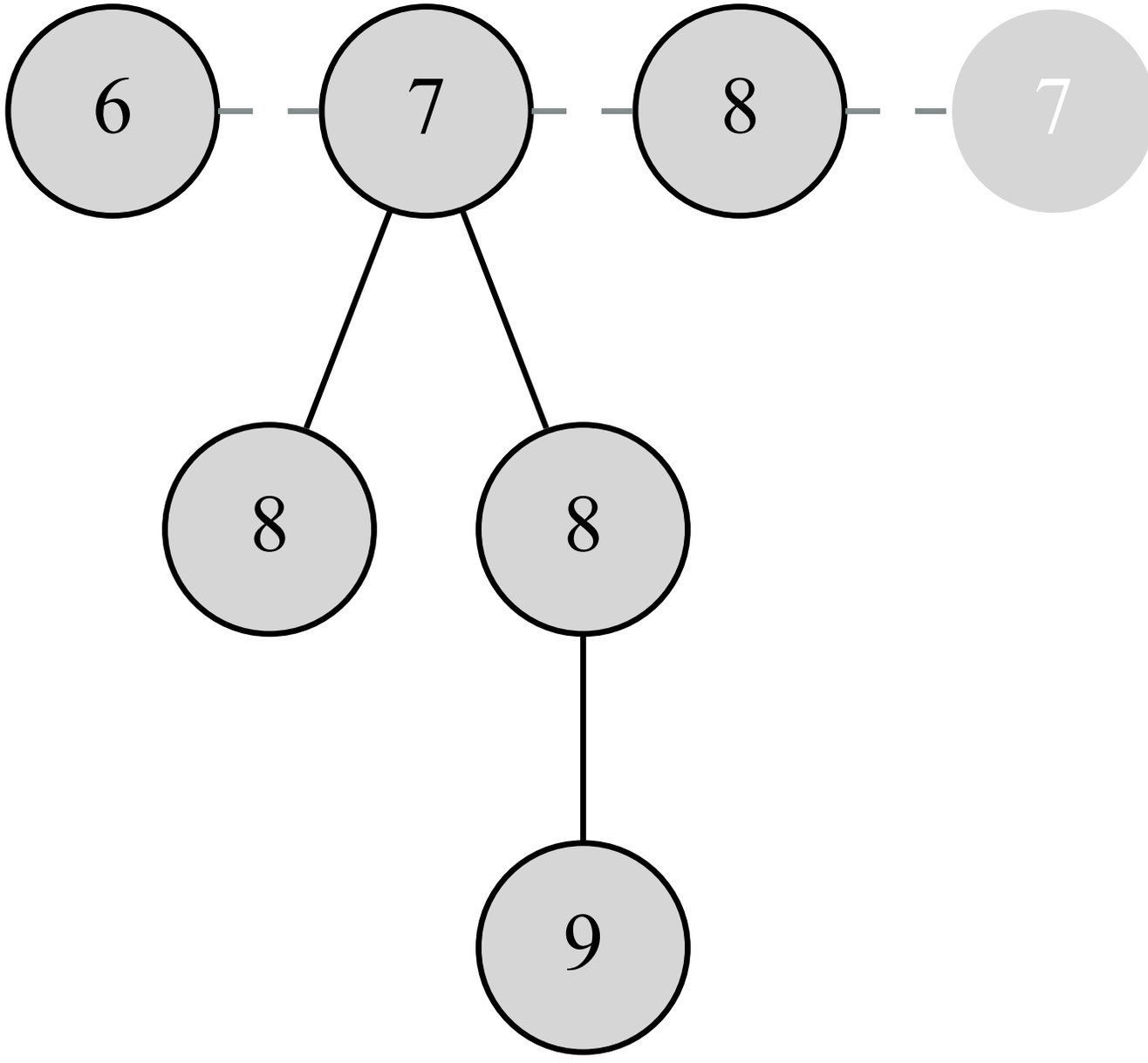
Inserting
Inserted node with key 6.



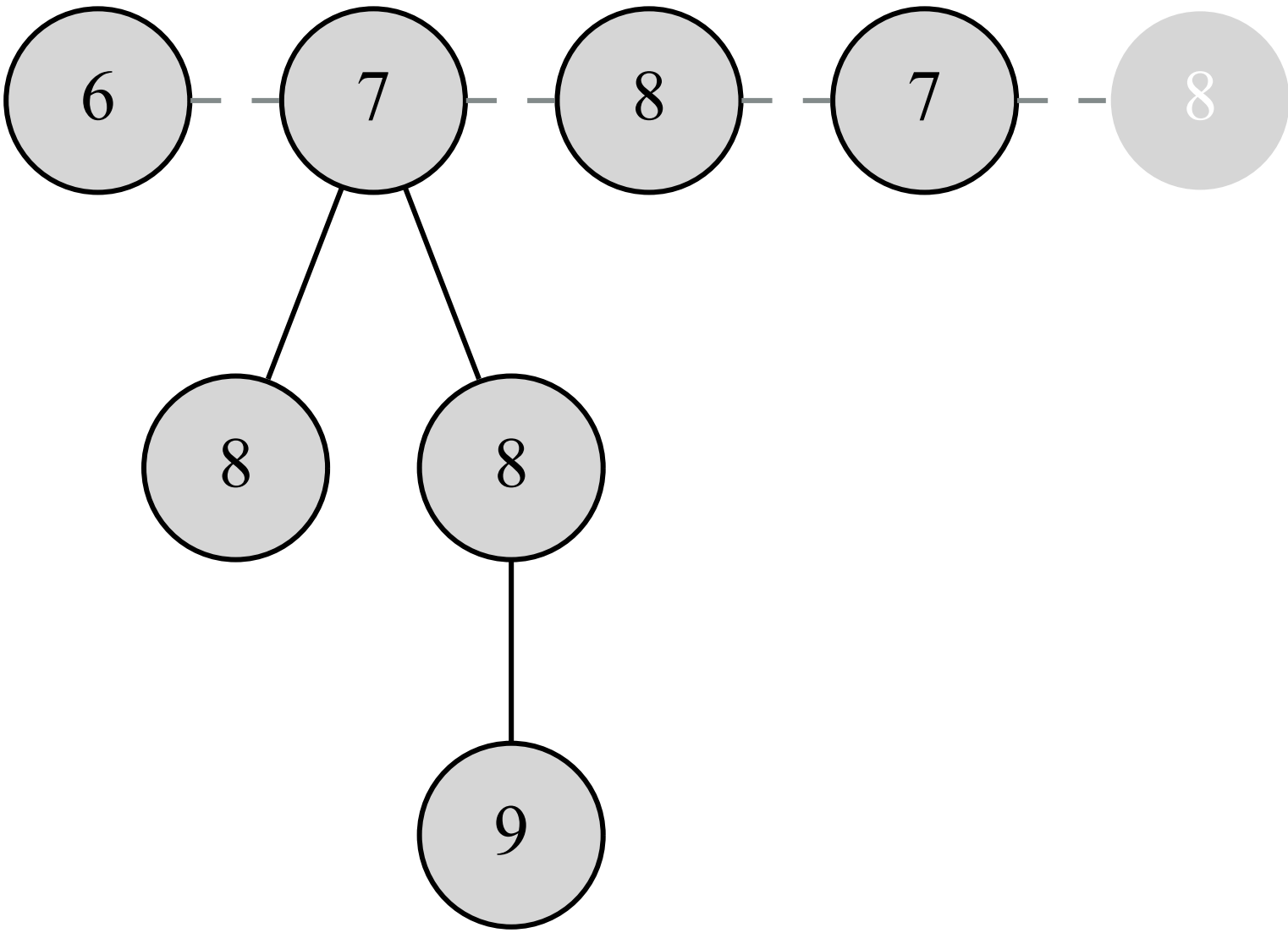
Inserting
Inserted node with key 8.



Inserting
Inserted node with key 7.

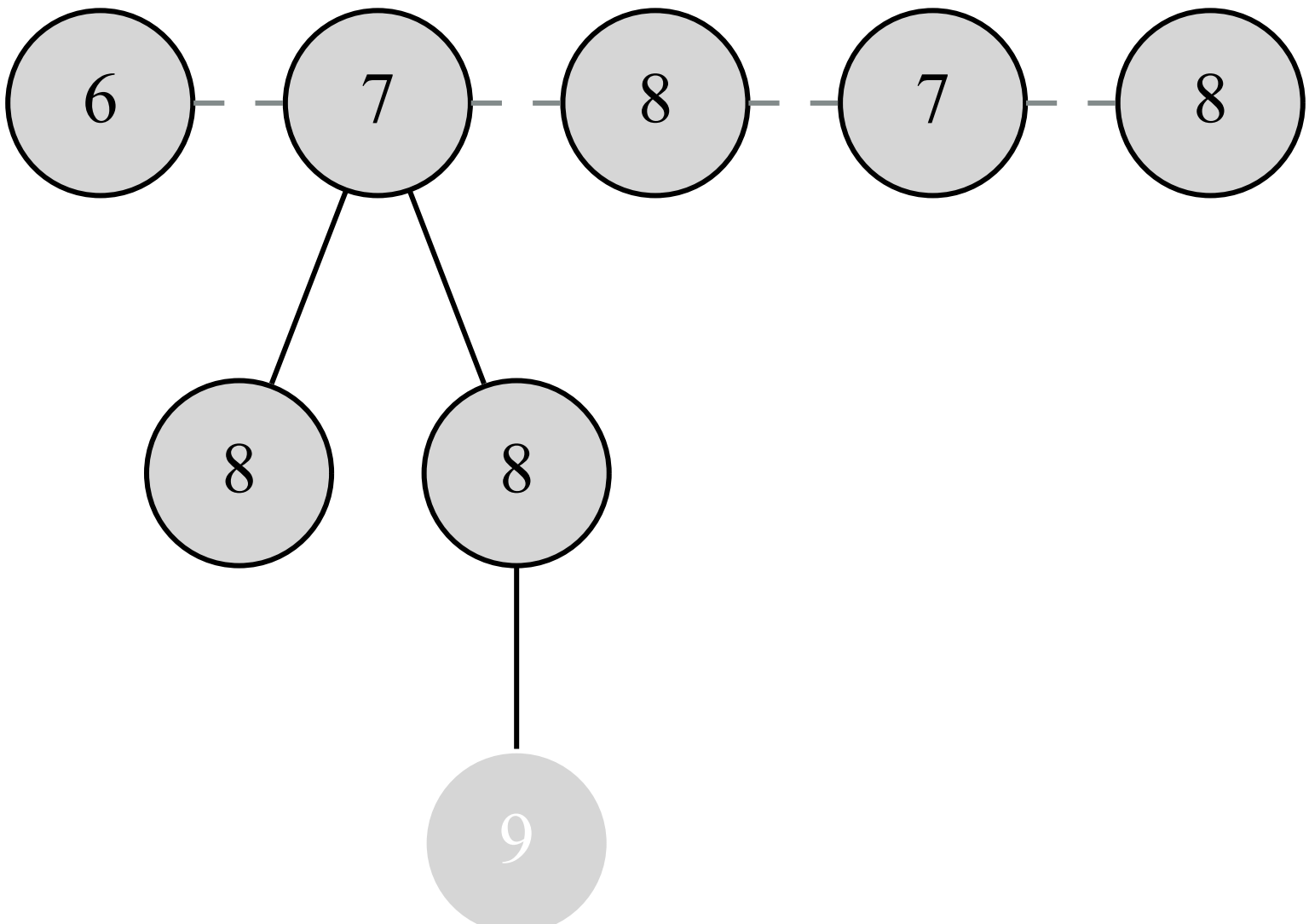


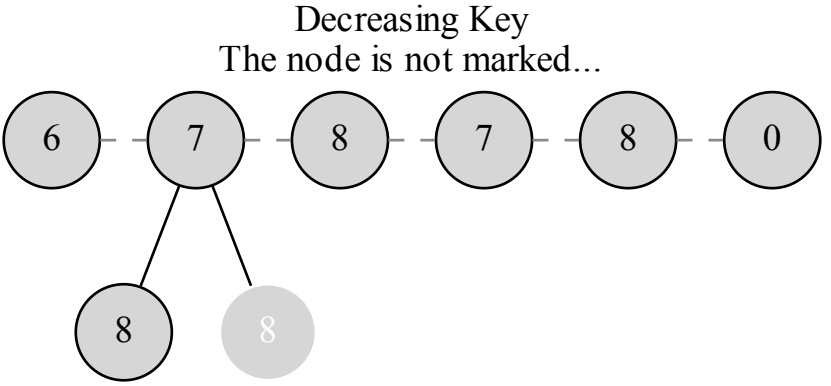
Inserting
Inserted node with key 8.



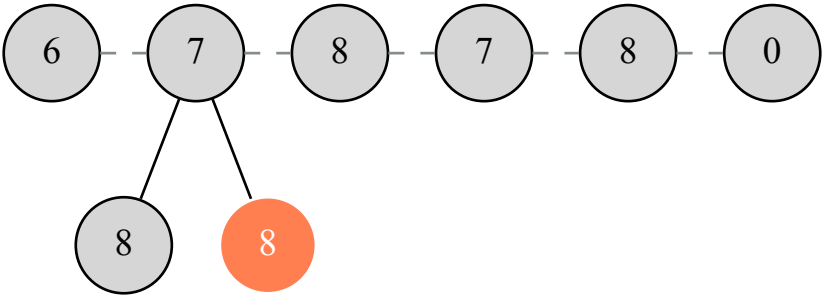
Decreasing Key

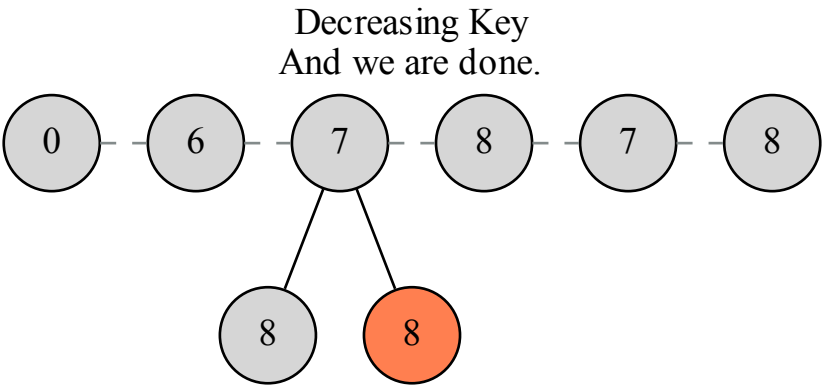
Decreasing key of node 9 to 0;

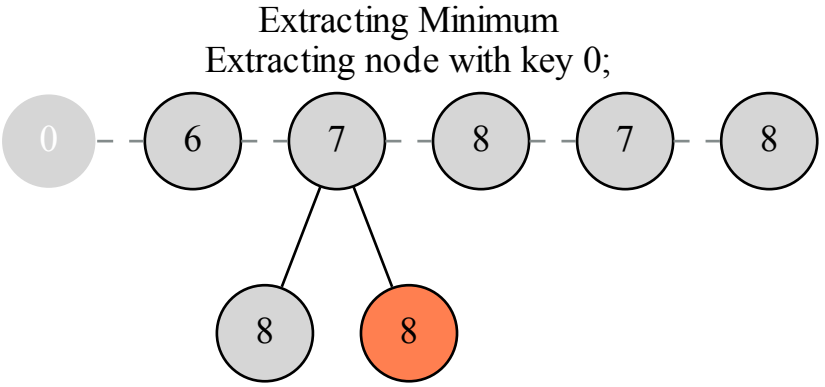



Decreasing Key
The node is not marked...
6
7
8
7
8
0
8
8

Decreasing Key
... so we mark it and finish the cascading cut.

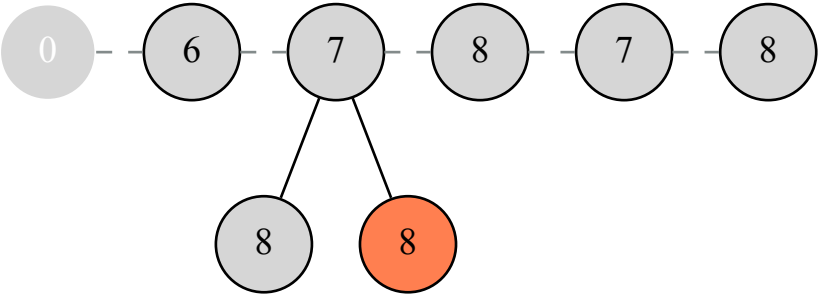



Decreasing Key
And we are done.
0
6
7
8
7
8
8
8


Extracting Minimum
Extracting node with key 0;
0
6
7
8
7
8
8
8

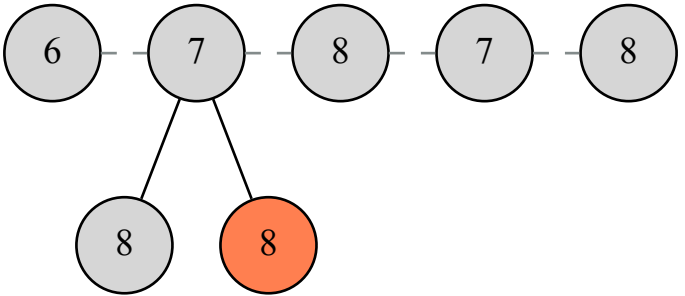
Extracting Minimum

We first meld the child list of 0 into the root list...



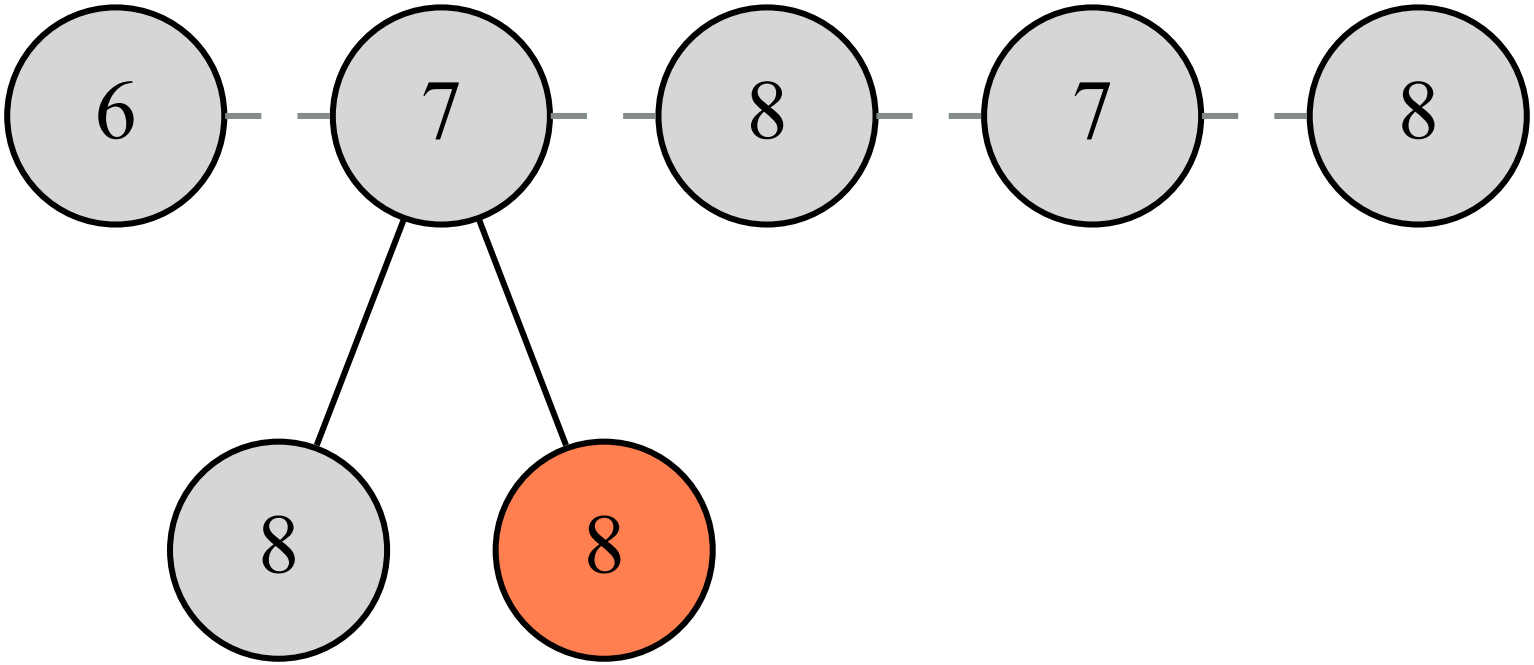
Extracting Minimum

... and remove the minimum node form the root list;



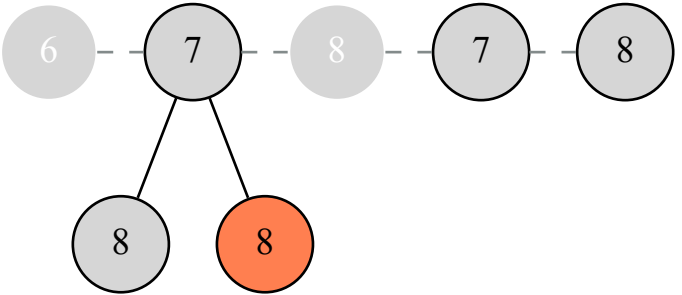
Extracting Minimum

Now we consolidate the Fibonacci heap;



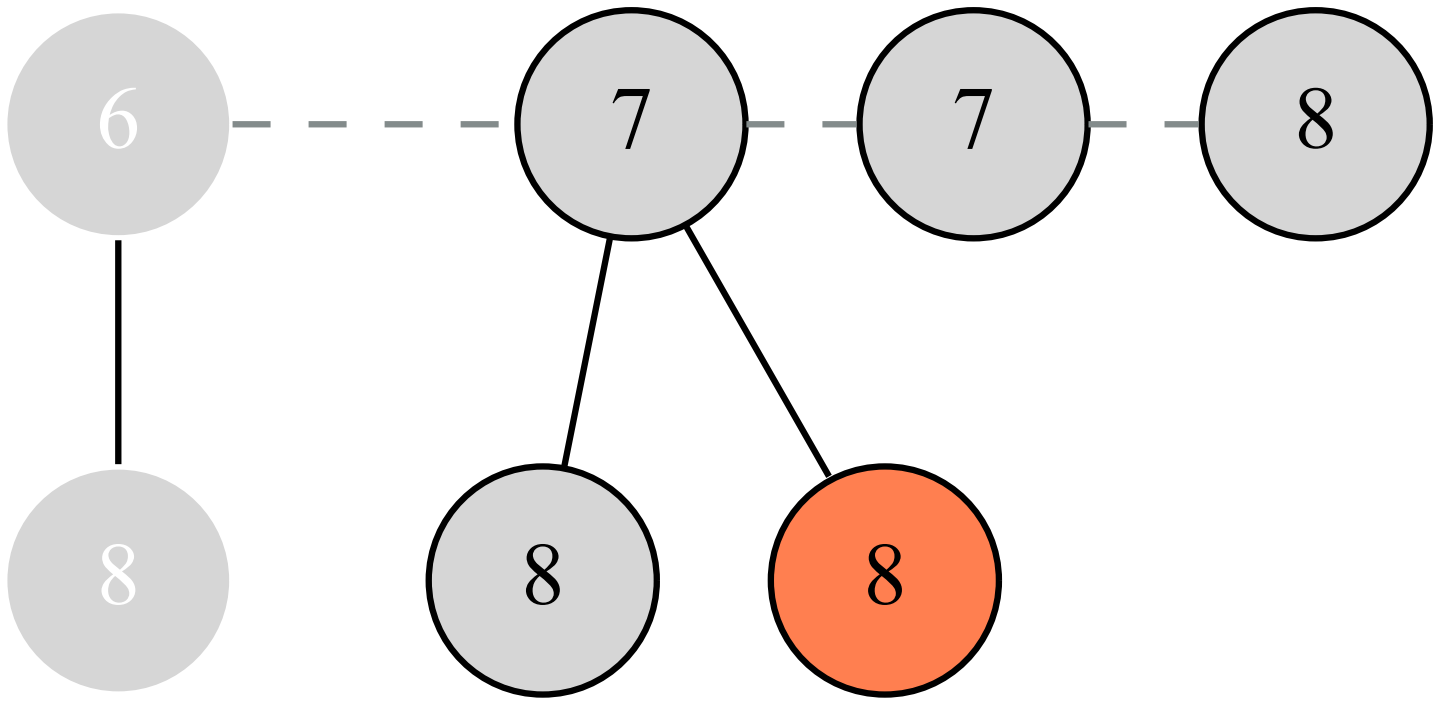
Extracting Minimum

Trees with roots 8 and 6 have the same degree (0)...



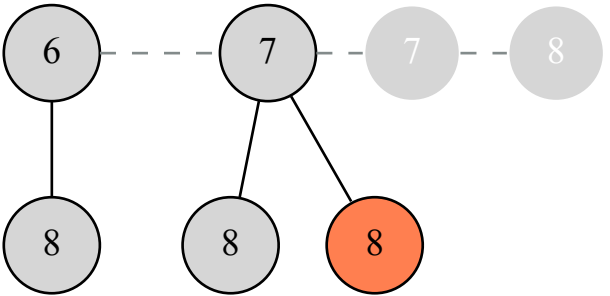
Extracting Minimum

... so we append 8 to the child list of 6;

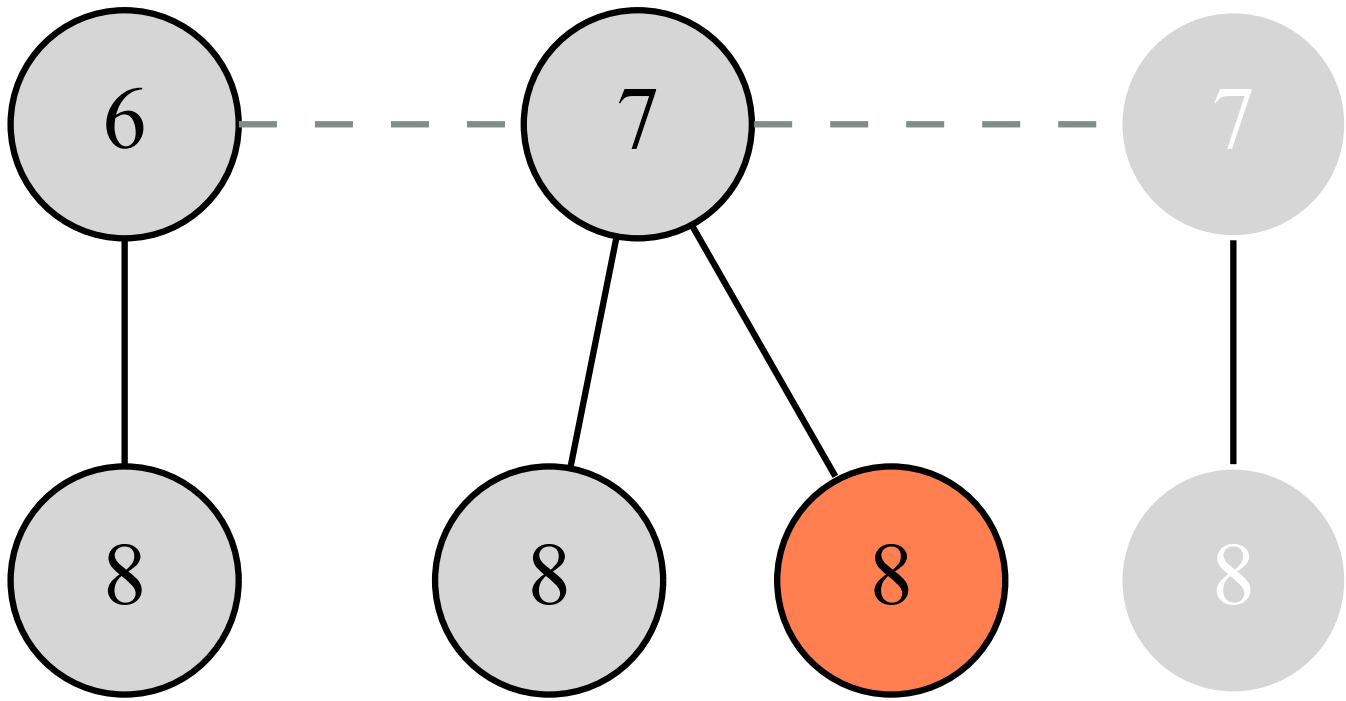


Extracting Minimum

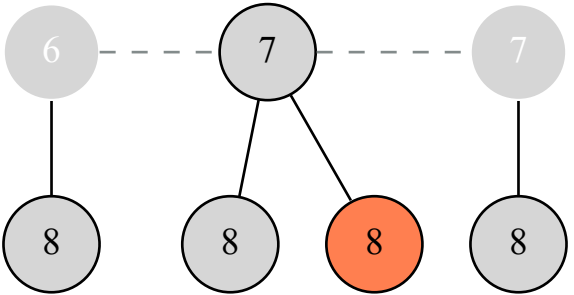
Trees with roots 8 and 7 have the same degree (0)...



Extracting Minimum
... so we append 8 to the child list of 7;

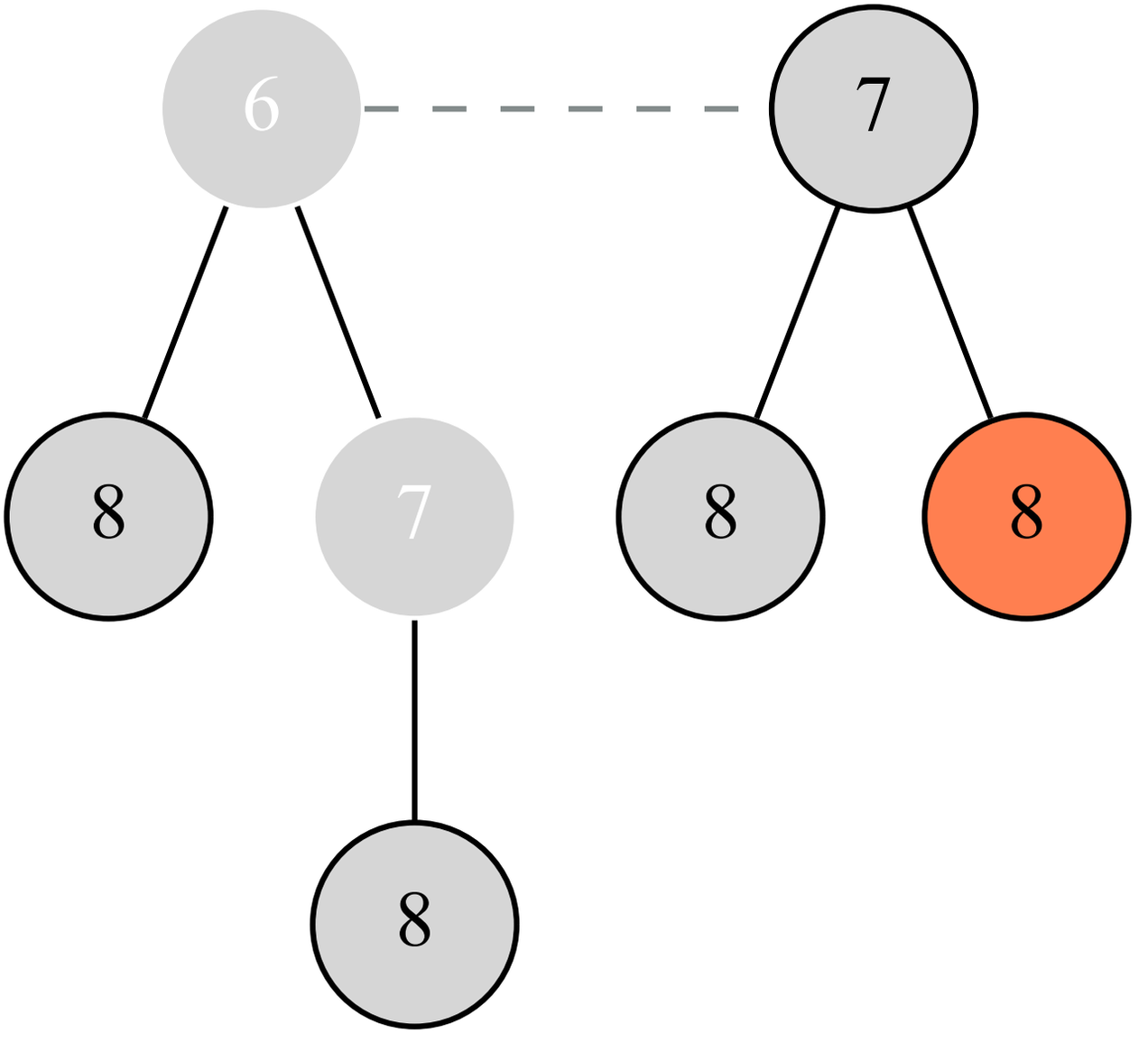


Extracting Minimum
Trees with roots 7 and 6 have the same degree (1)...

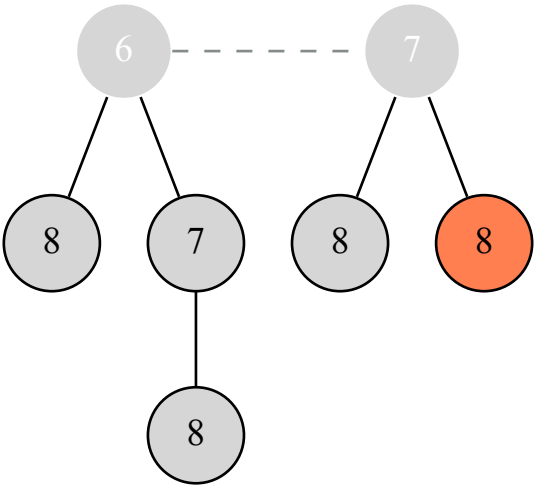


Extracting Minimum

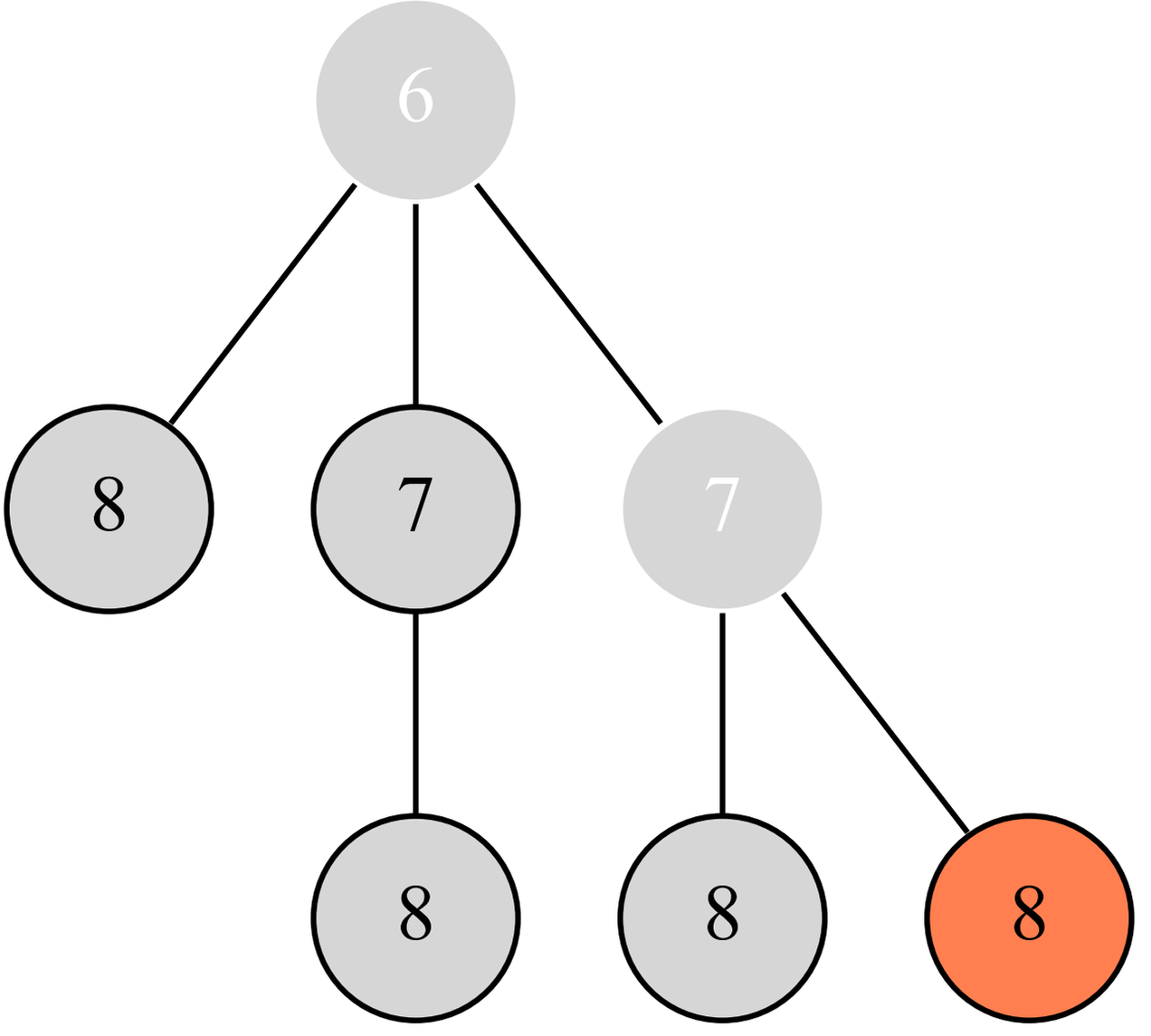
... so we append 7 to the child list of 6;



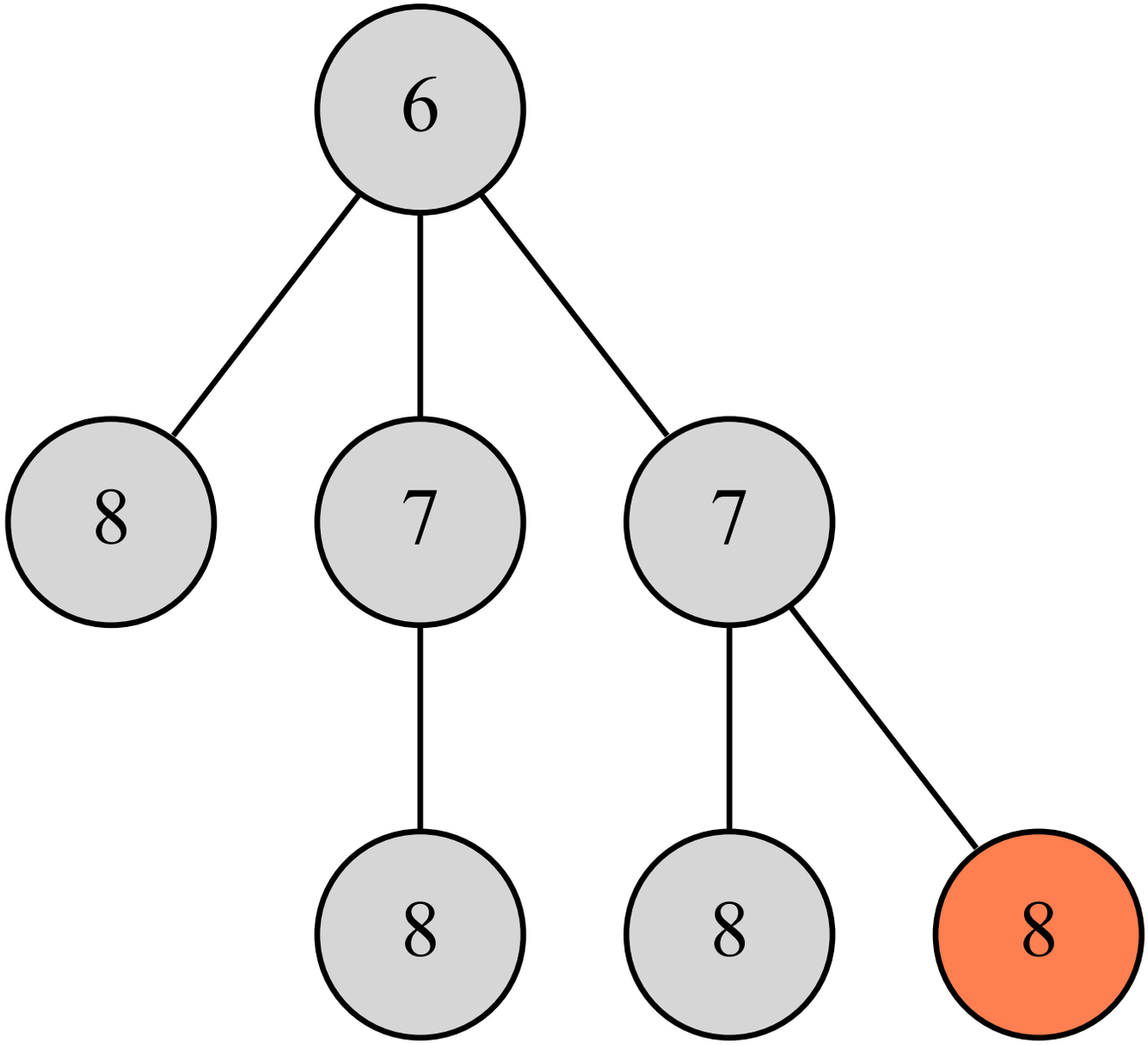
Extracting Minimum
Trees with roots 6 and 7 have the same degree (2)...



Extracting Minimum
... so we append 7 to the child list of 6;

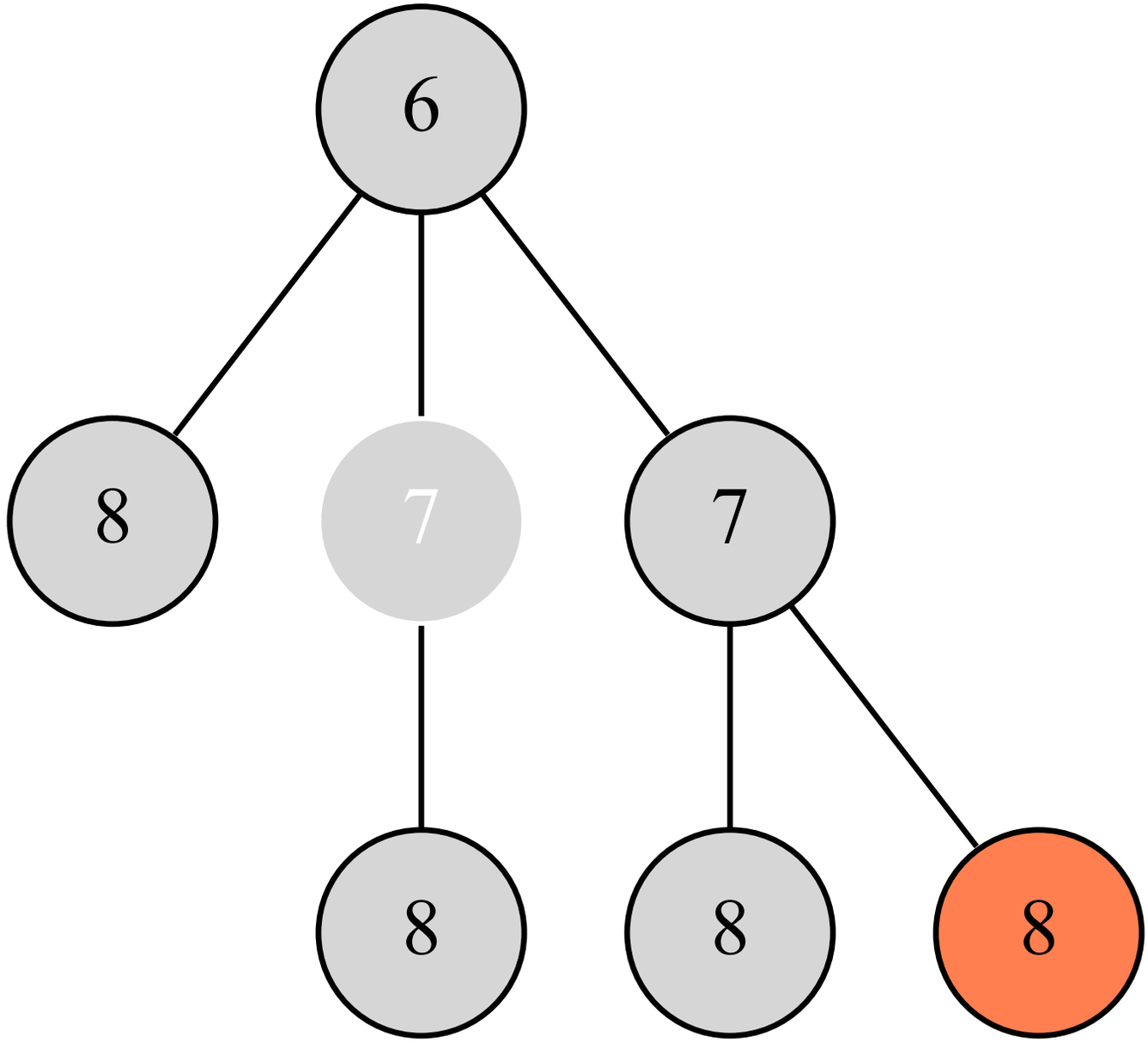


Extracting Minimum
And we are done.



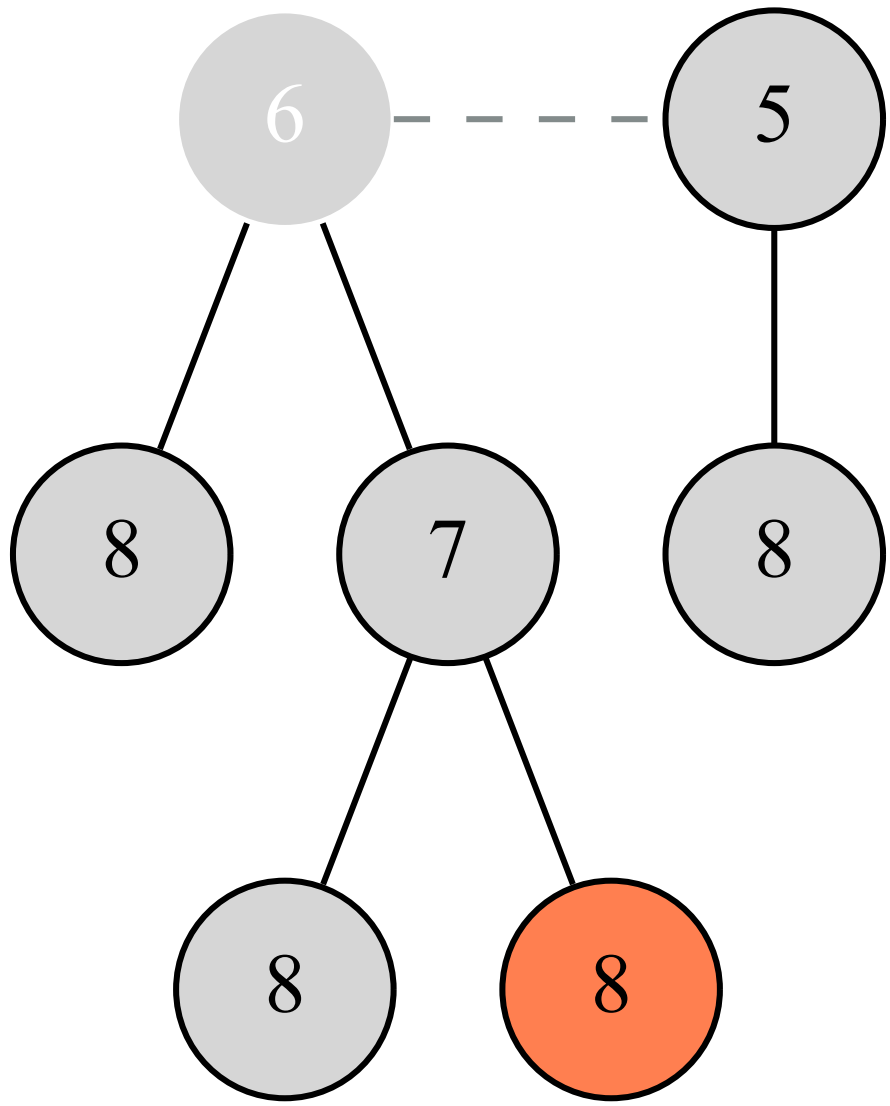
Decreasing Key

Decreasing key of node 7 to 5;

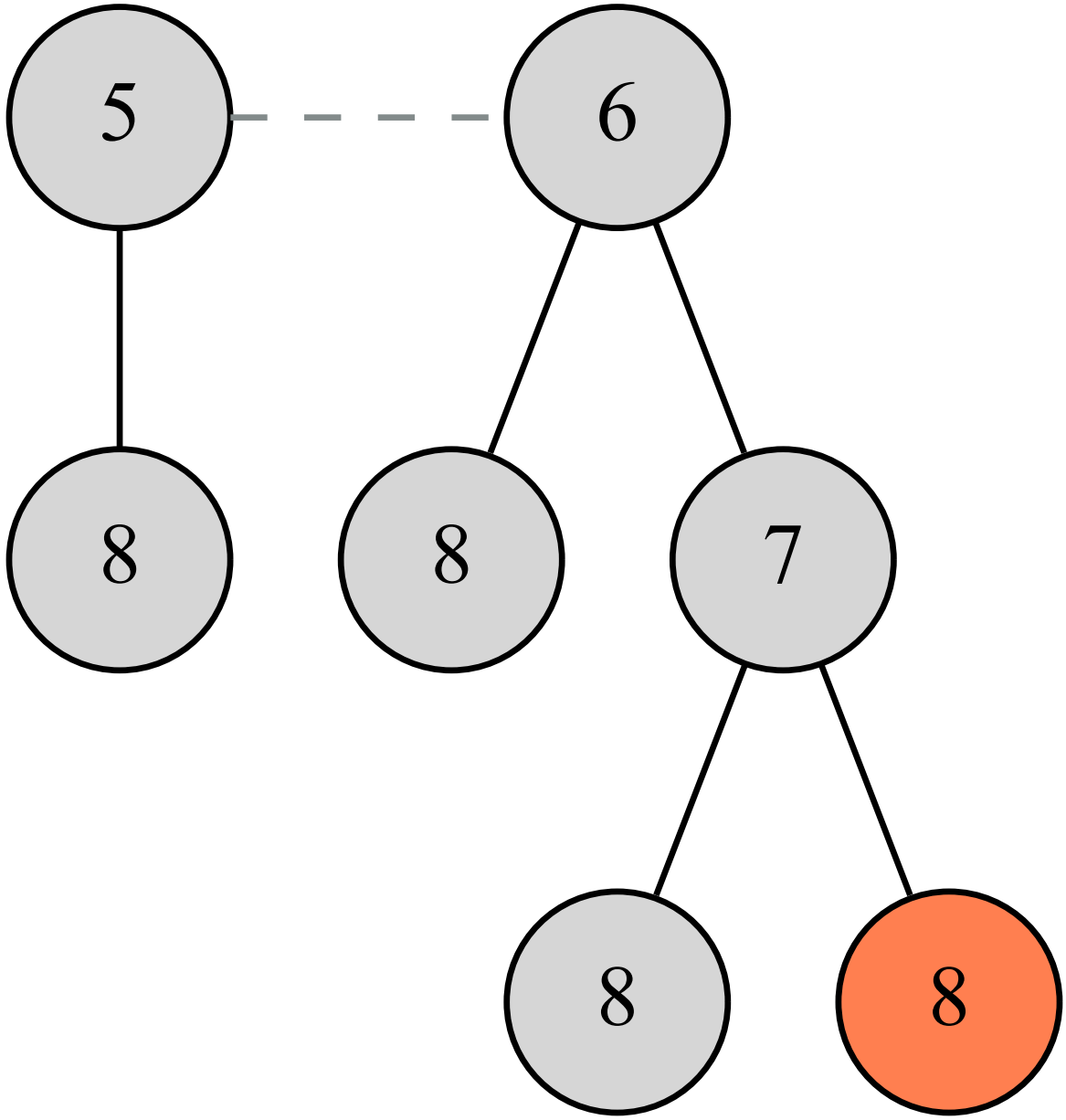


Decreasing Key

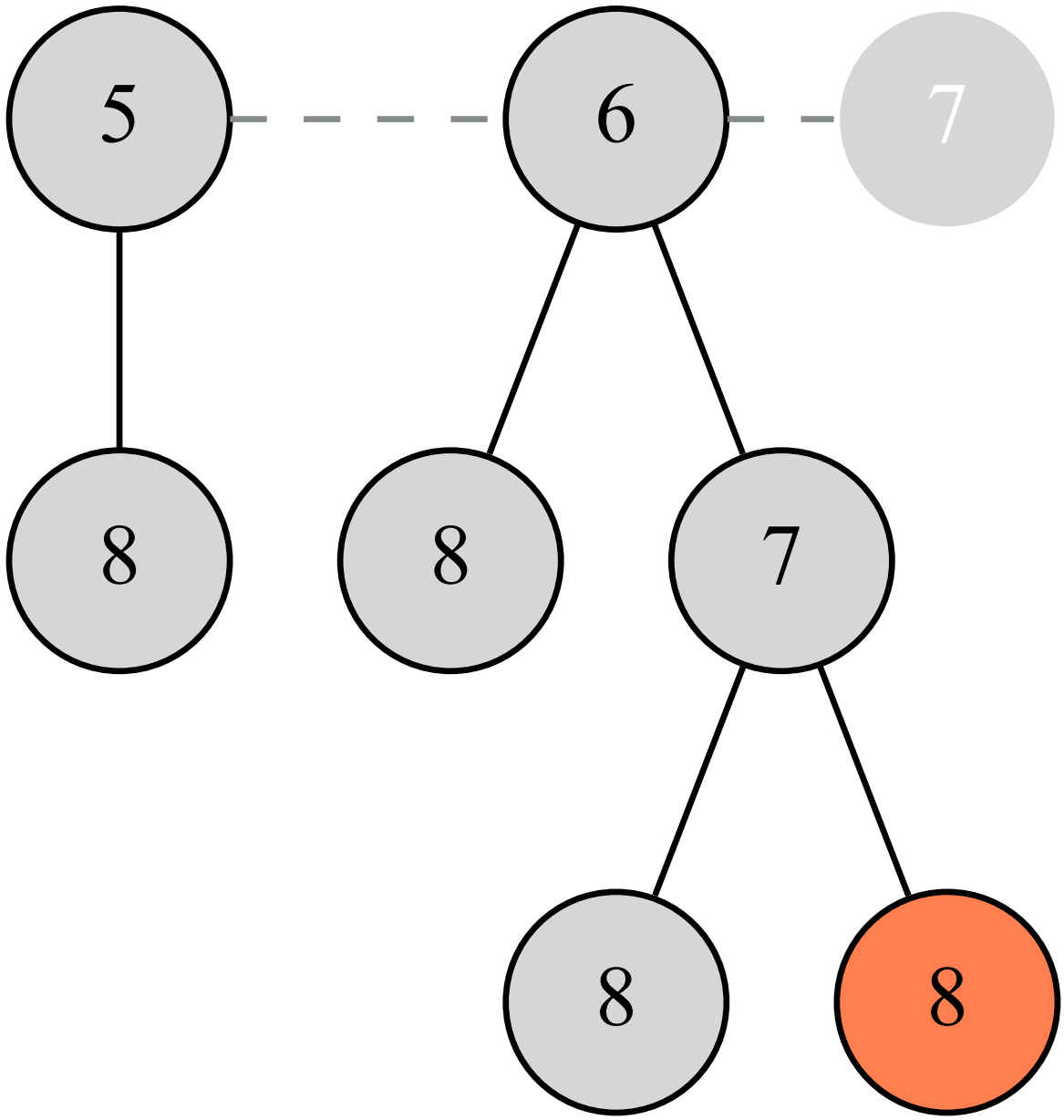
Since we have reached the root, we finish.



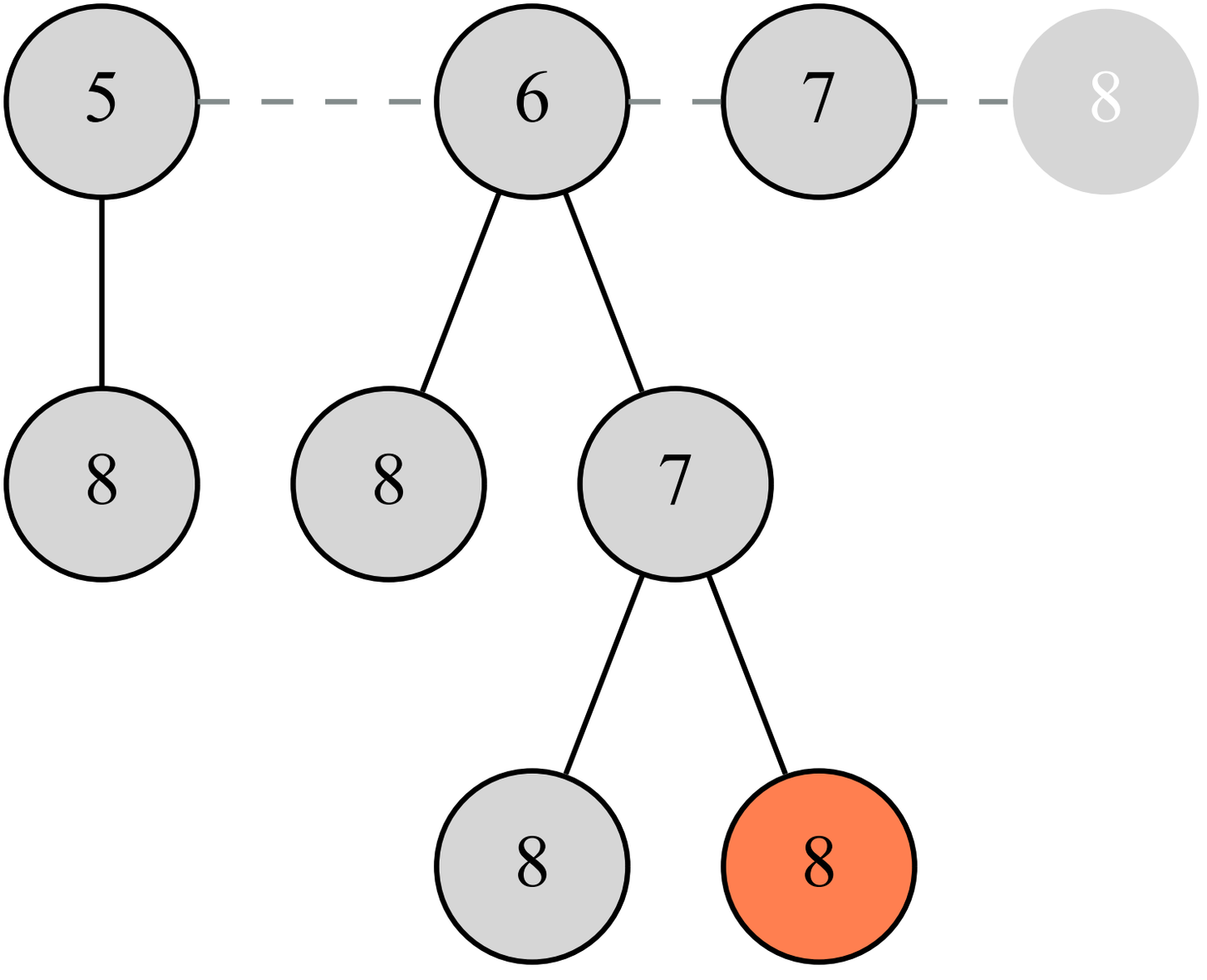
Decreasing Key
And we are done.



Inserting
Inserted node with key 7.

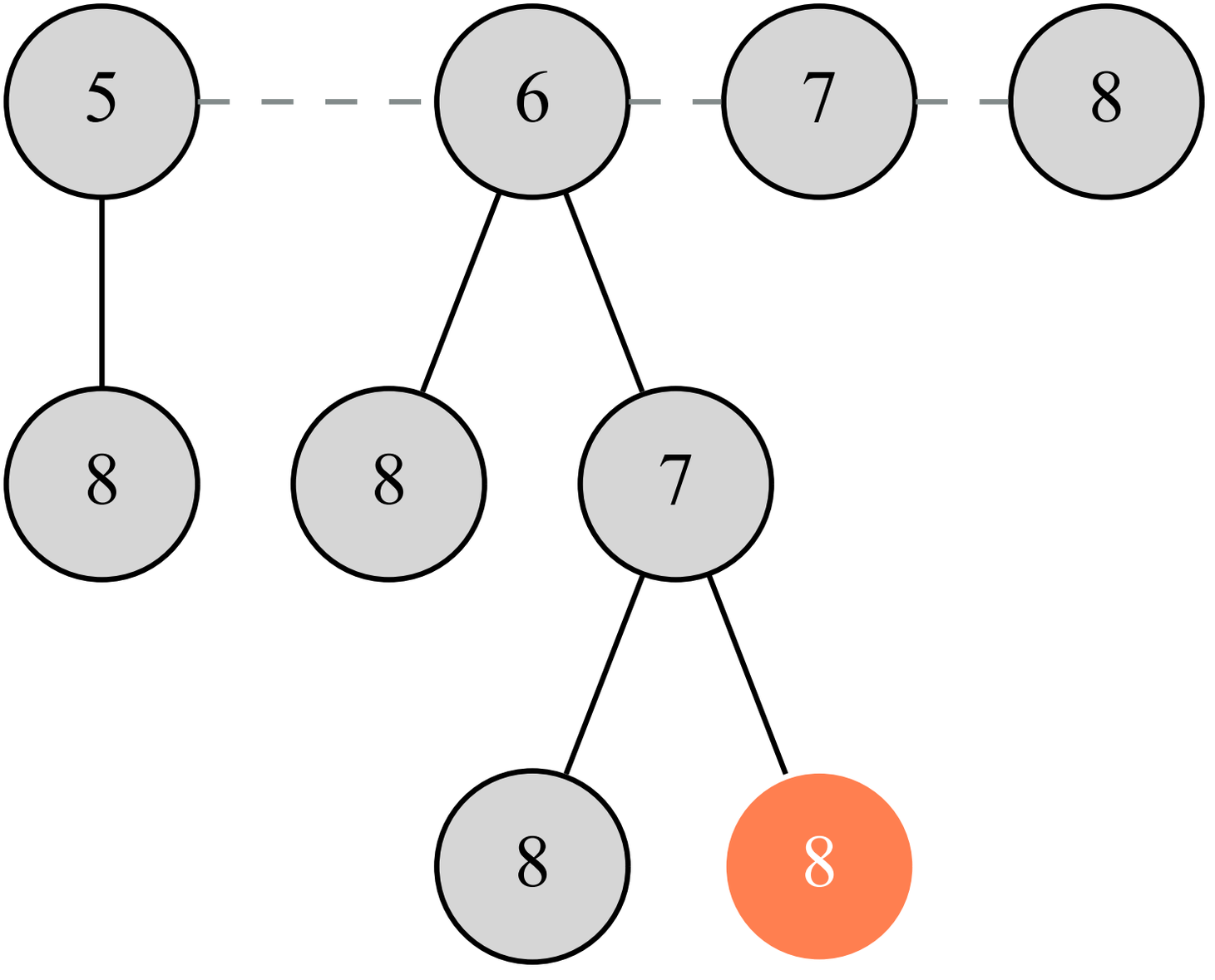


Inserting
Inserted node with key 8.

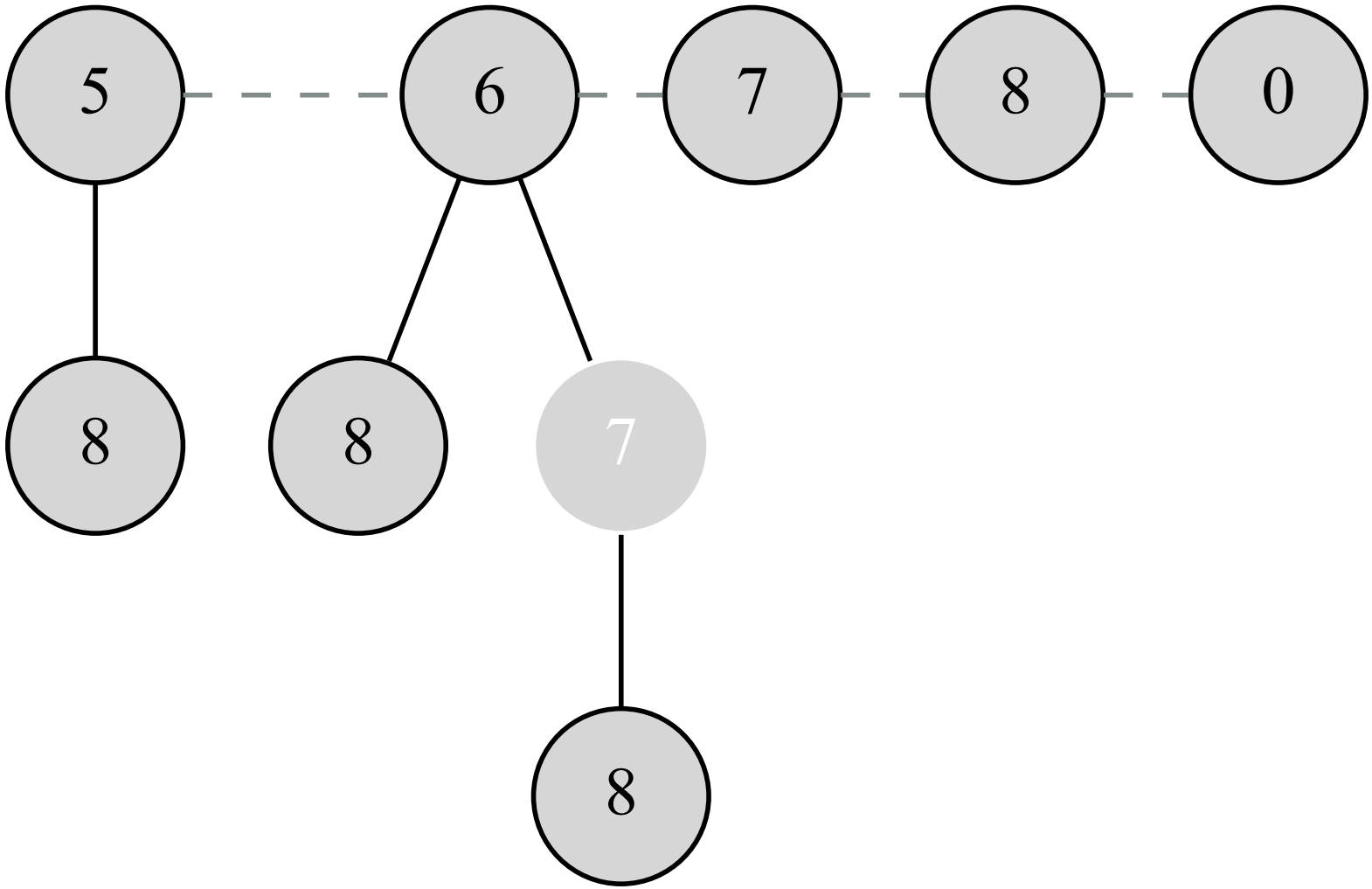


Decreasing Key

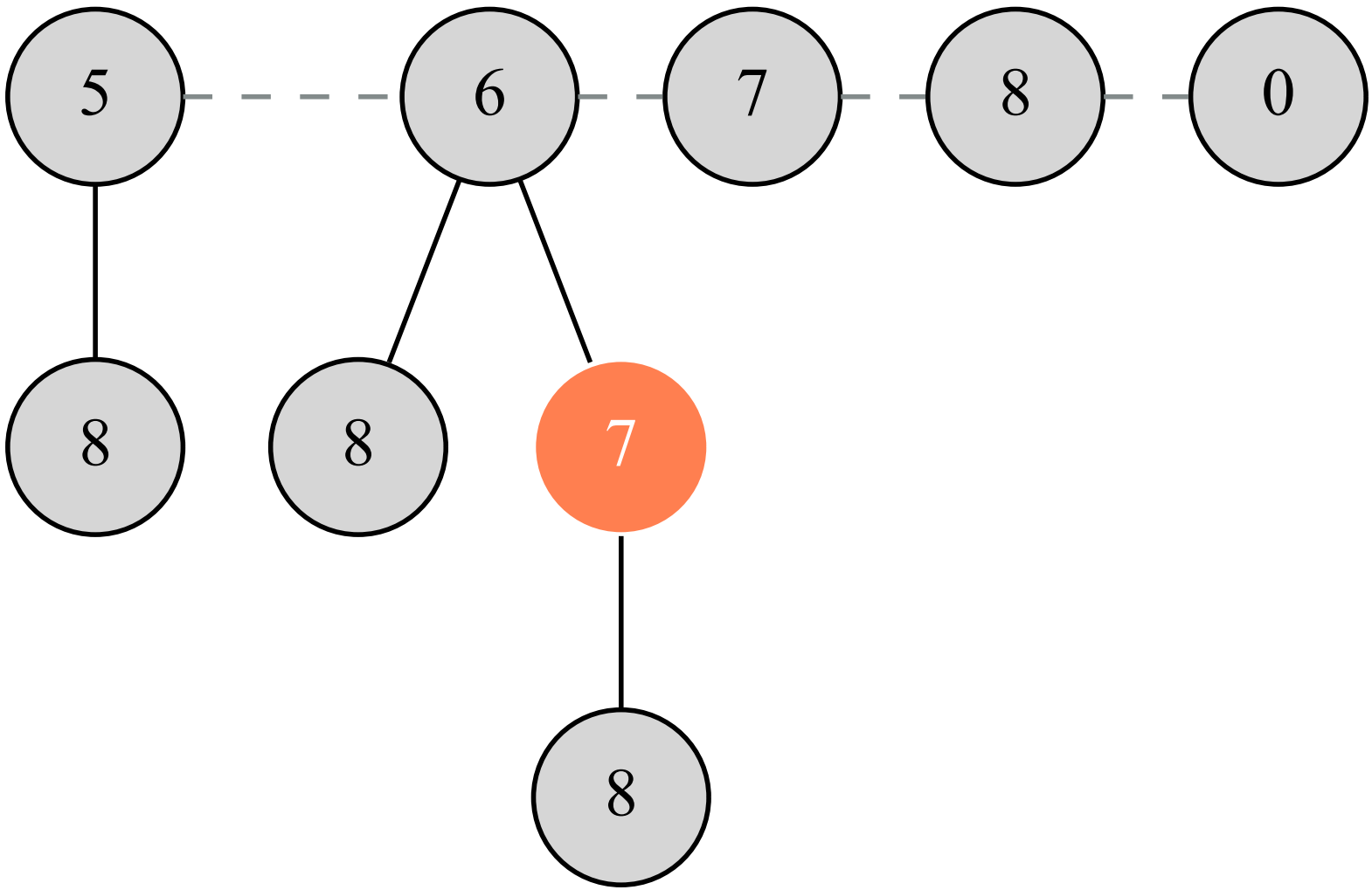
Decreasing key of node 8 to 0;



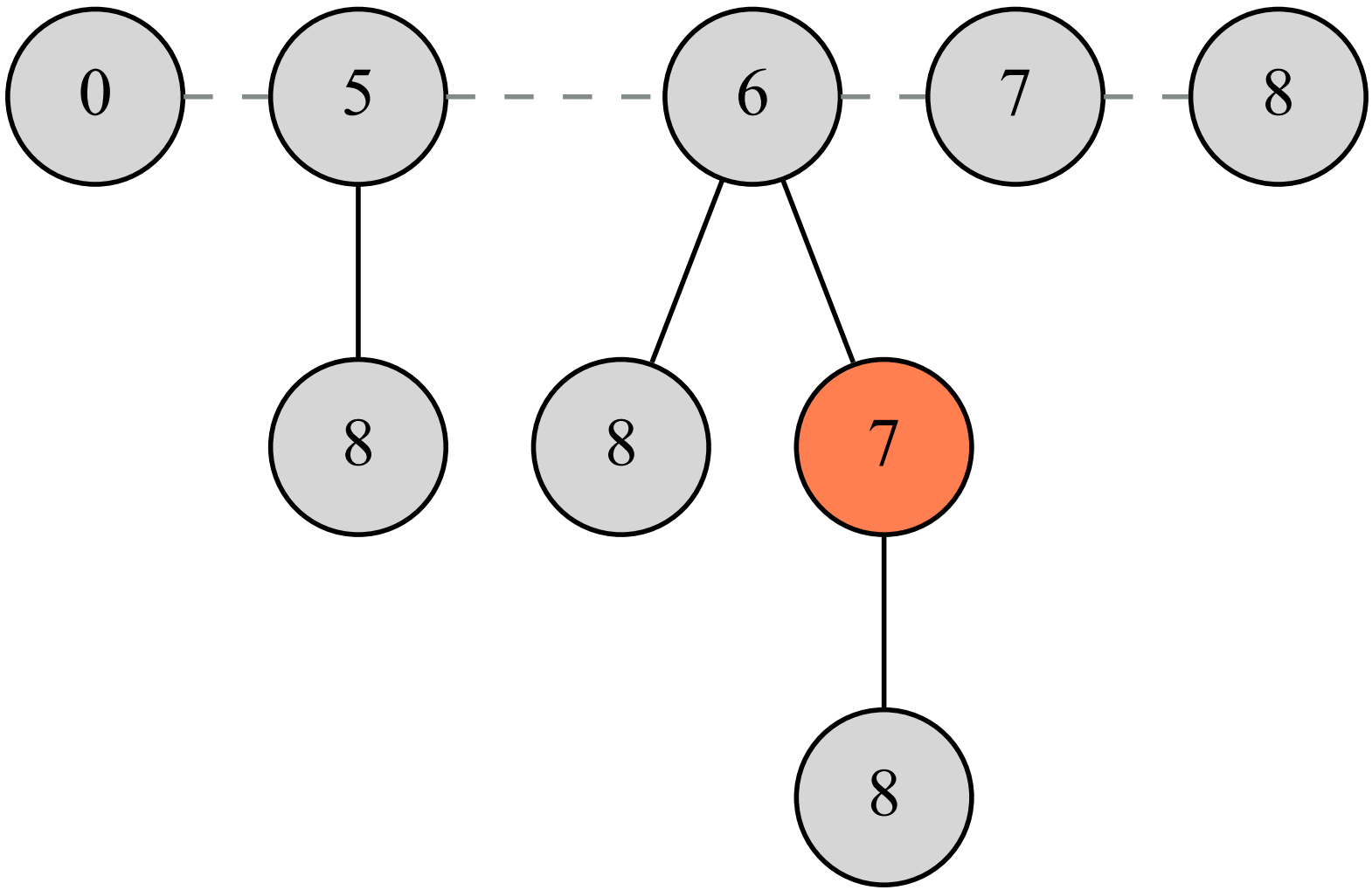
Decreasing Key
The node is not marked...



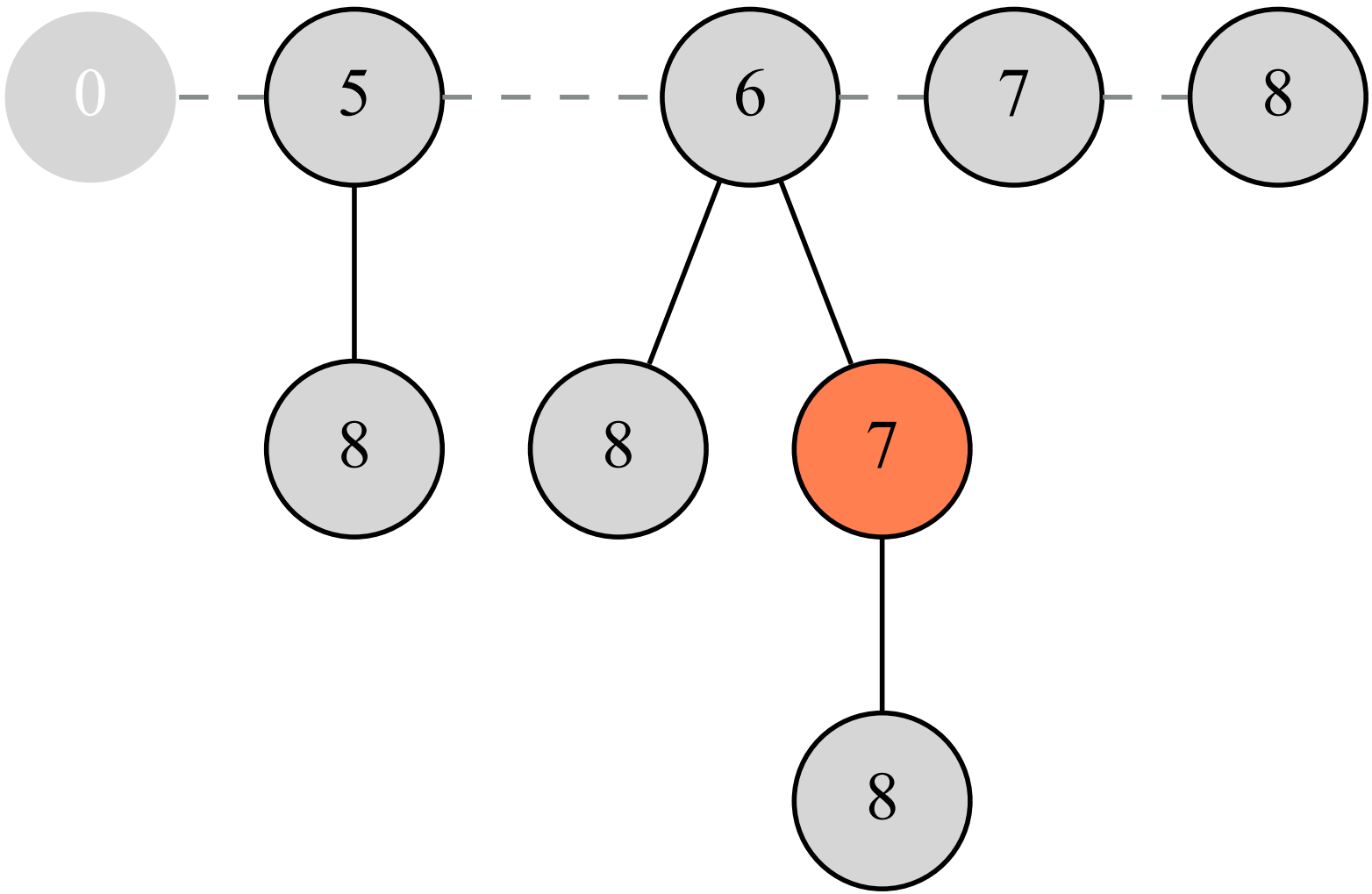
Decreasing Key
... so we mark it and finish the cascading cut.



Decreasing Key
And we are done.

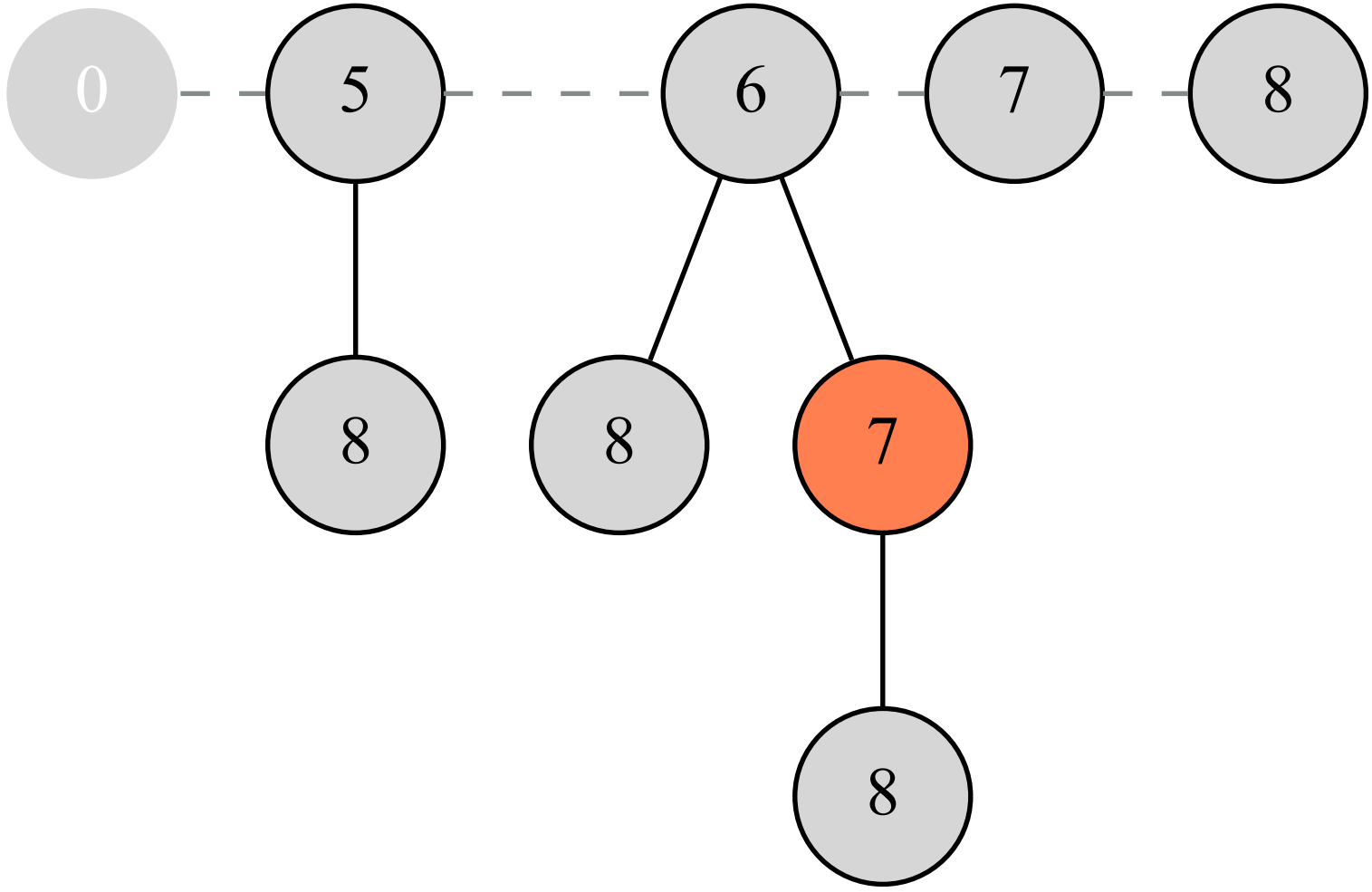


Extracting Minimum
Extracting node with key 0;



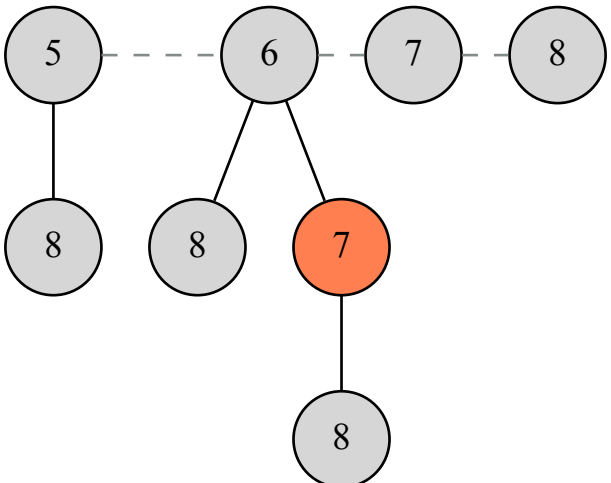
Extracting Minimum

We first meld the child list of 0 into the root list...



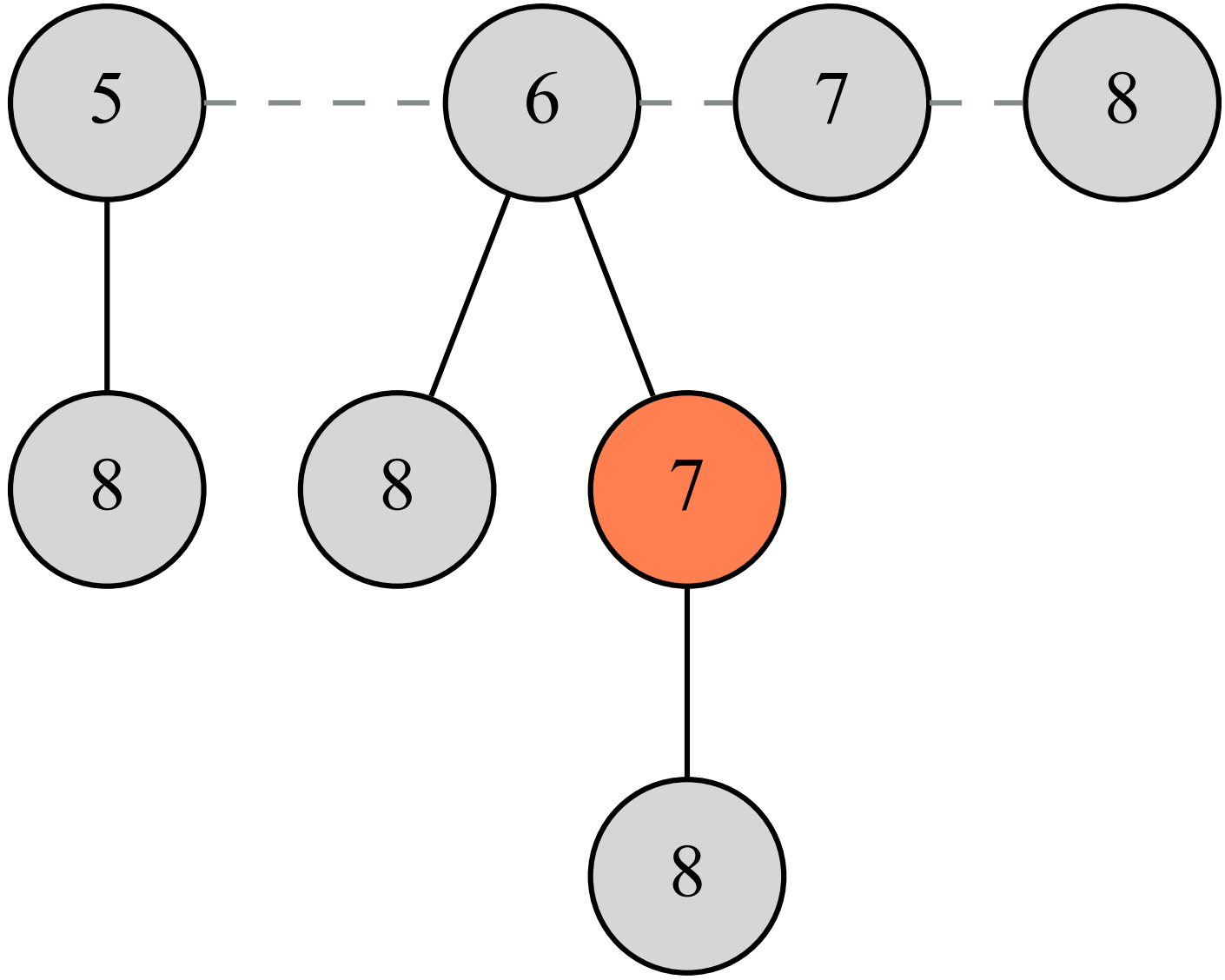
Extracting Minimum

... and remove the minimum node form the root list;



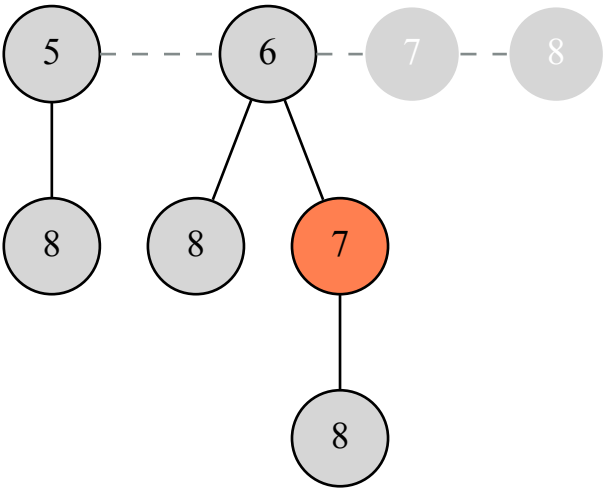
Extracting Minimum

Now we consolidate the Fibonacci heap;



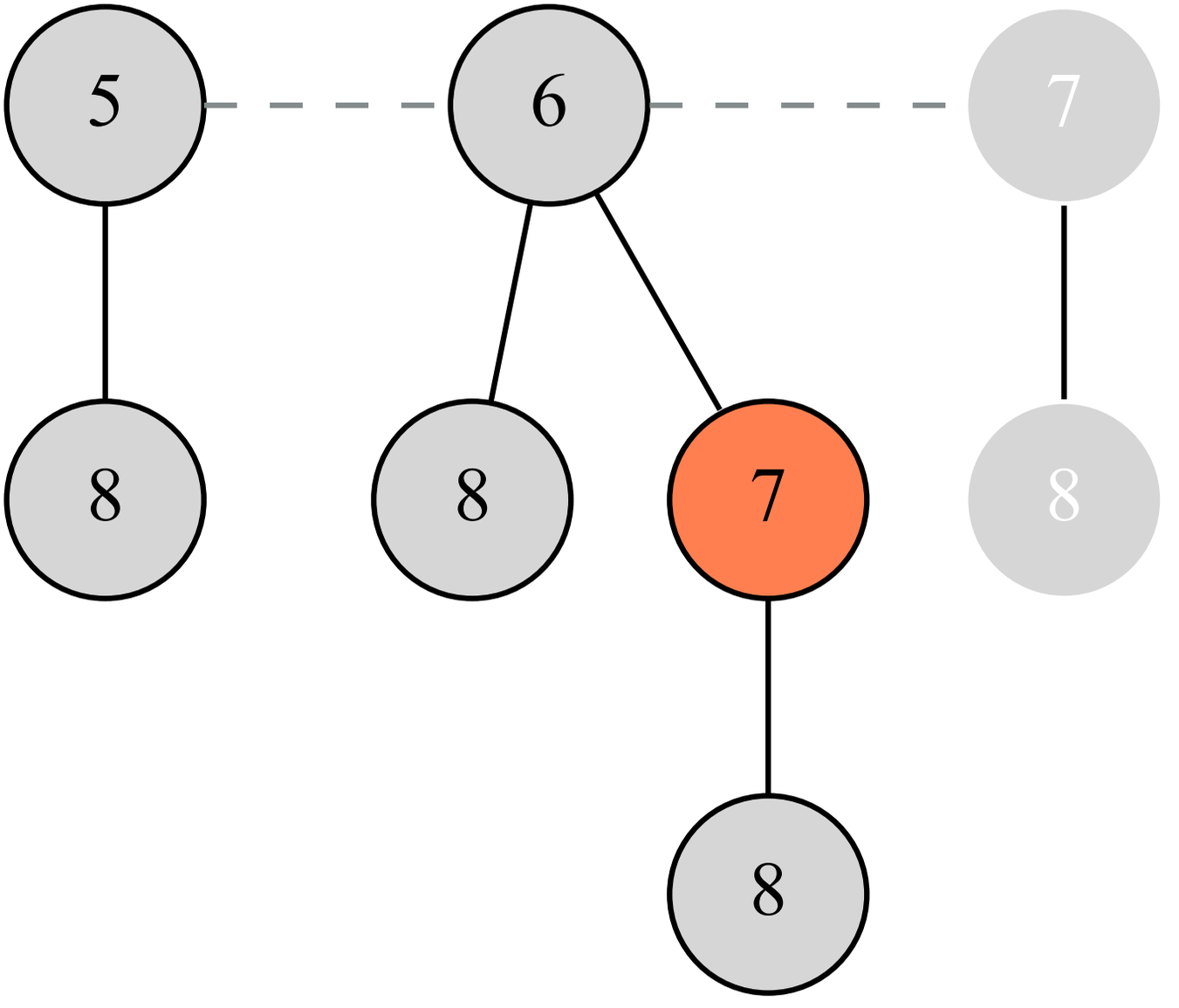
Extracting Minimum

Trees with roots 8 and 7 have the same degree (0)...



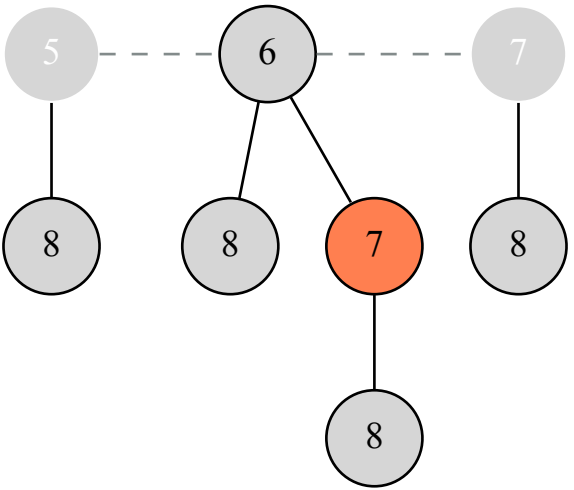
Extracting Minimum

... so we append 8 to the child list of 7;



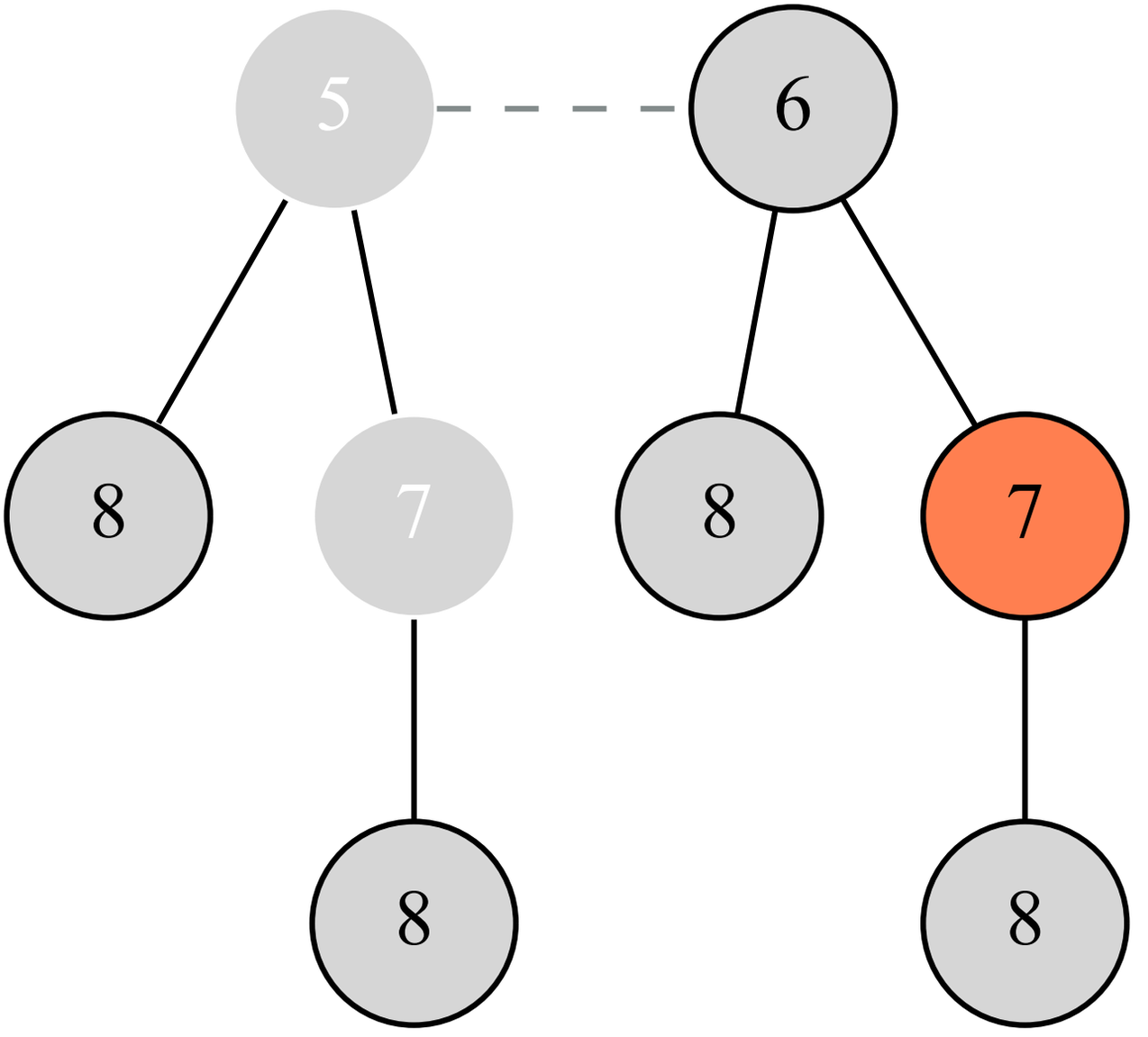
Extracting Minimum

Trees with roots 7 and 5 have the same degree (1)...

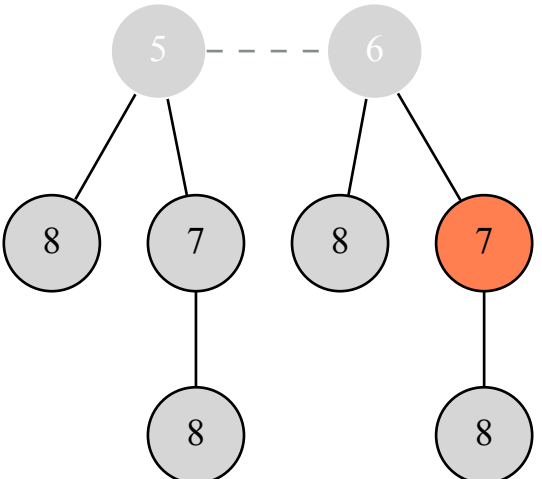


Extracting Minimum

... so we append 7 to the child list of 5;

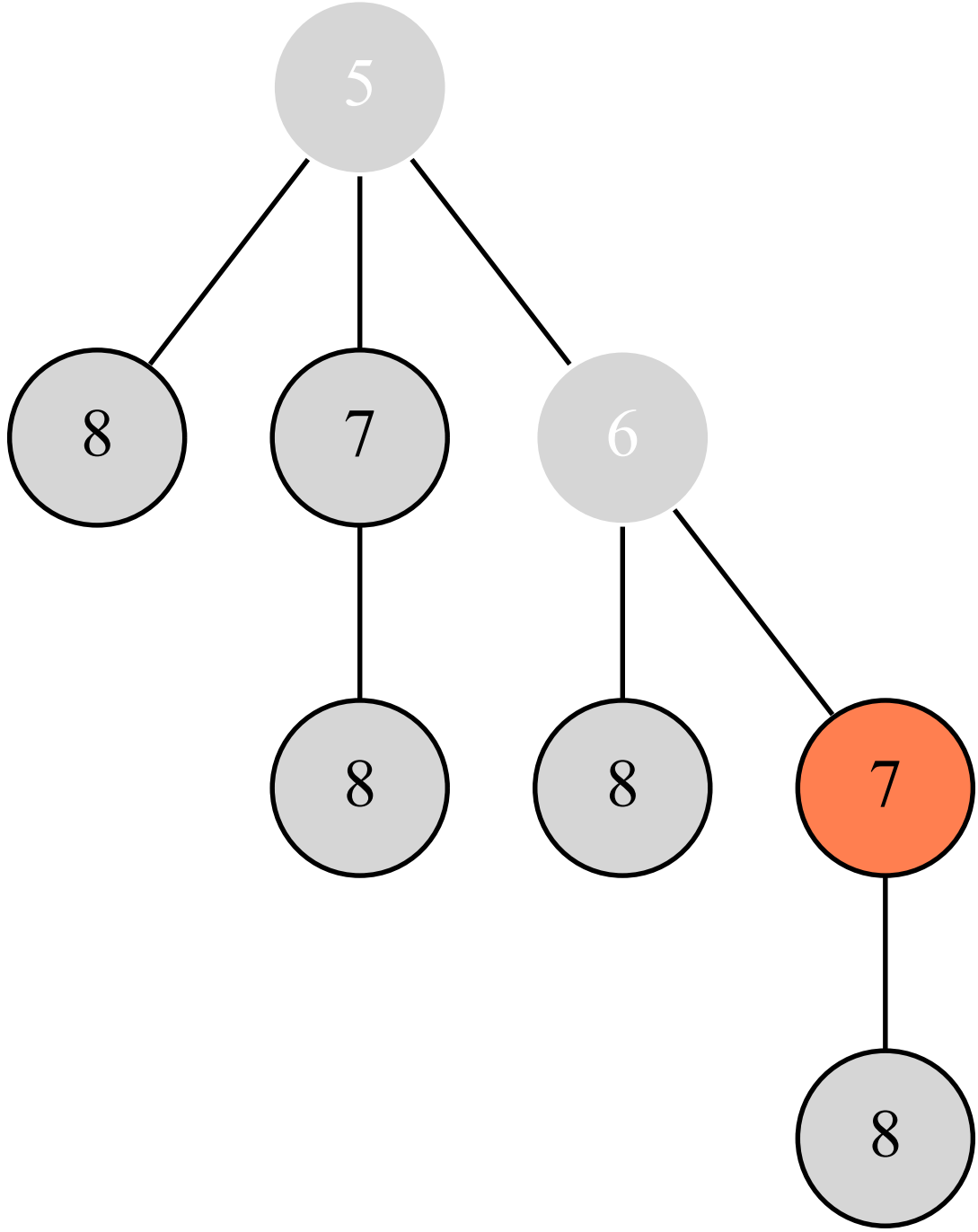


Extracting Minimum
Trees with roots 5 and 6 have the same degree (2)...

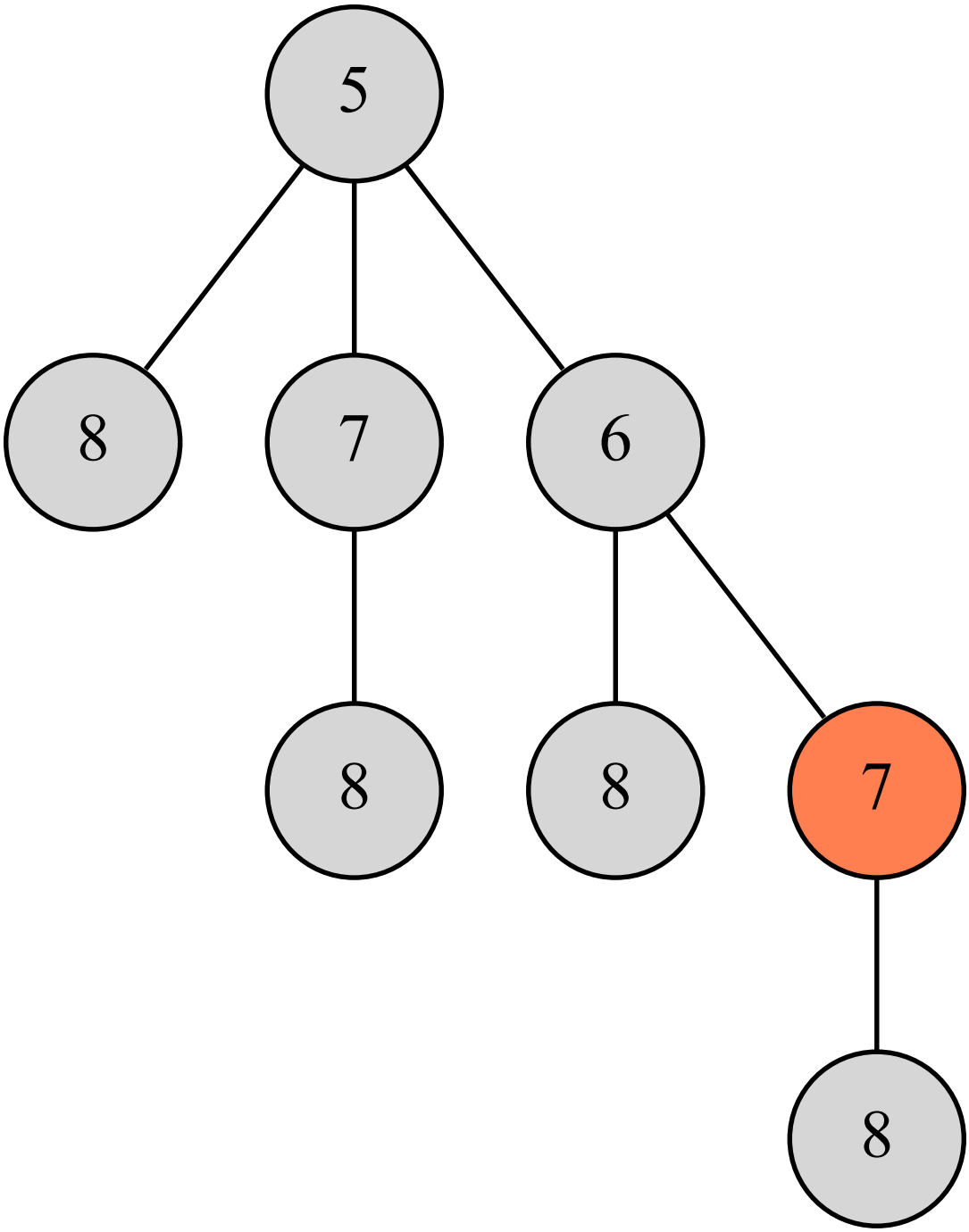


Extracting Minimum

... so we append 6 to the child list of 5;

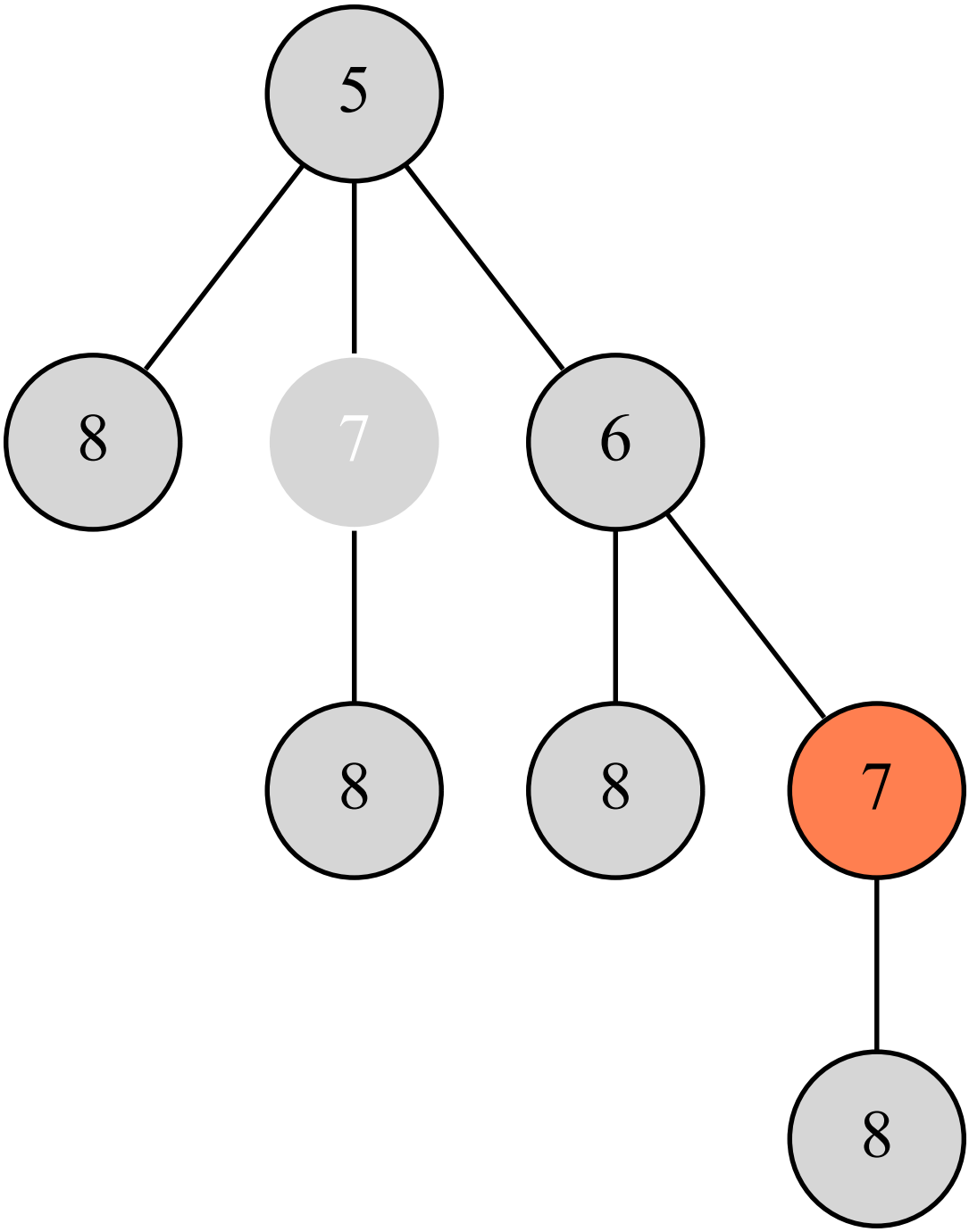


Extracting Minimum
And we are done.



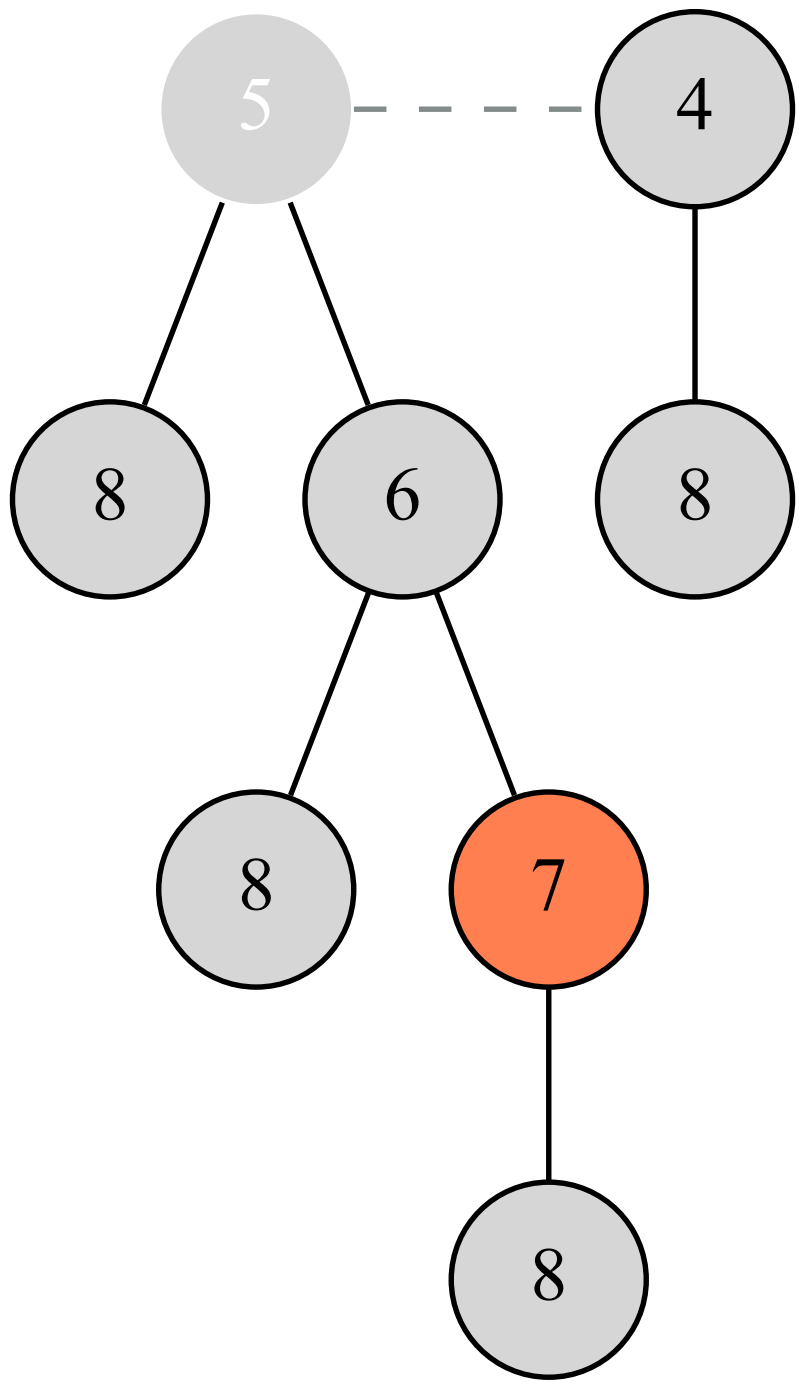
Decreasing Key

Decreasing key of node 7 to 4;

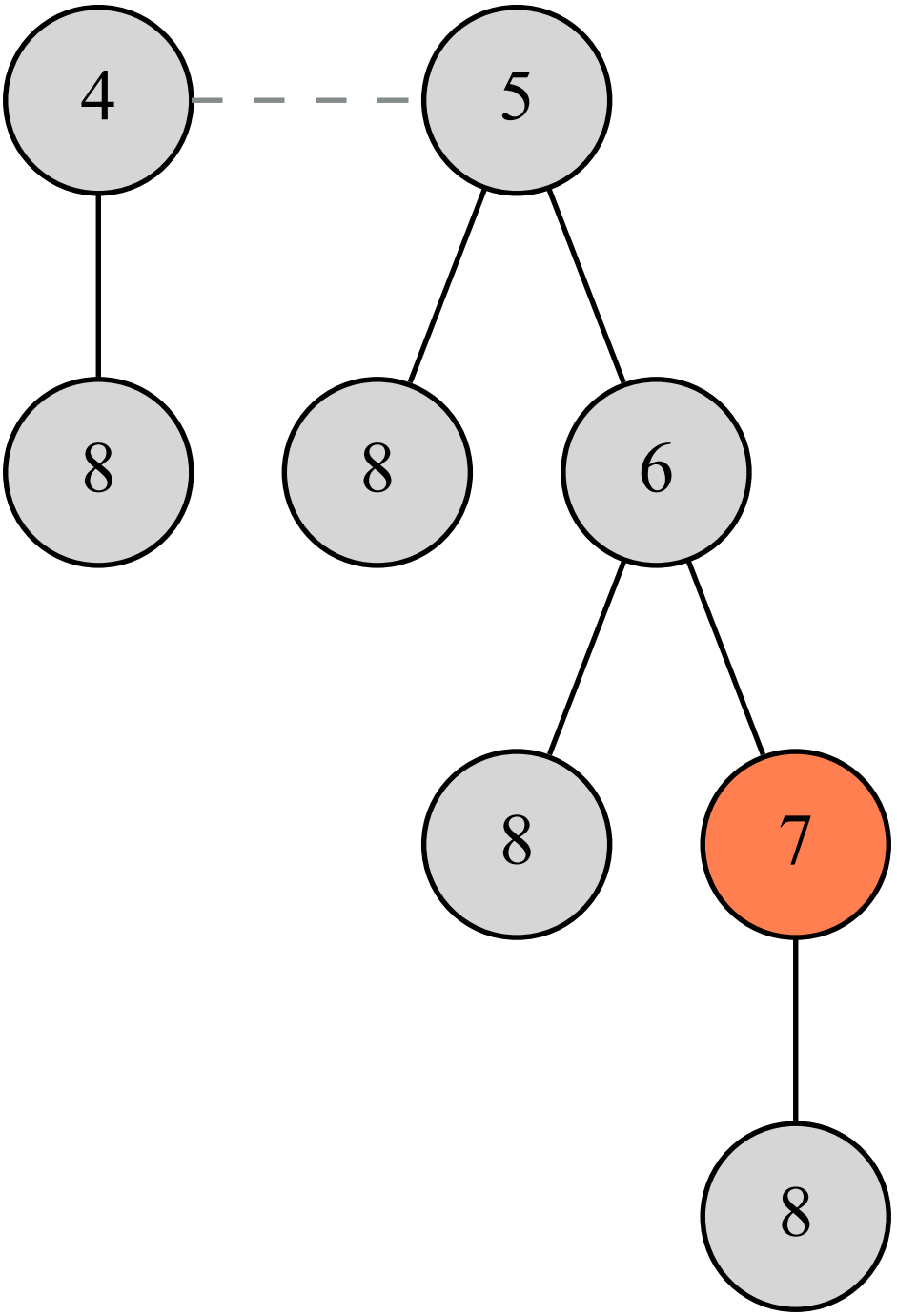


Decreasing Key

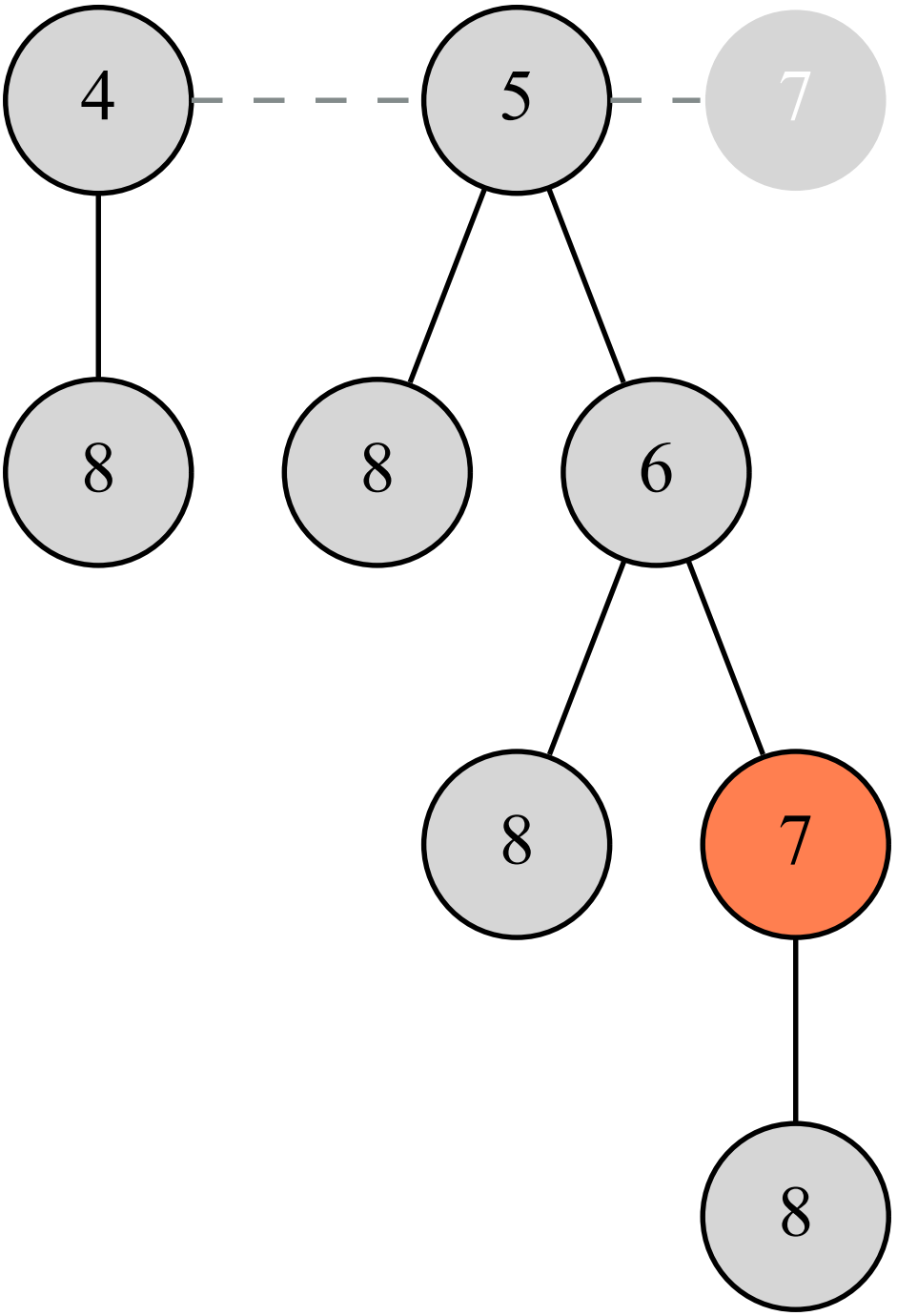
Since we have reached the root, we finish.



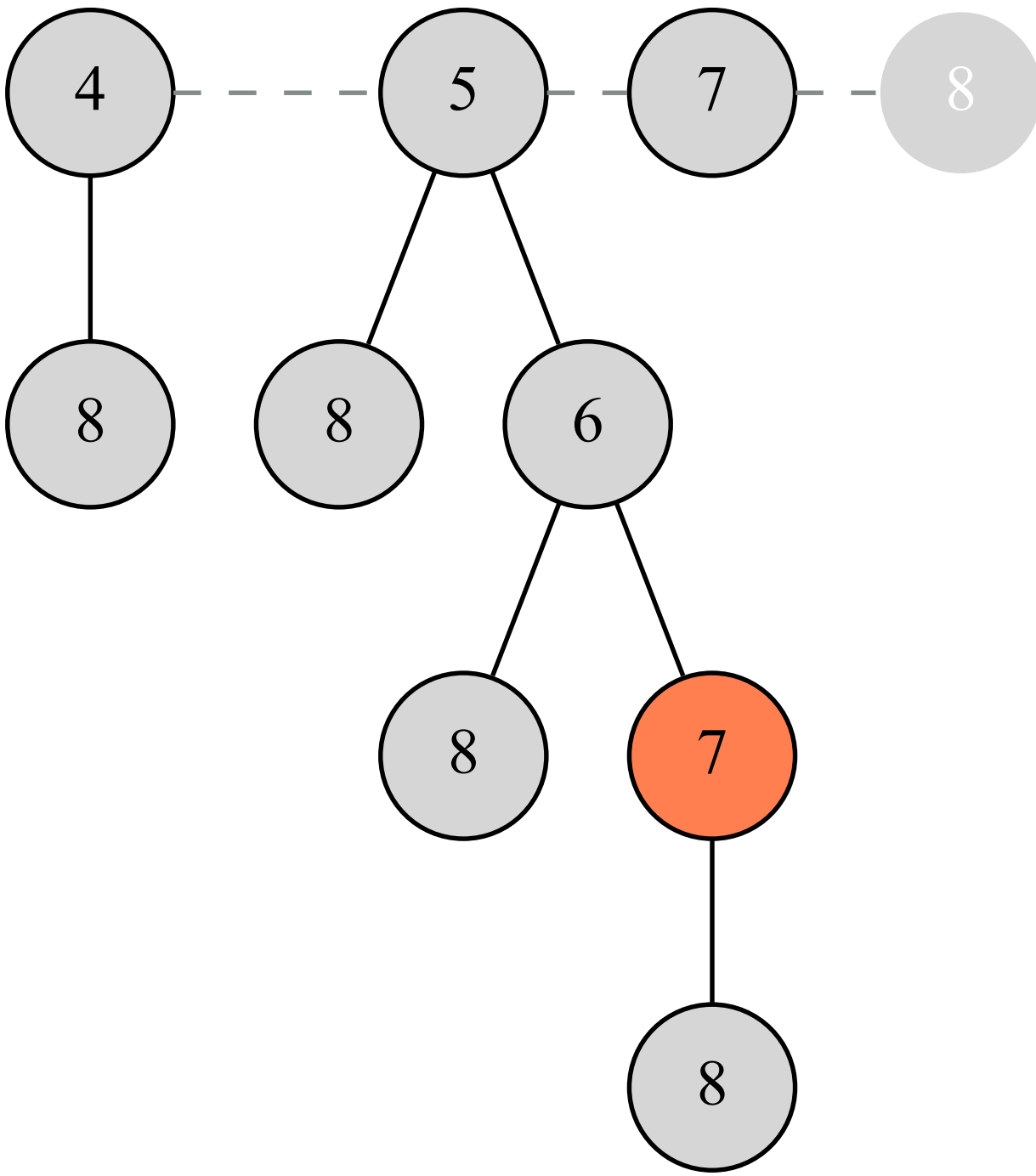
Decreasing Key
And we are done.



Inserting
Inserted node with key 7.

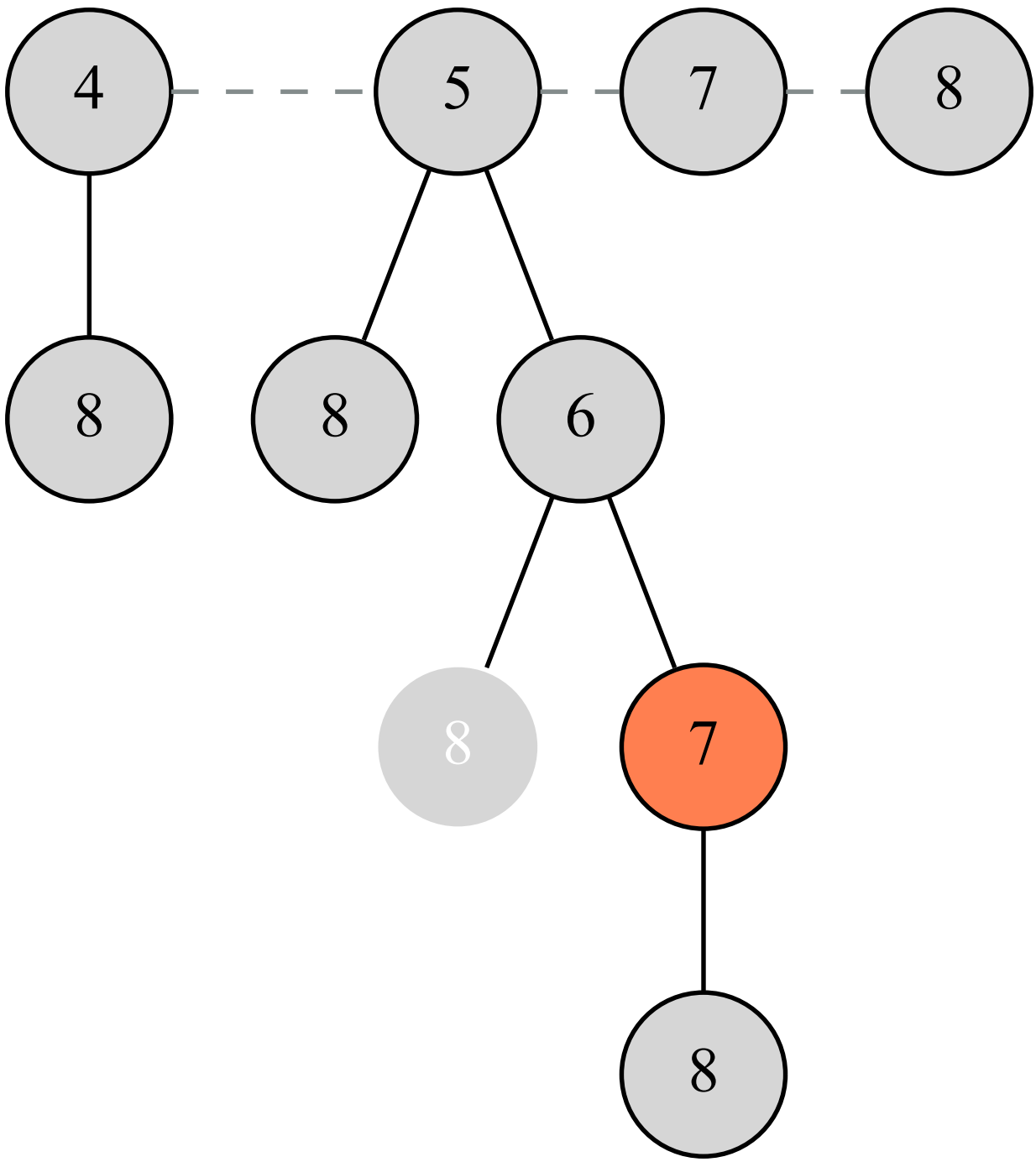


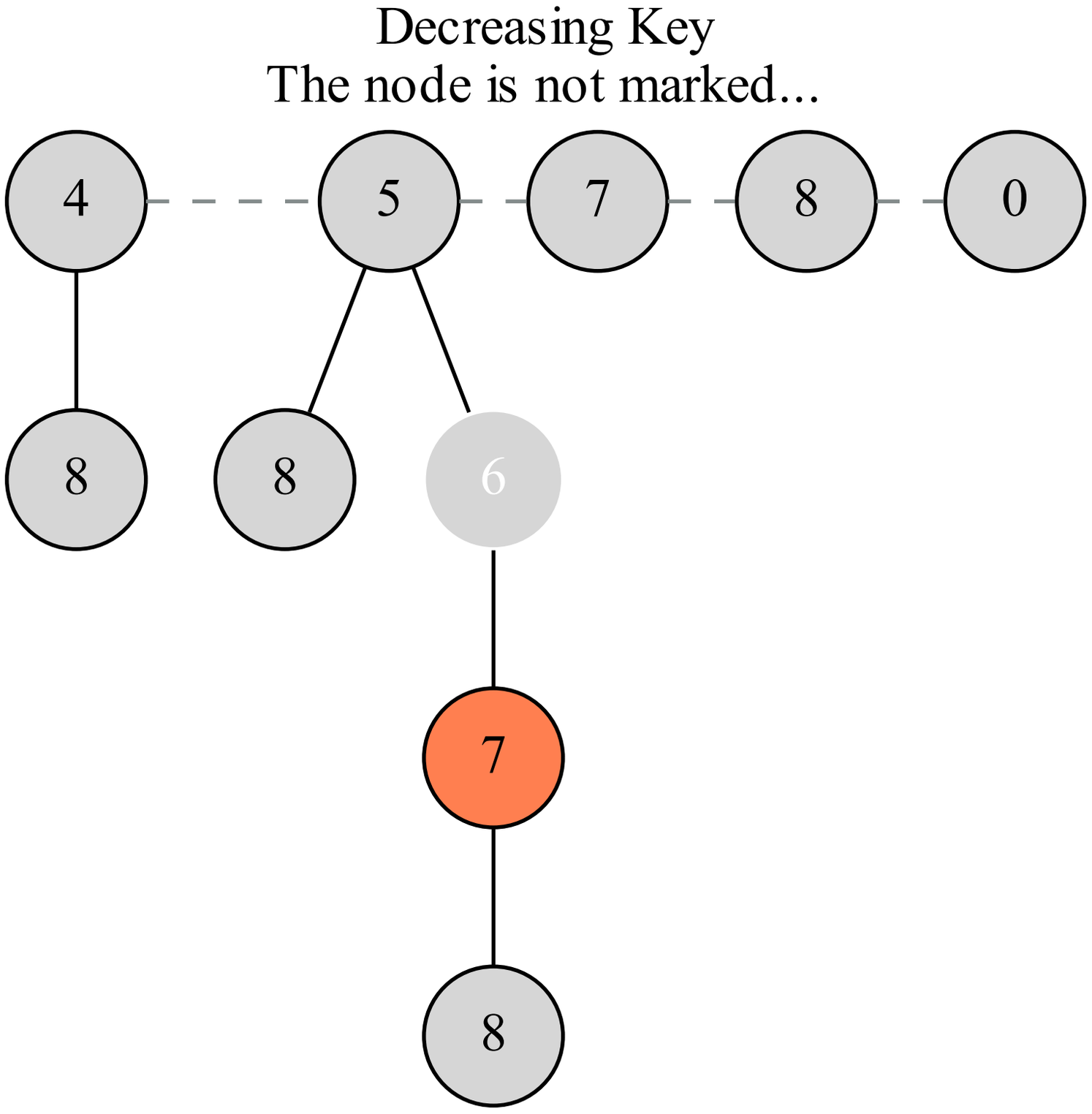
Inserting
Inserted node with key 8.



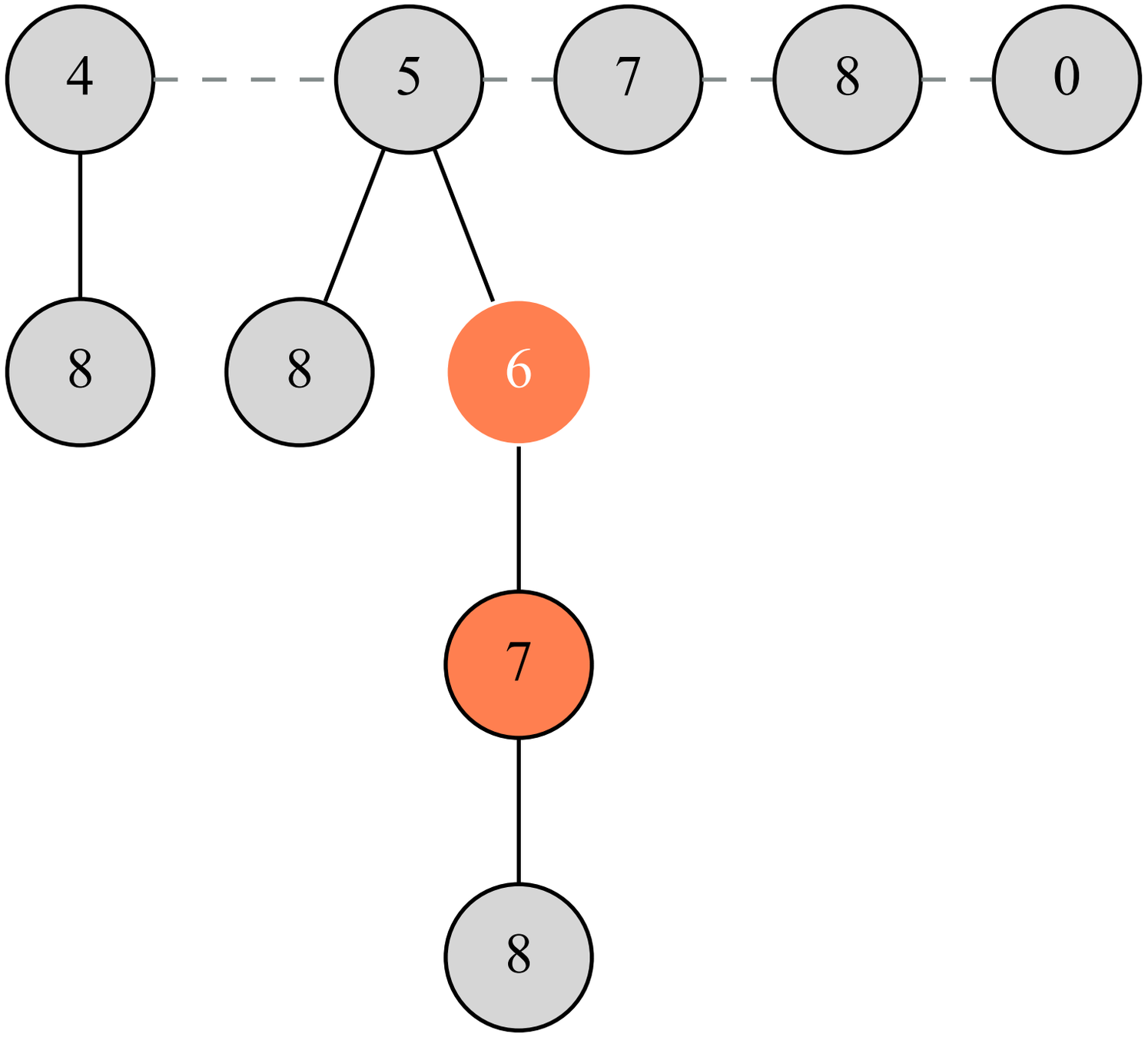
Decreasing Key

Decreasing key of node 8 to 0;

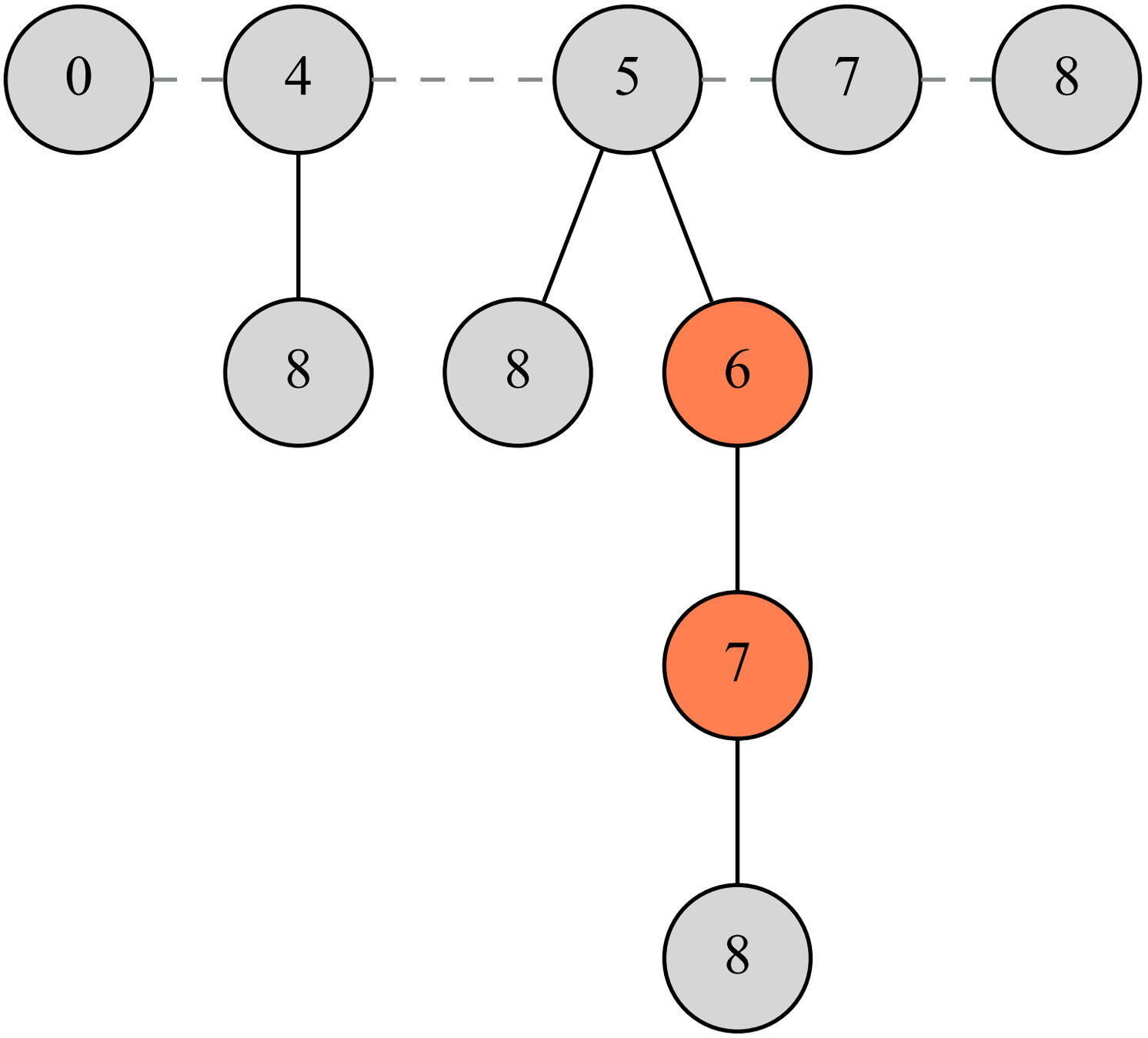



Decreasing Key
The node is not marked...
4
5
7
8
0
8
8
6
7
8

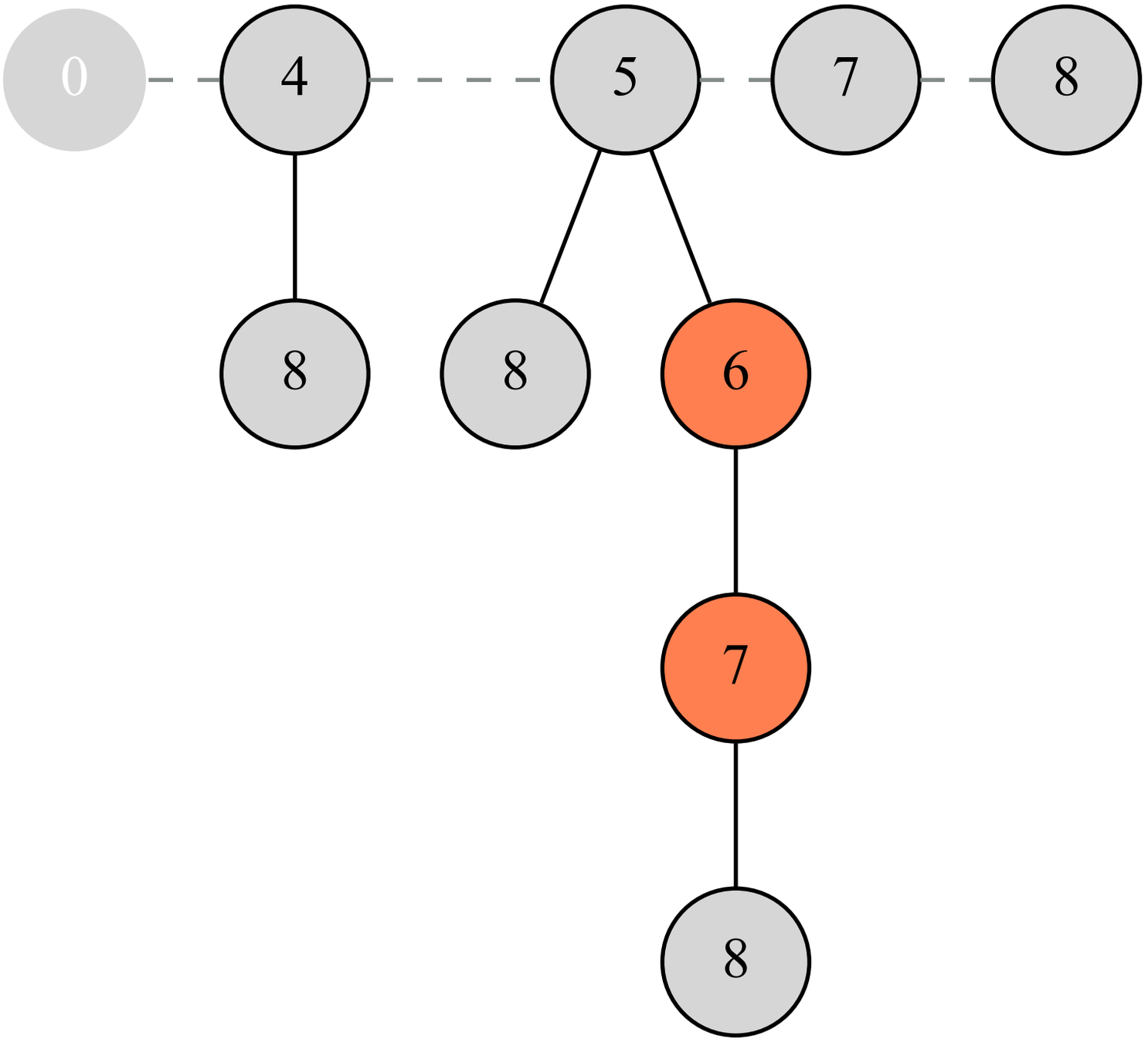
Decreasing Key
... so we mark it and finish the cascading cut.



Decreasing Key
And we are done.

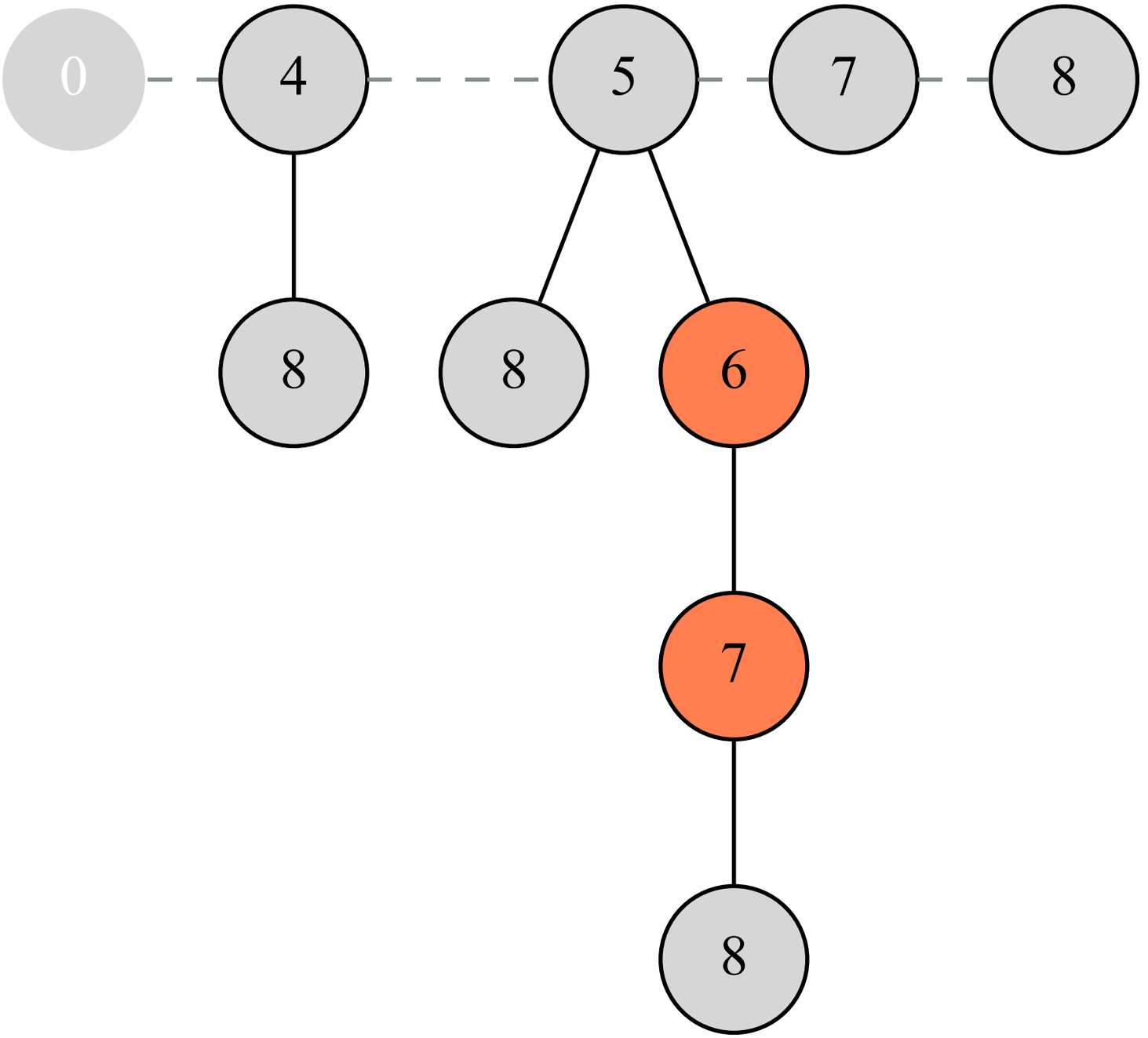


Extracting Minimum
Extracting node with key 0;

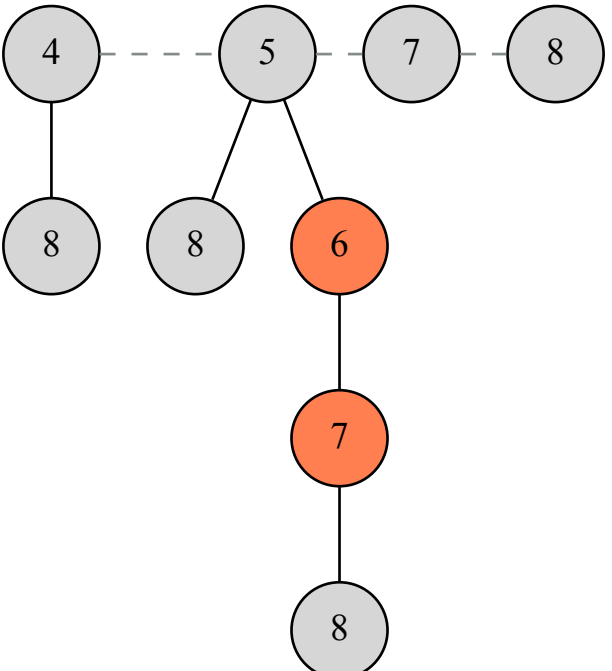


Extracting Minimum

We first meld the child list of 0 into the root list...

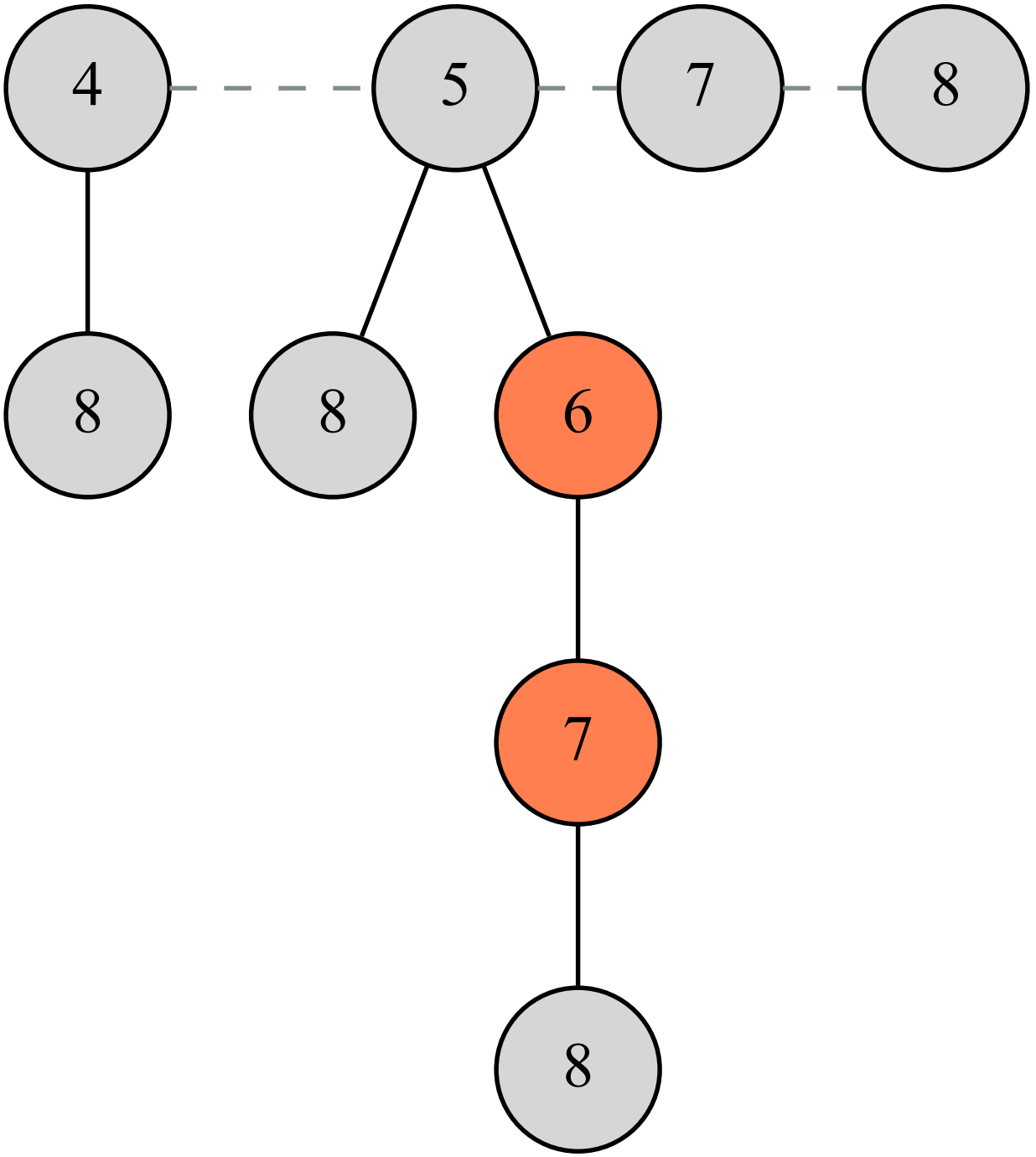


Extracting Minimum
... and remove the minimum node form the root list;

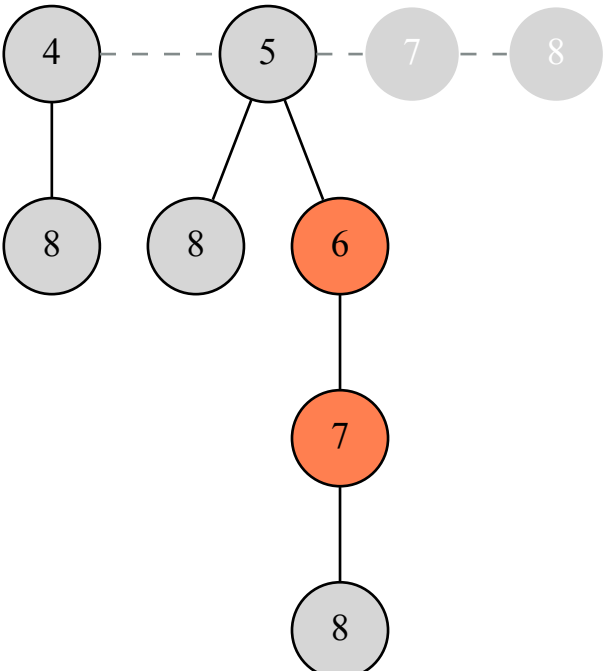


Extracting Minimum

Now we consolidate the Fibonacci heap;

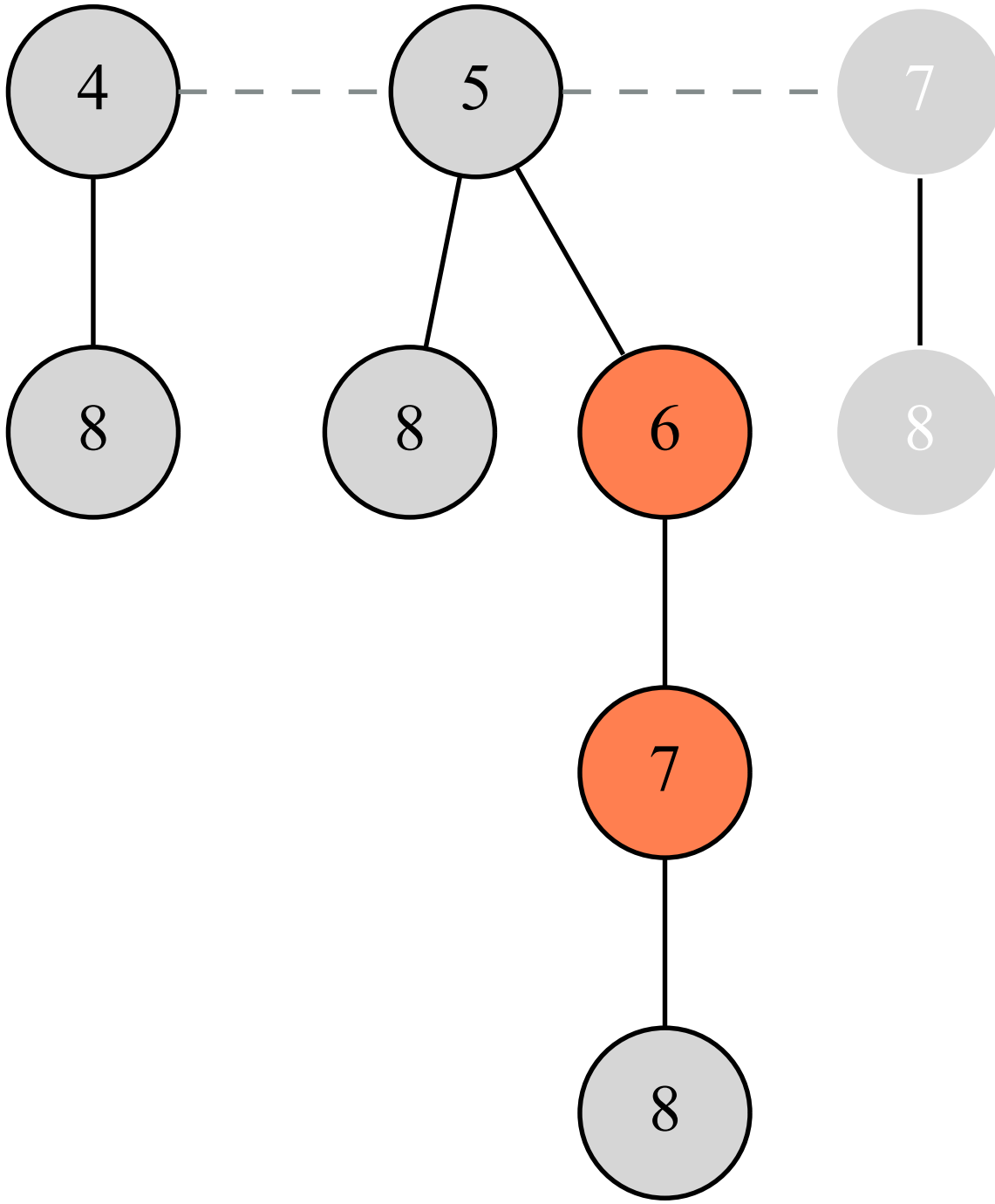


Extracting Minimum
Trees with roots 8 and 7 have the same degree (0)...

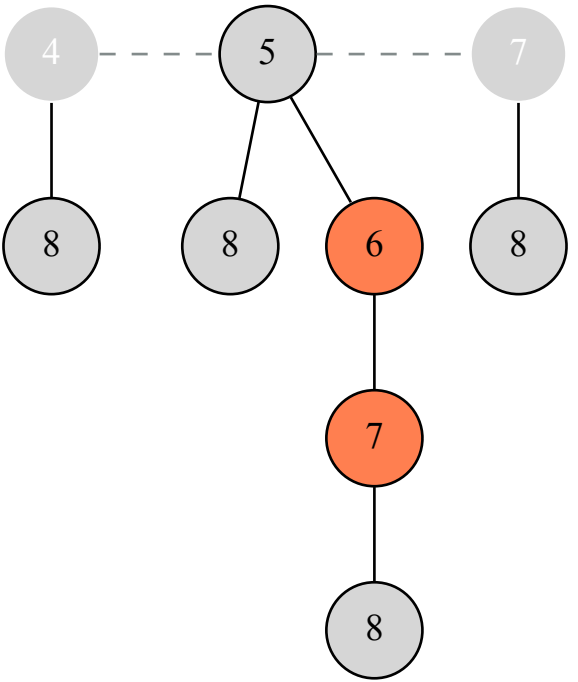


Extracting Minimum

... so we append 8 to the child list of 7;

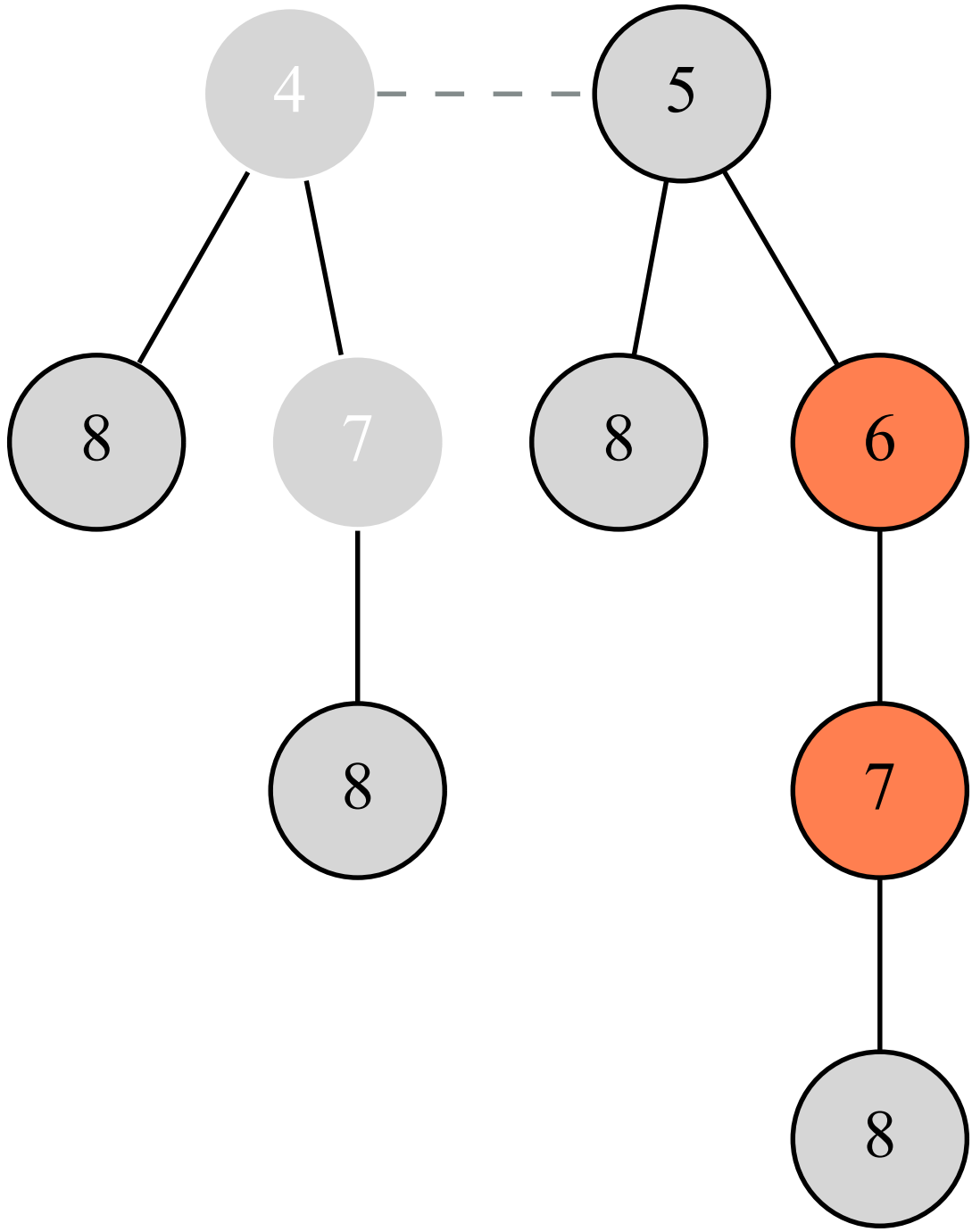


Extracting Minimum
Trees with roots 7 and 4 have the same degree (1)...

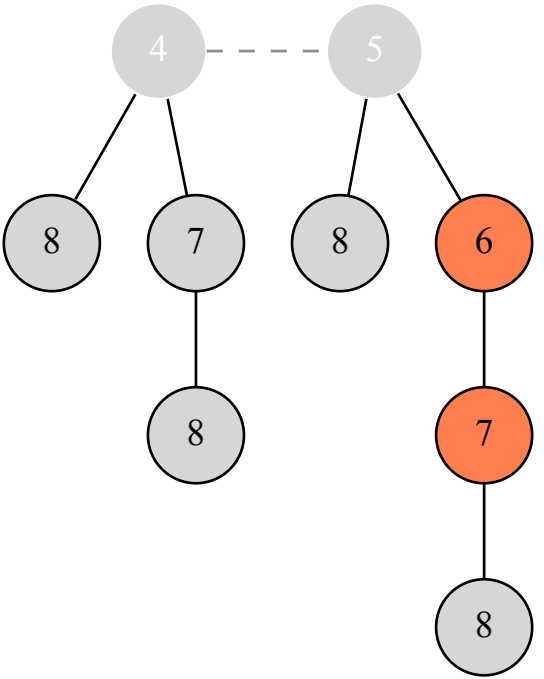


Extracting Minimum

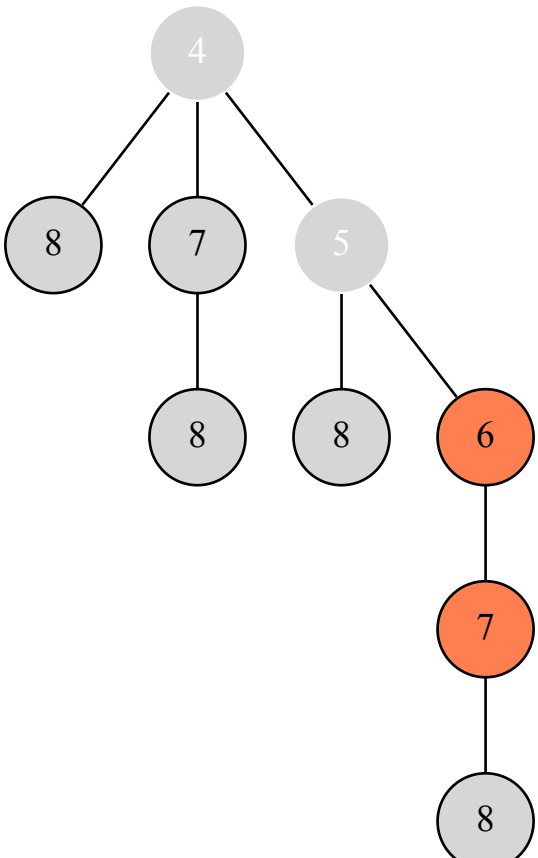
... so we append 7 to the child list of 4;



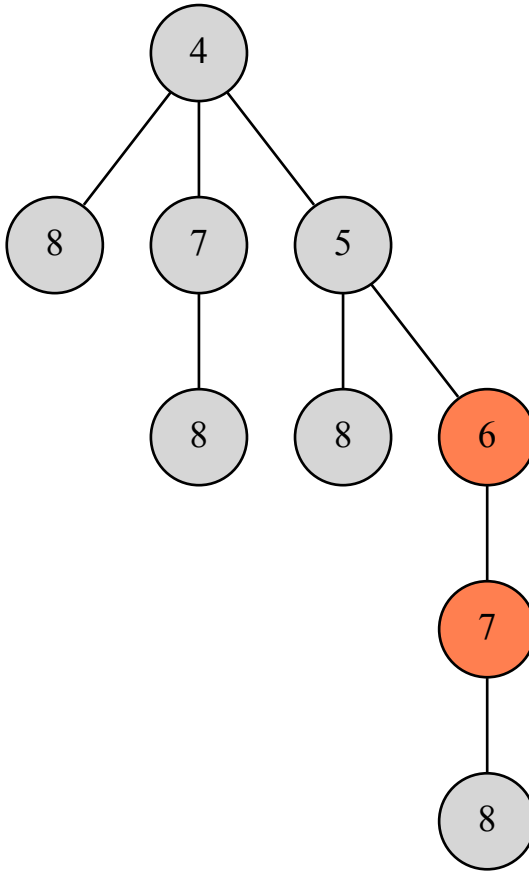
Extracting Minimum
Trees with roots 4 and 5 have the same degree (2)...



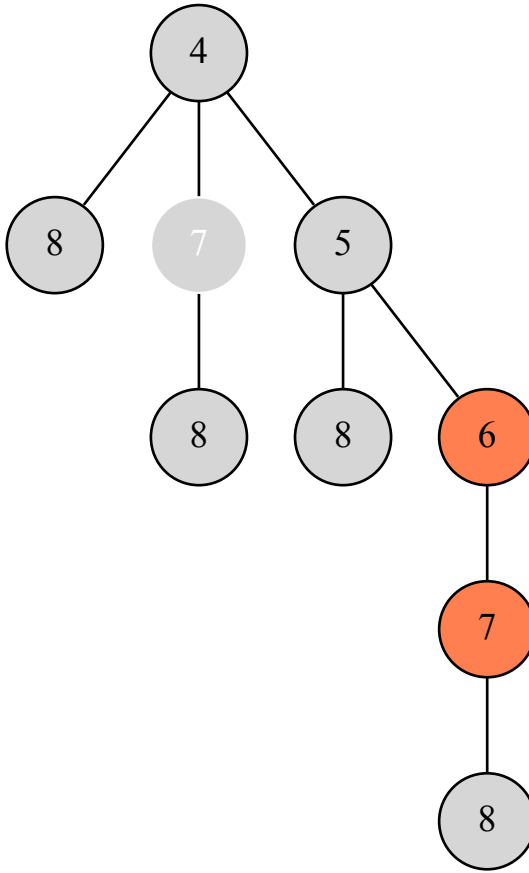
Extracting Minimum
... so we append 5 to the child list of 4;



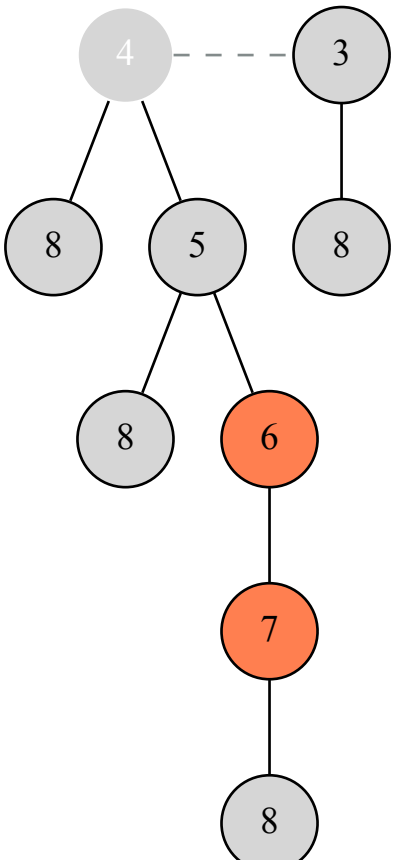
Extracting Minimum
And we are done.



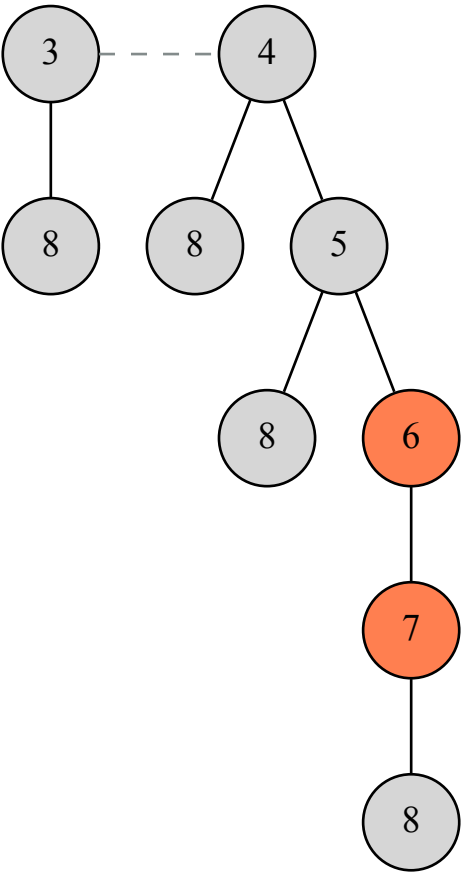
Decreasing Key
Decreasing key of node 7 to 3;

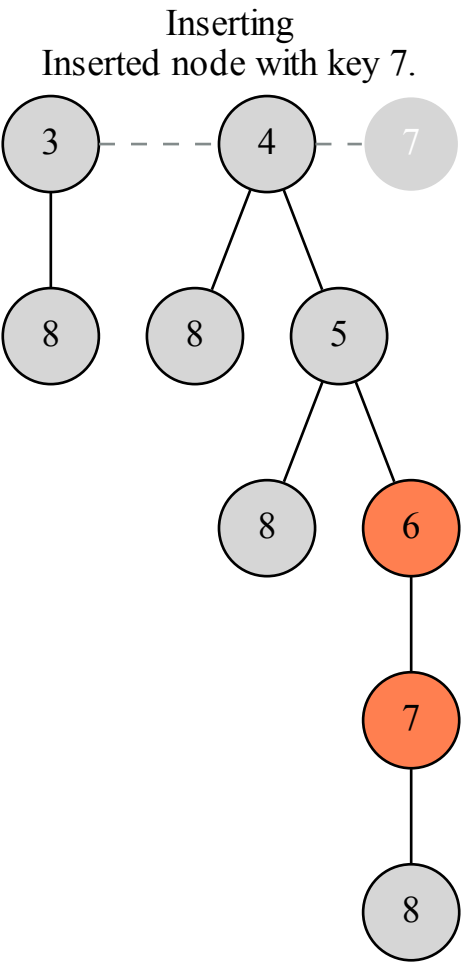


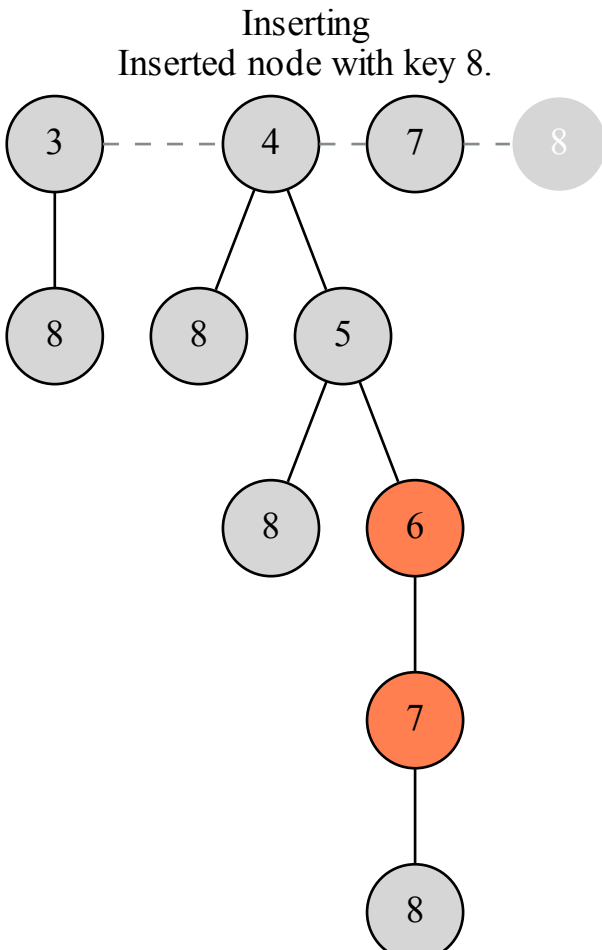
Decreasing Key
Since we have reached the root, we finish.



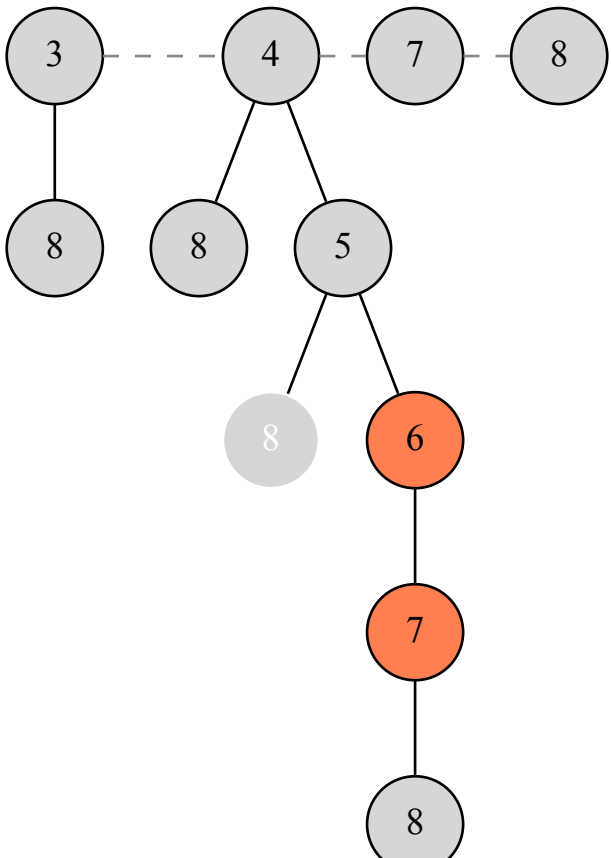
Decreasing Key
And we are done.

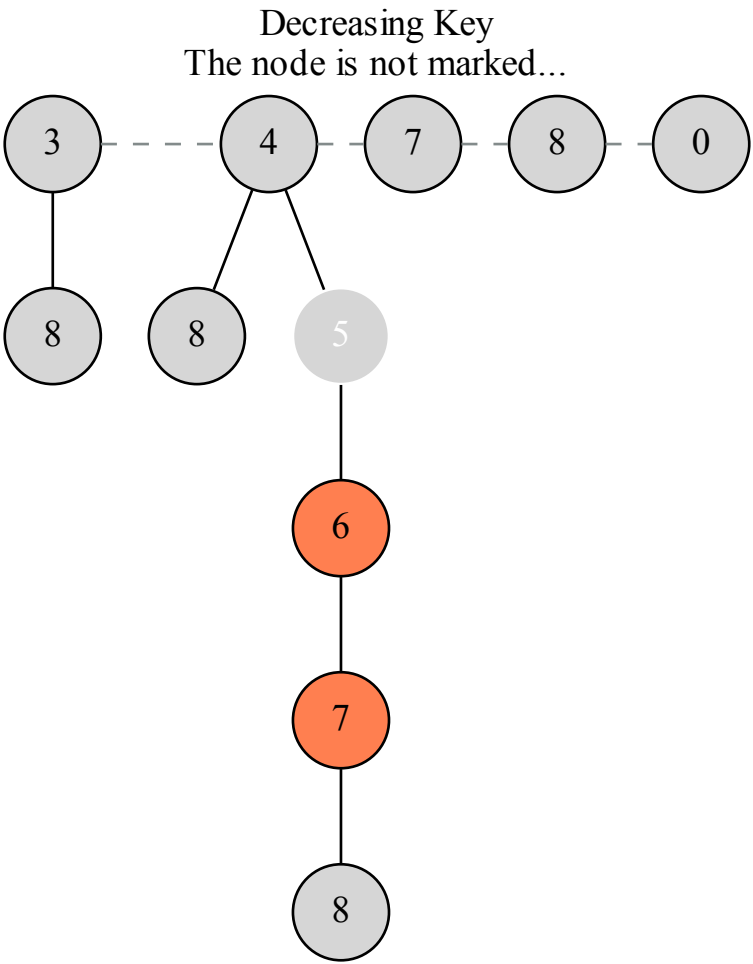



Inserting
Inserted node with key 7.
3
4
7
8
8
5
8
6
7
8

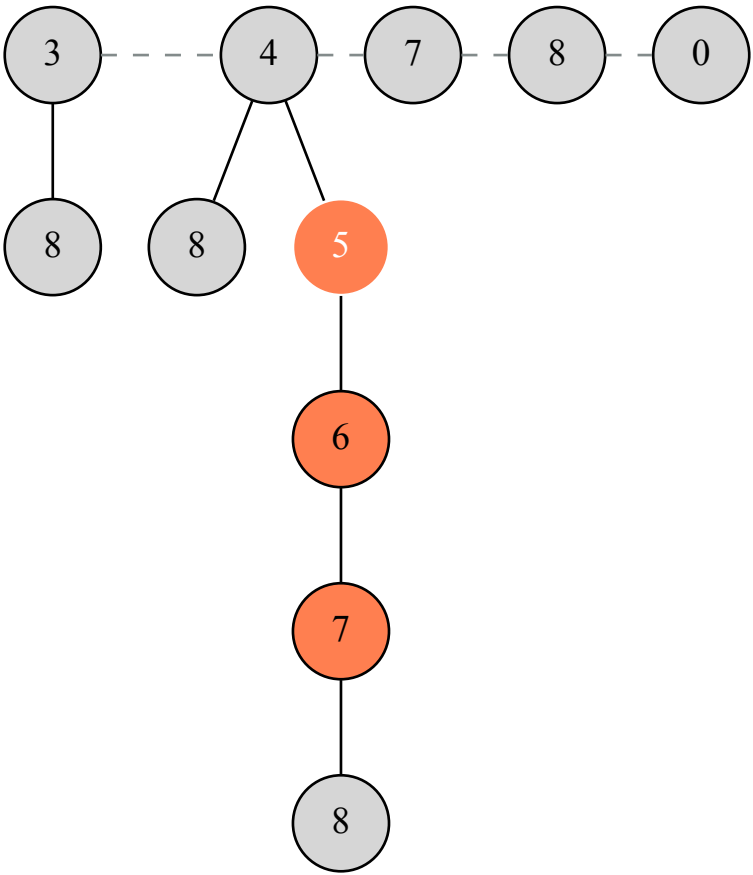

Inserting
Inserted node with key 8.
3
4
7
8
8
8
5
8
6
7
8

Decreasing Key
Decreasing key of node 8 to 0;

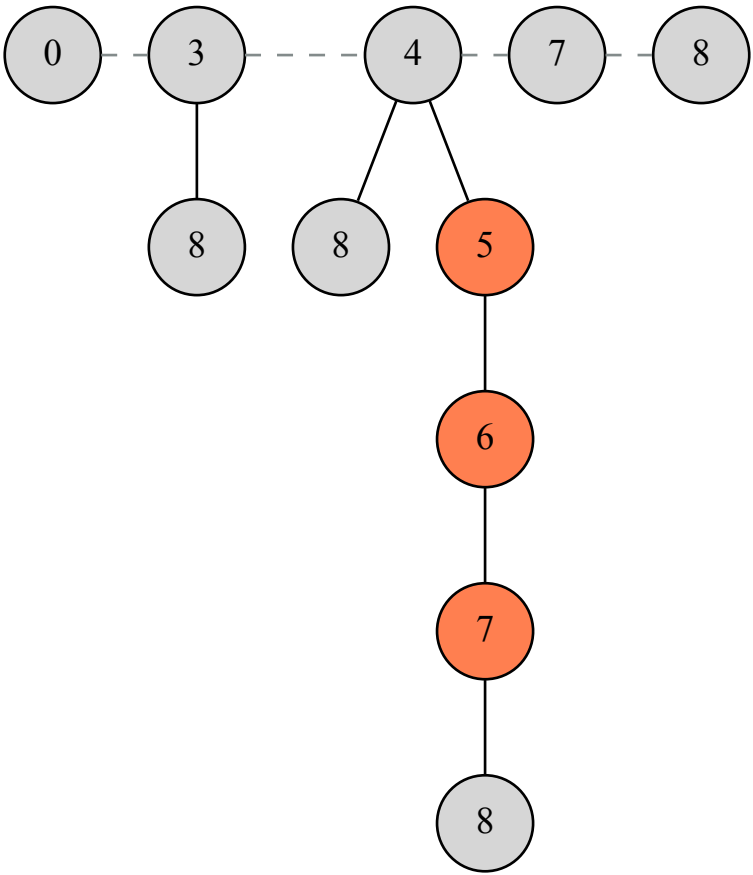


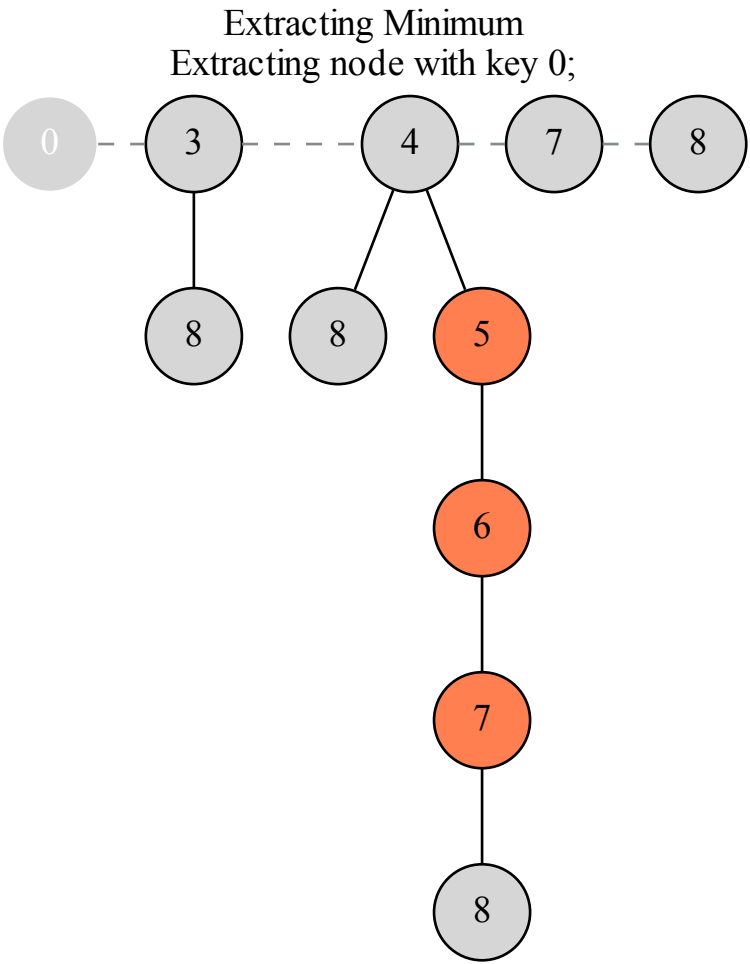

Decreasing Key
The node is not marked...
3
4
7
8
0
8
8
5
6
7
8

Decreasing Key
... so we mark it and finish the cascading cut.



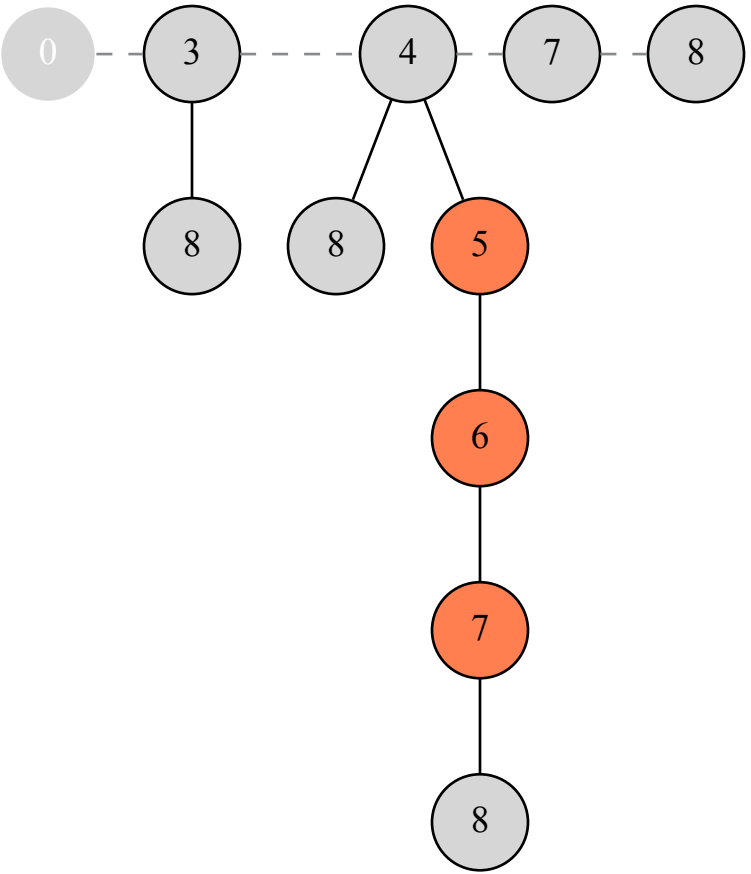
Decreasing Key
And we are done.




Extracting Minimum
Extracting node with key 0;
0
3
4
7
8
8
8
5
6
7
8

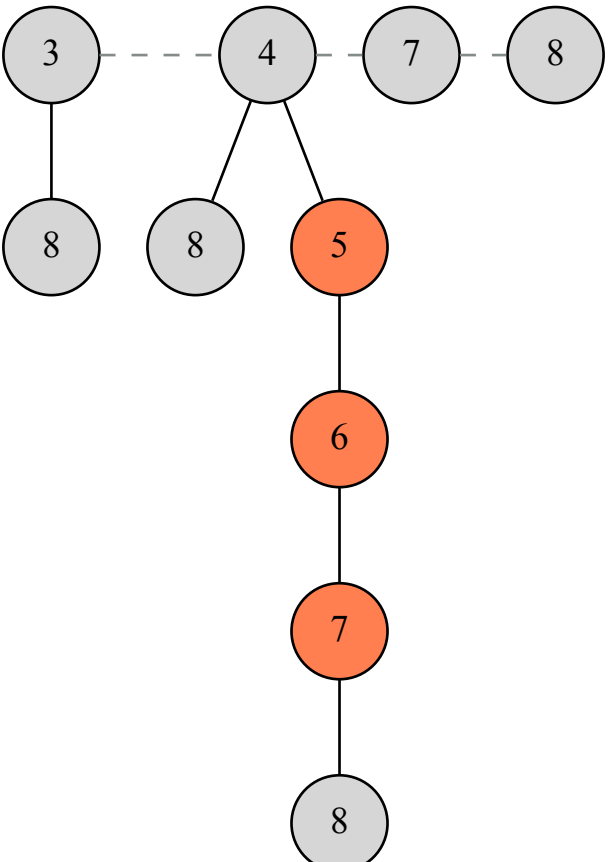
Extracting Minimum

We first meld the child list of 0 into the root list...

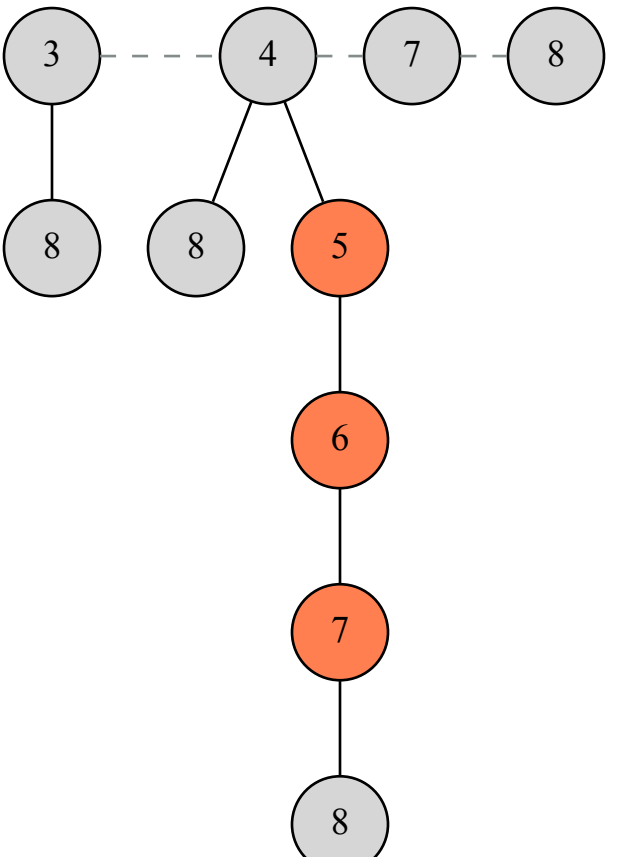


Extracting Minimum

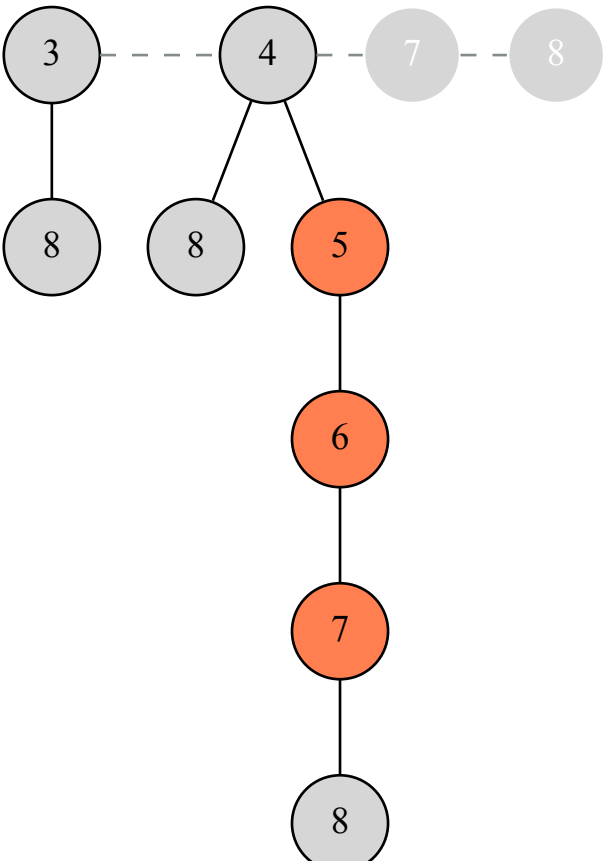
... and remove the minimum node form the root list;



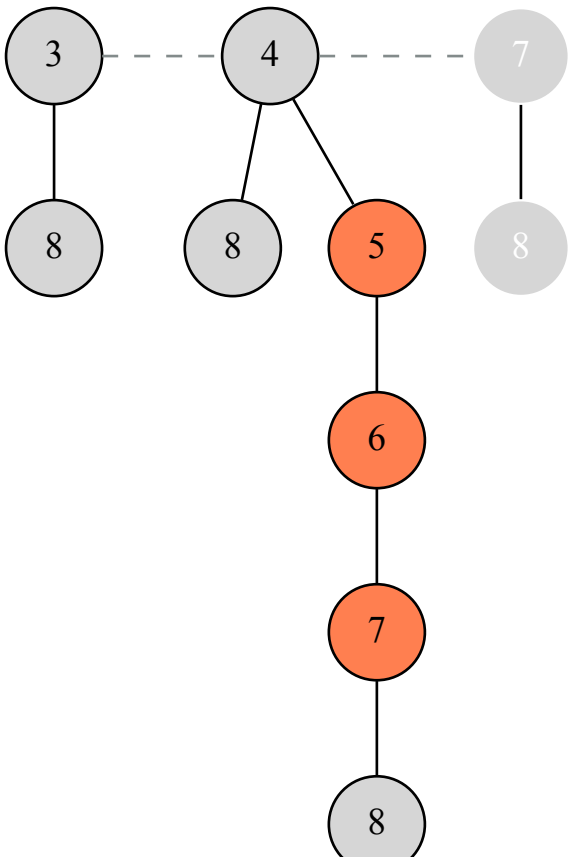
Extracting Minimum
Now we consolidate the Fibonacci heap;



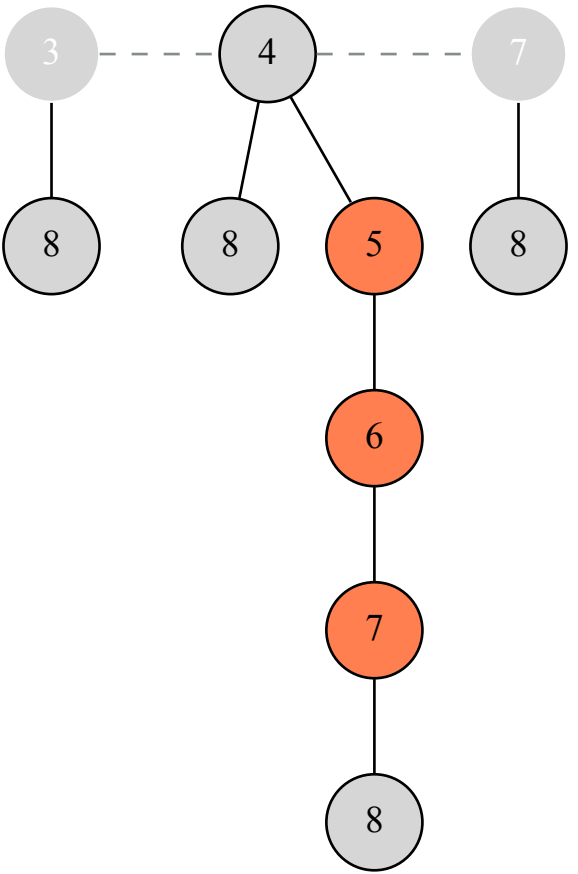
Extracting Minimum
Trees with roots 8 and 7 have the same degree (0)...



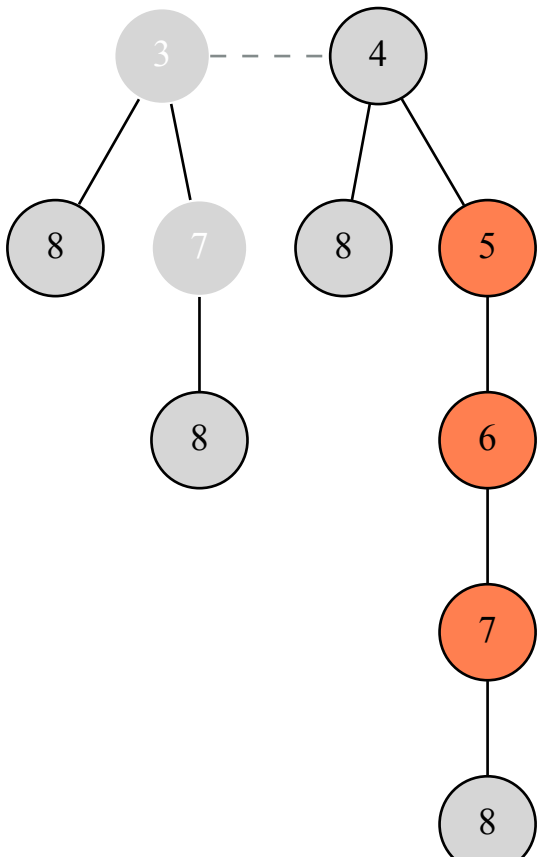
Extracting Minimum
... so we append 8 to the child list of 7;



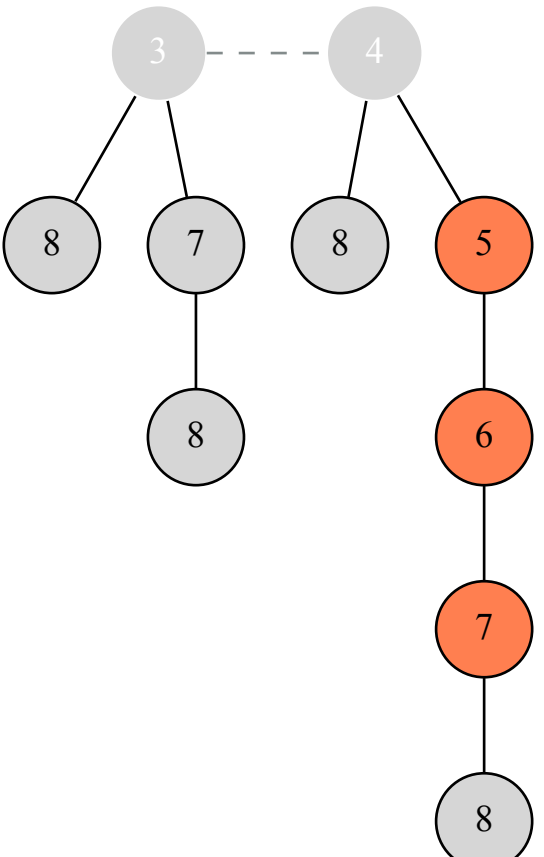
Extracting Minimum
Trees with roots 7 and 3 have the same degree (1)...



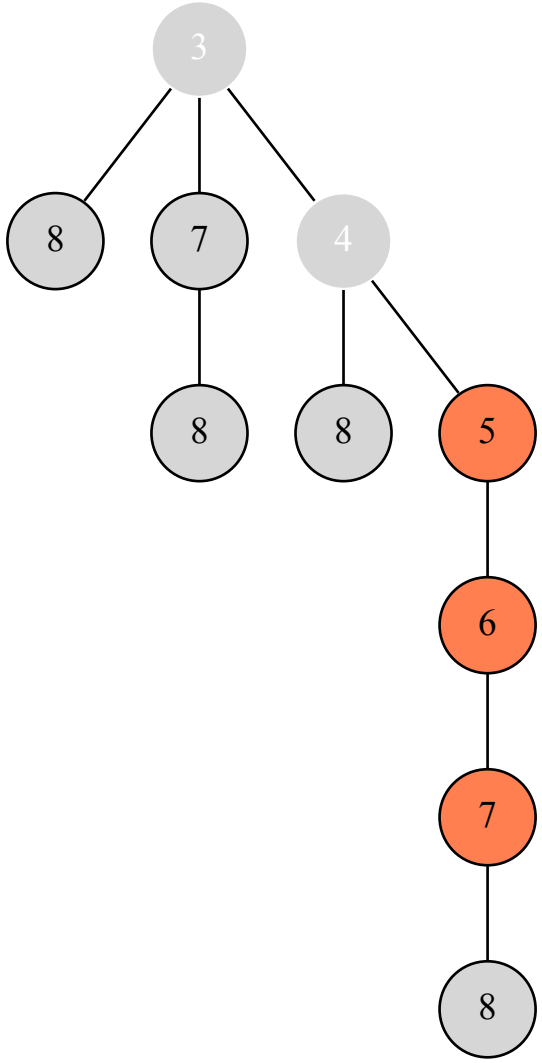
Extracting Minimum
... so we append 7 to the child list of 3;



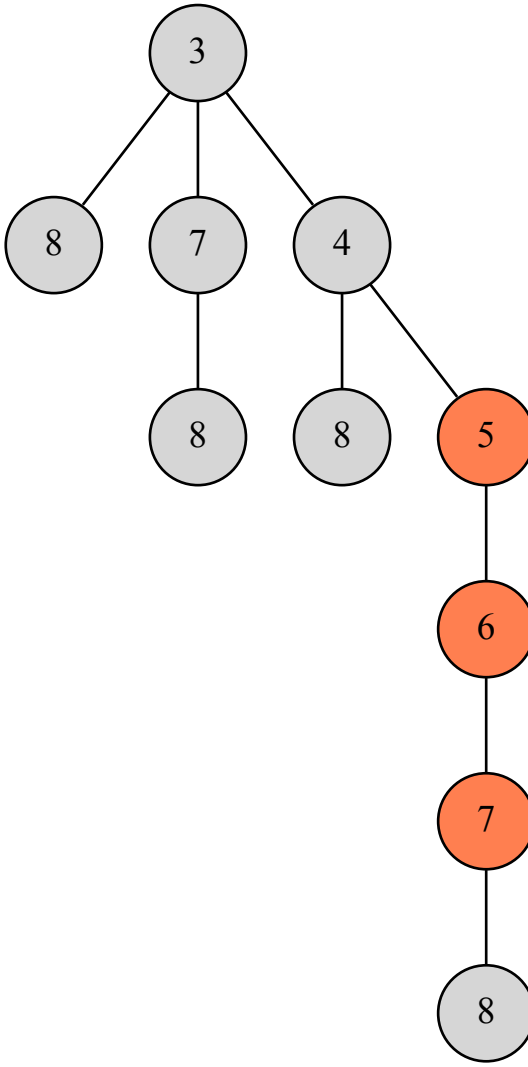
Extracting Minimum
Trees with roots 3 and 4 have the same degree (2)...



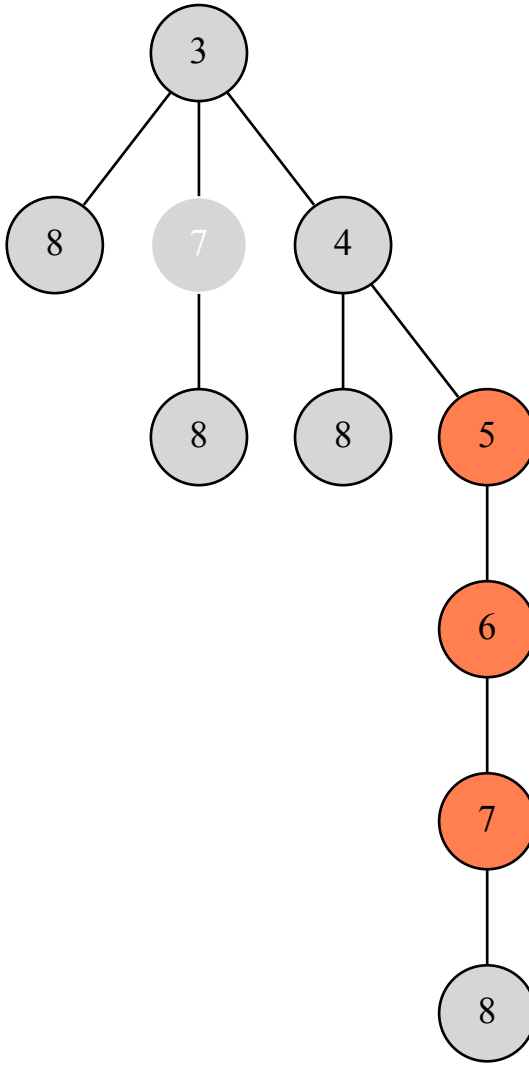
Extracting Minimum
... so we append 4 to the child list of 3;



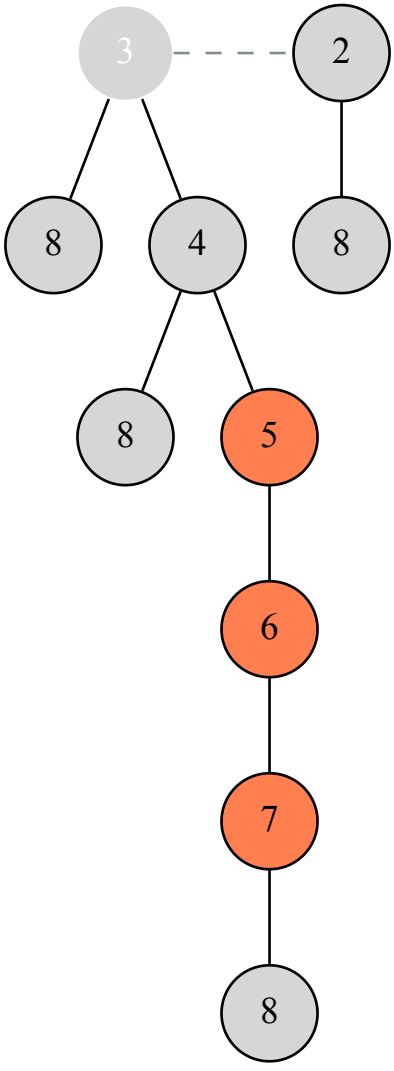
Extracting Minimum
And we are done.



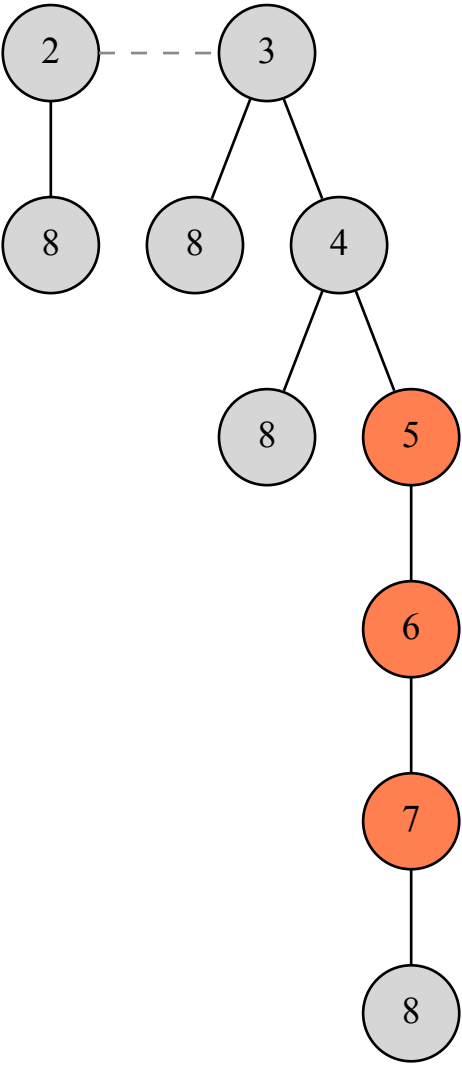
Decreasing Key
Decreasing key of node 7 to 2;

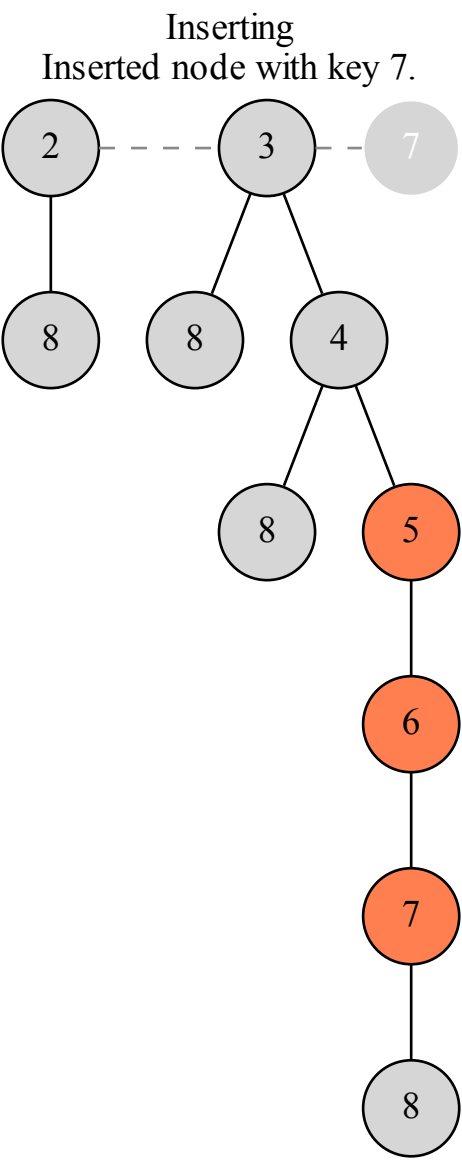


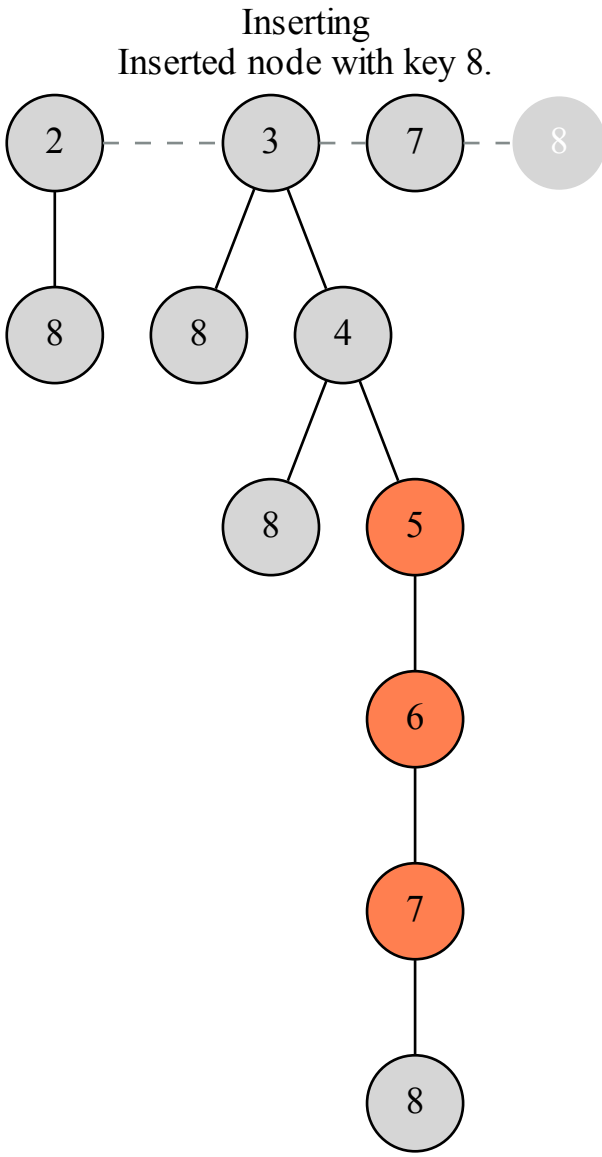
Decreasing Key
Since we have reached the root, we finish.



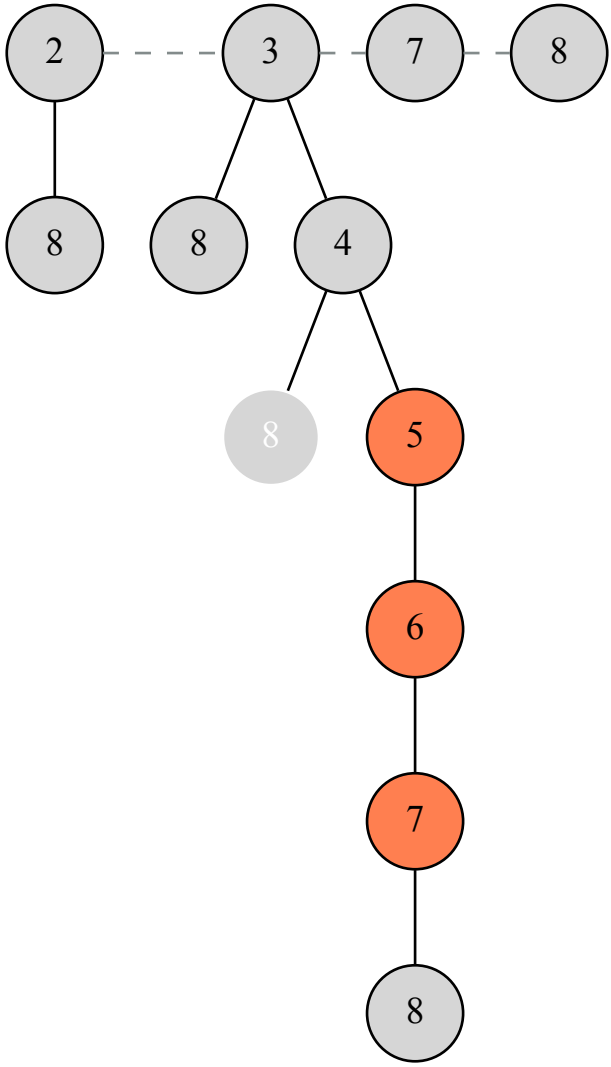
Decreasing Key
And we are done.

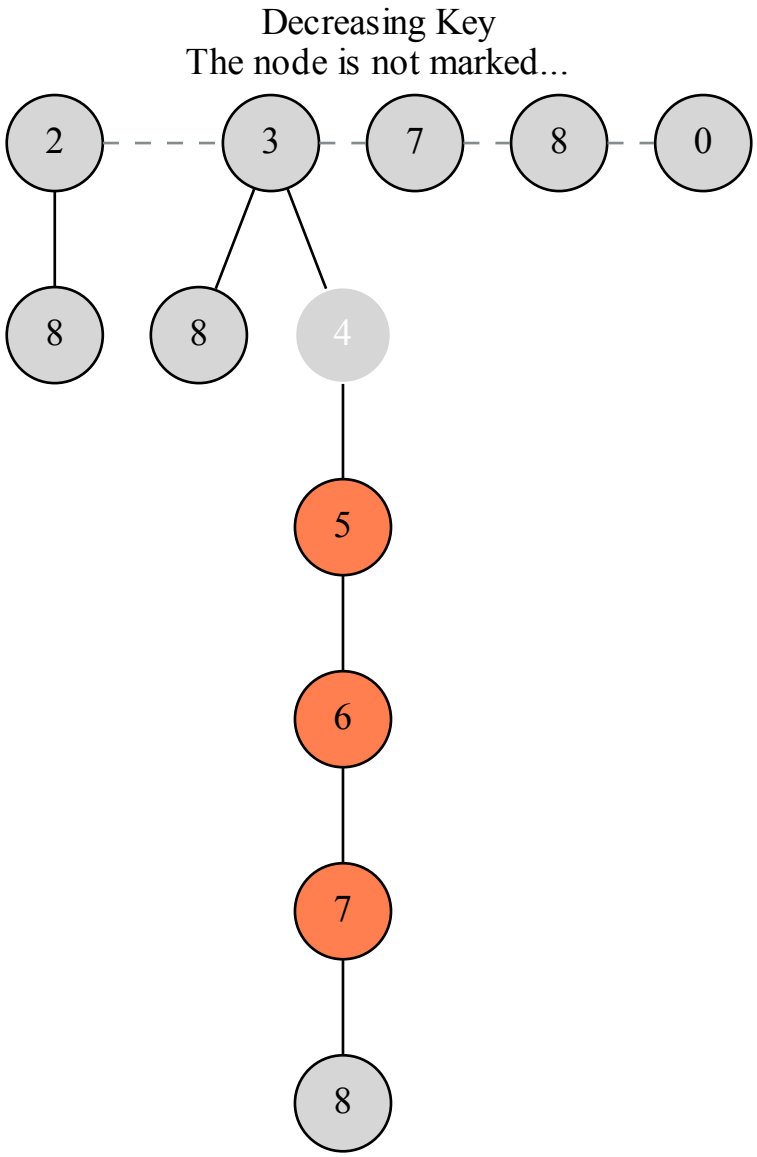



Inserting
Inserted node with key 7.
2
3
7
8
8
4
8
5
6
7
8

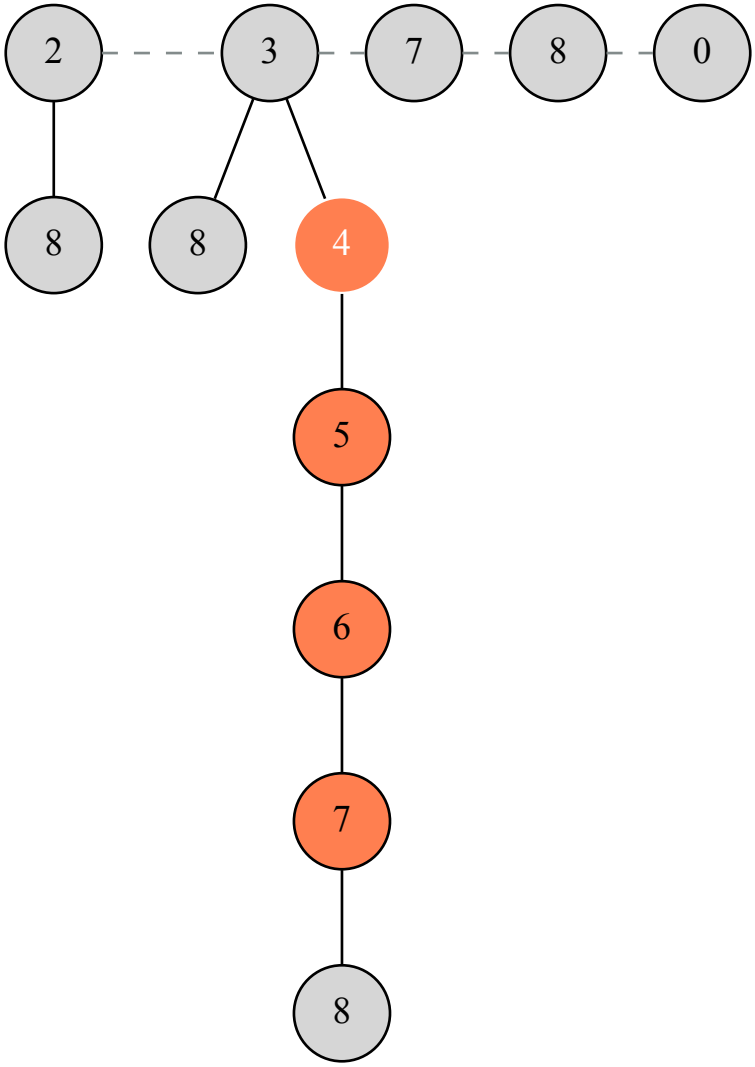

Inserting
Inserted node with key 8.
2
3
7
8
8
8
4
8
5
6
7
8

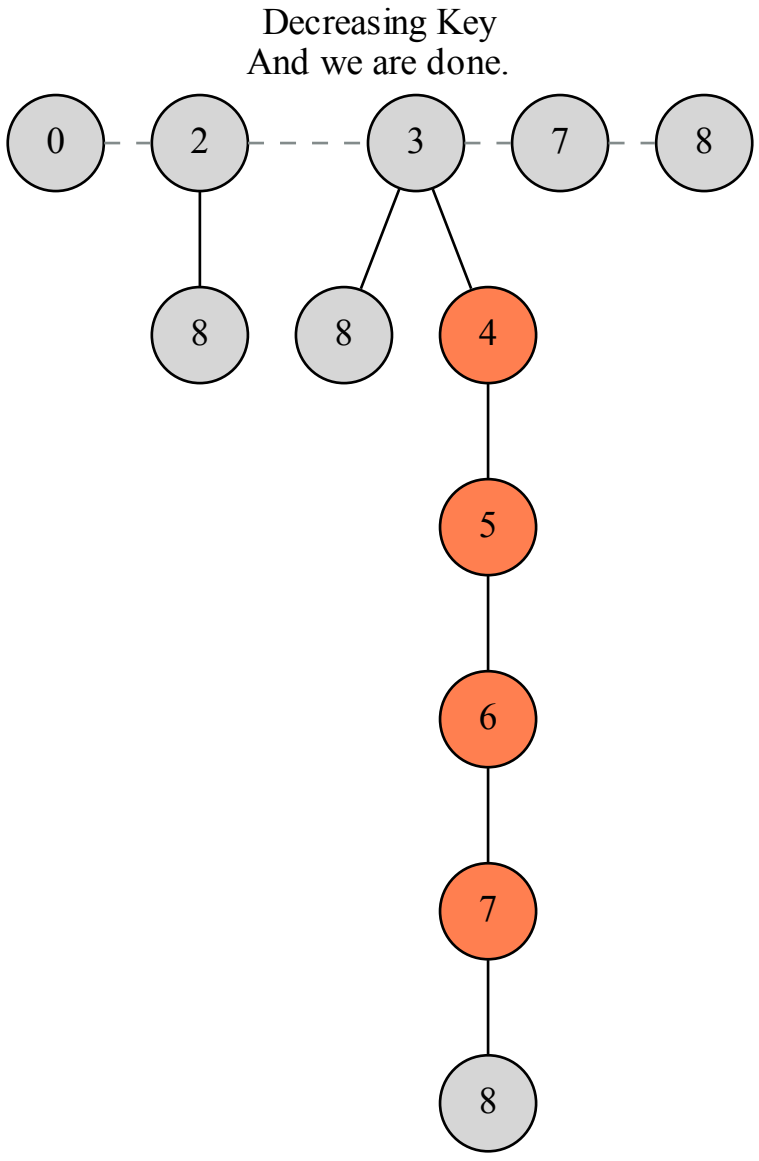
Decreasing Key
Decreasing key of node 8 to 0;

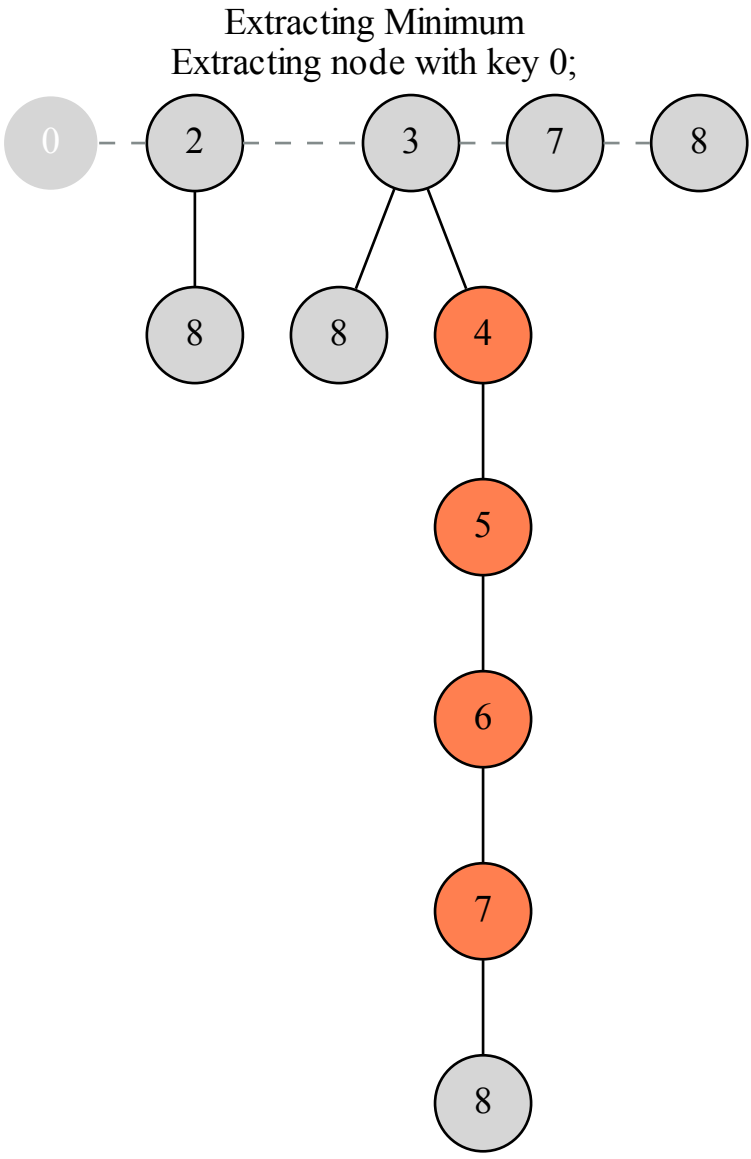



Decreasing Key
The node is not marked...
2
3
7
8
0
8
8
4
5
6
7
8

Decreasing Key
... so we mark it and finish the cascading cut.

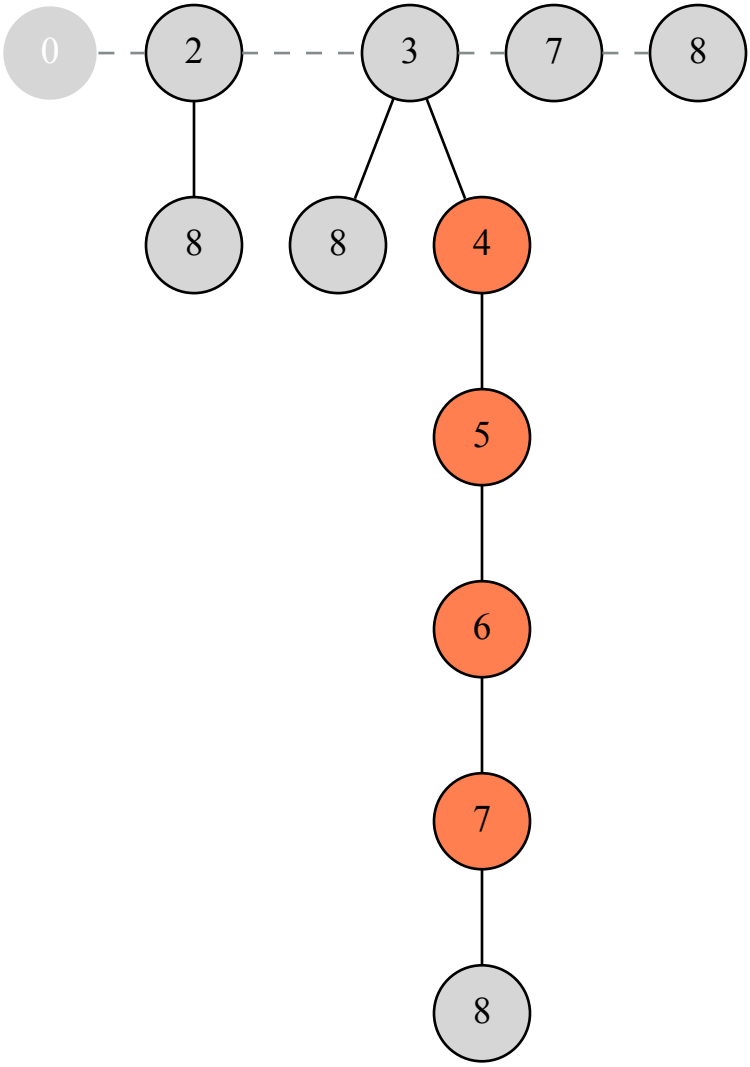



Decreasing Key
And we are done.
0
2
3
7
8
8
8
4
5
6
7
8

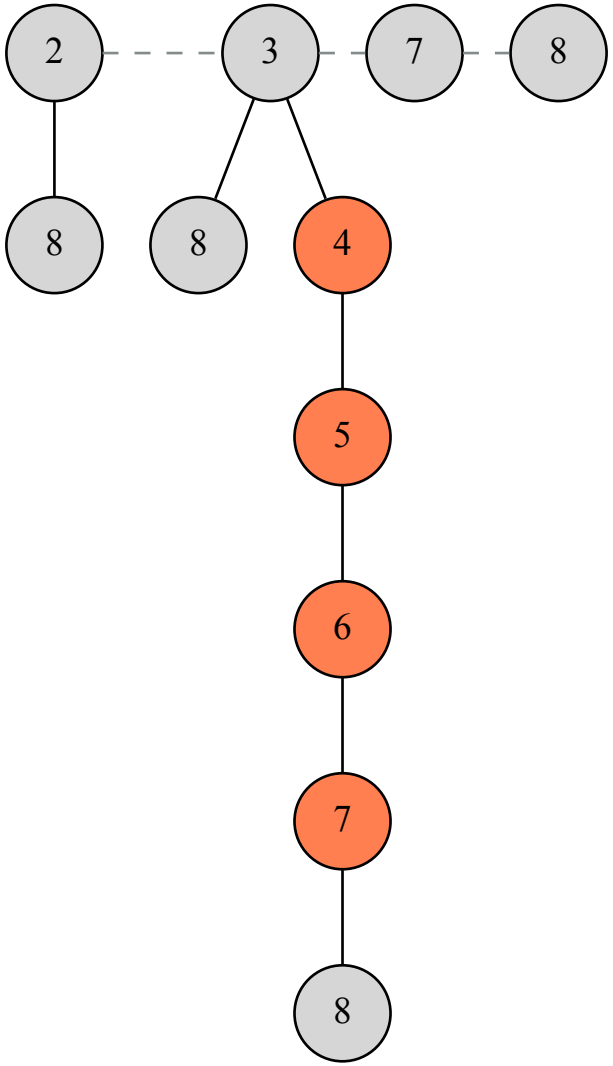

Extracting Minimum
Extracting node with key 0;
0
2
3
7
8
8
8
4
5
6
7
8

Extracting Minimum

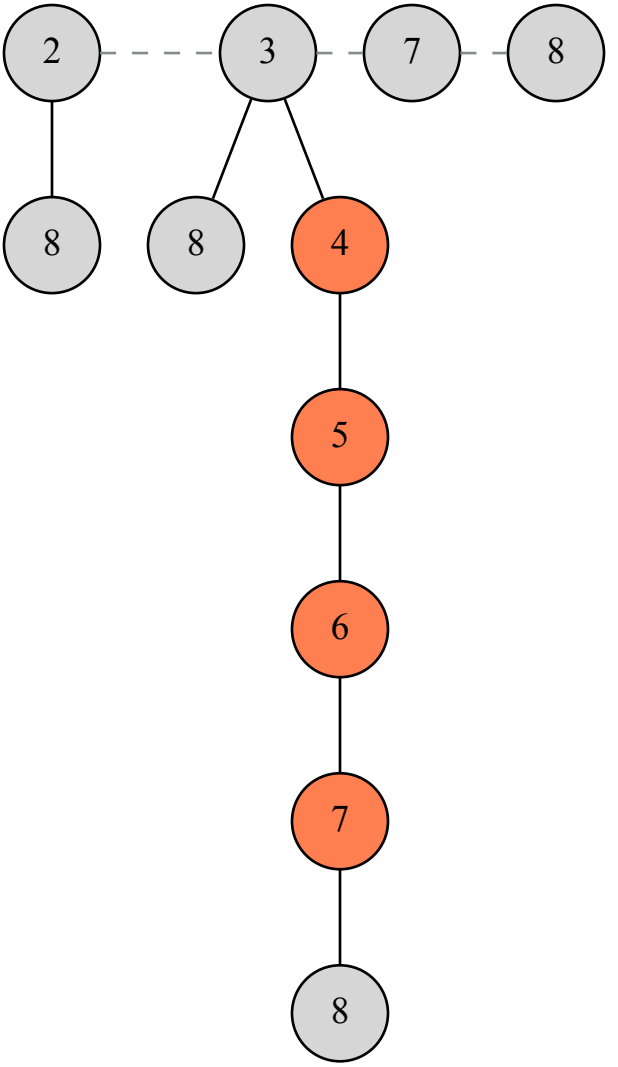
We first meld the child list of 0 into the root list...



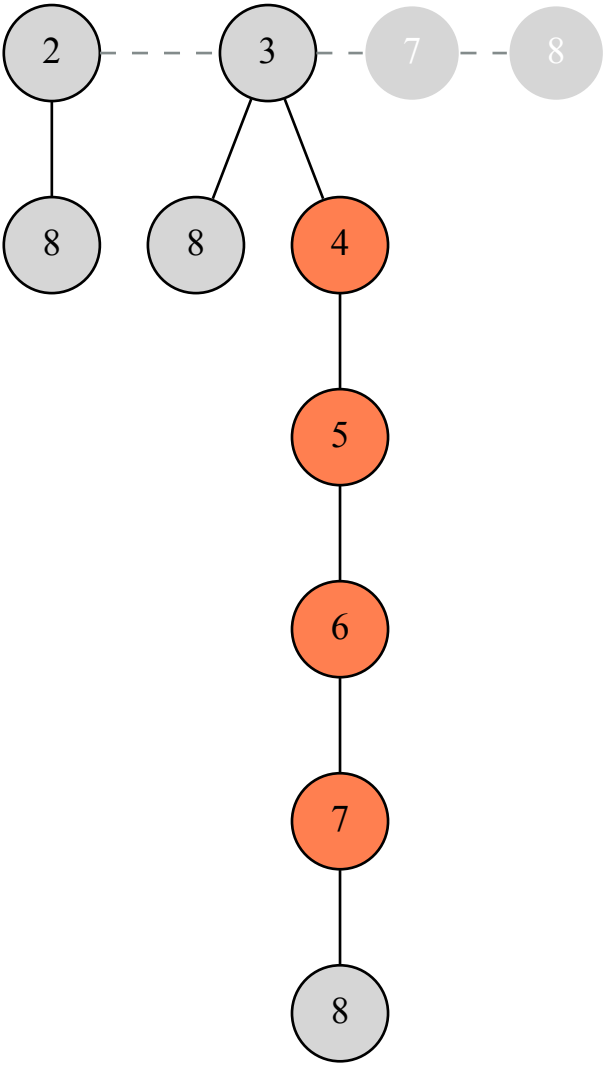
Extracting Minimum
... and remove the minimum node form the root list;



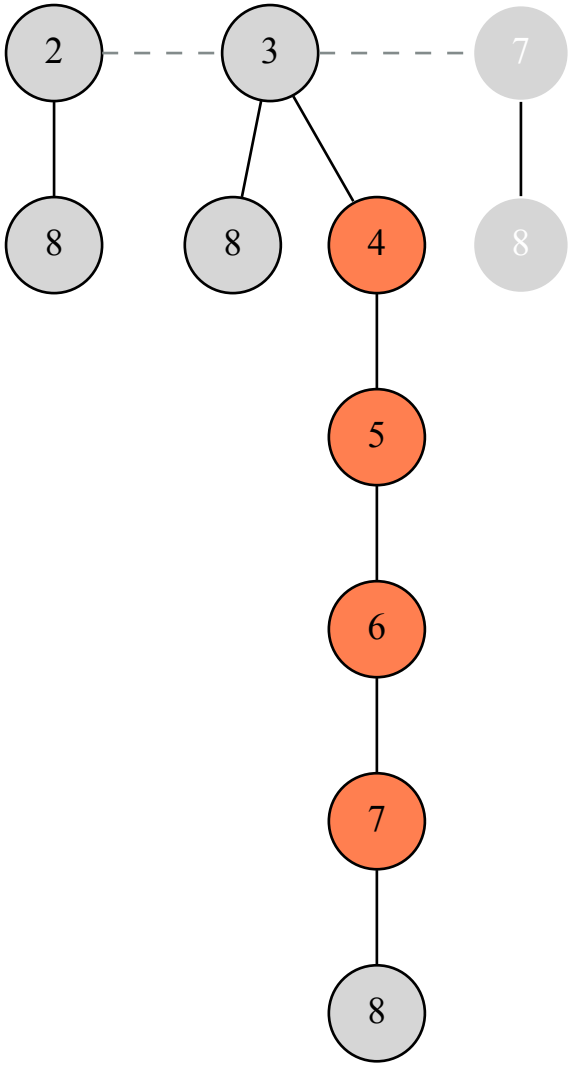
Extracting Minimum
Now we consolidate the Fibonacci heap;



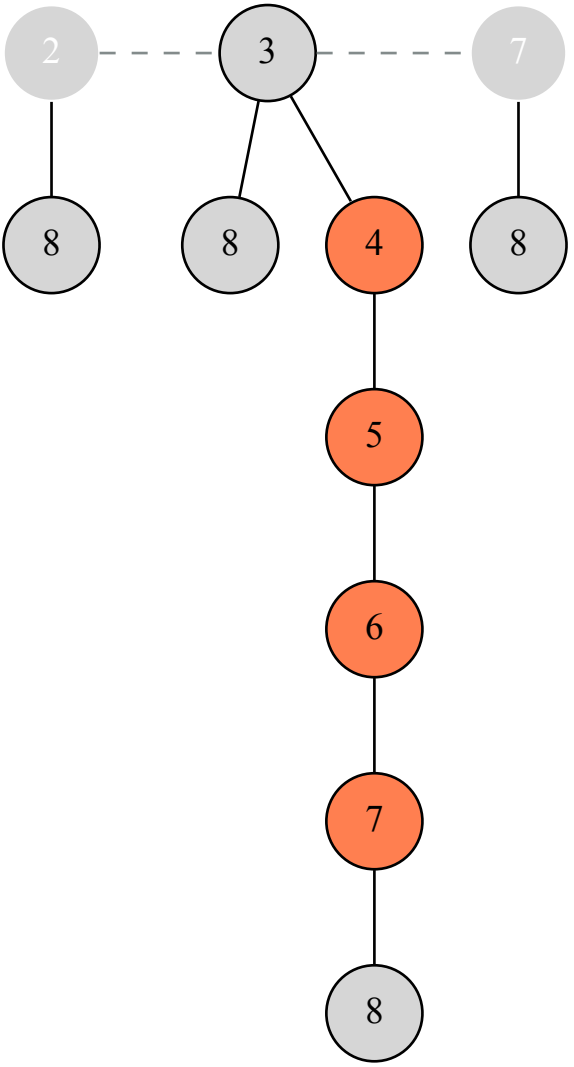
Extracting Minimum
Trees with roots 8 and 7 have the same degree (0)...



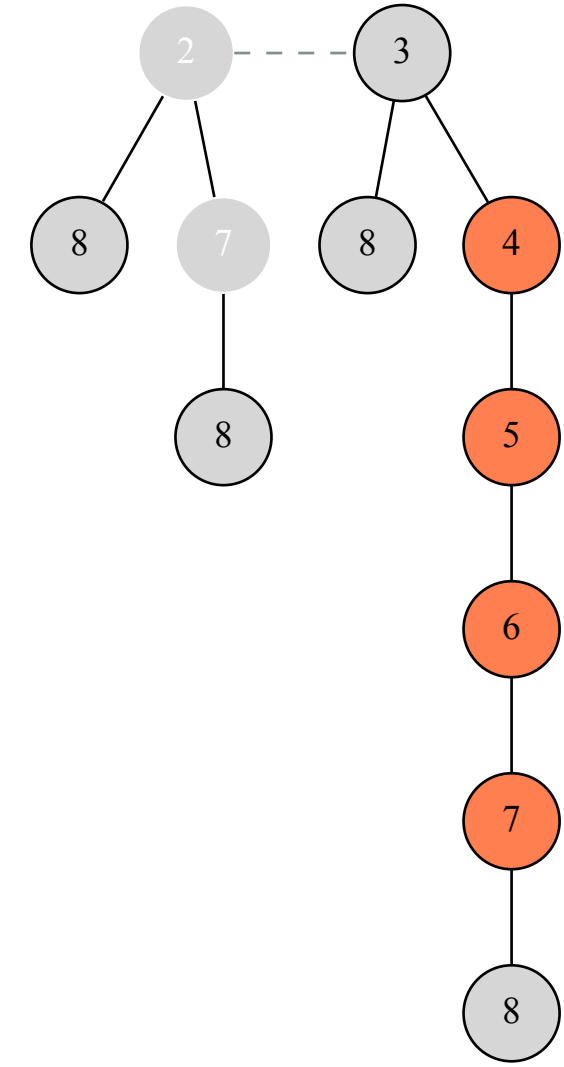
Extracting Minimum
... so we append 8 to the child list of 7;



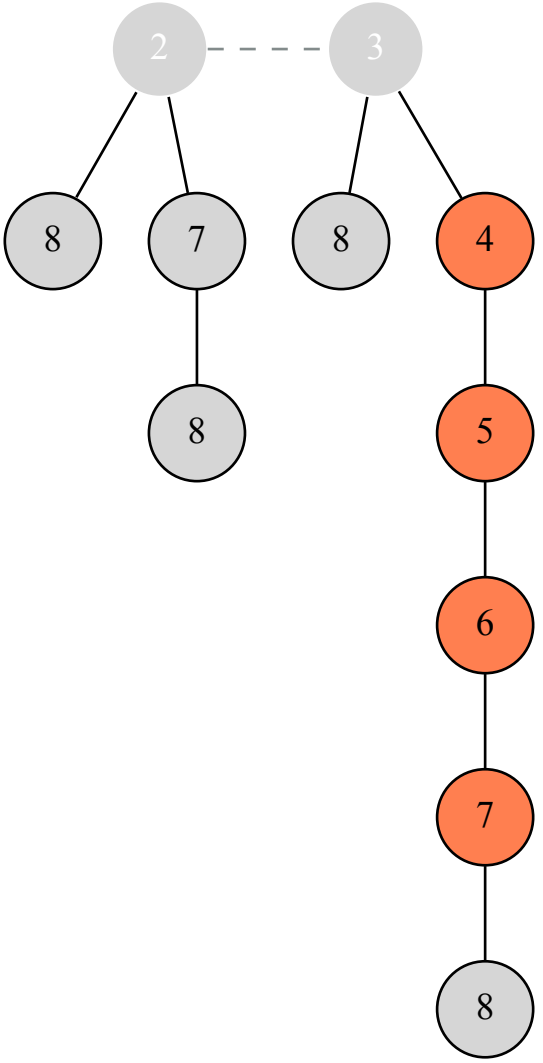
Extracting Minimum
Trees with roots 7 and 2 have the same degree (1)...



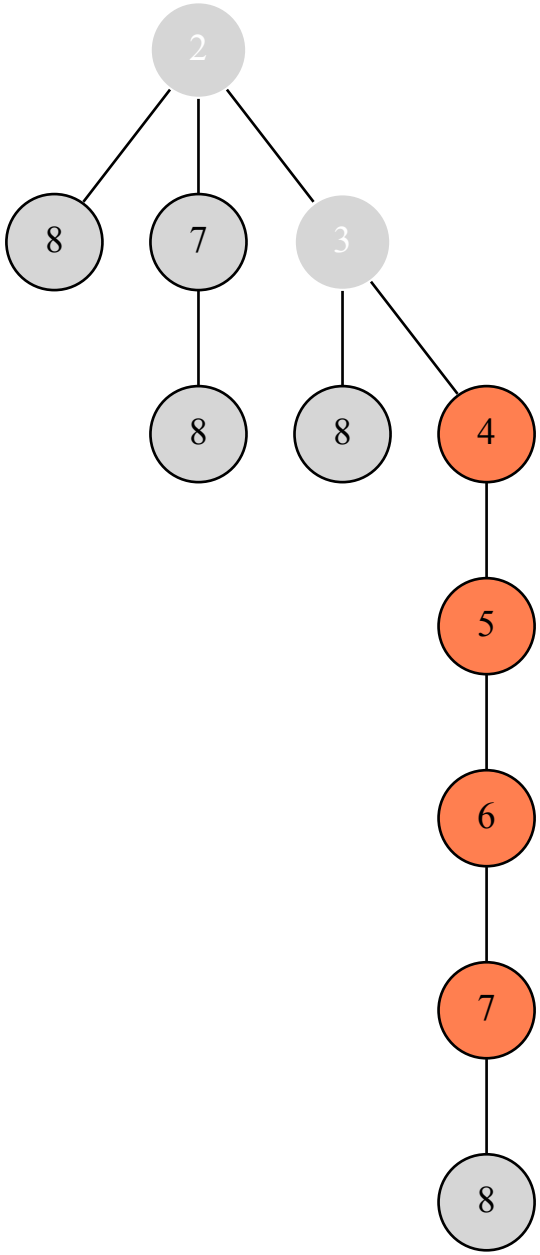
Extracting Minimum
... so we append 7 to the child list of 2;



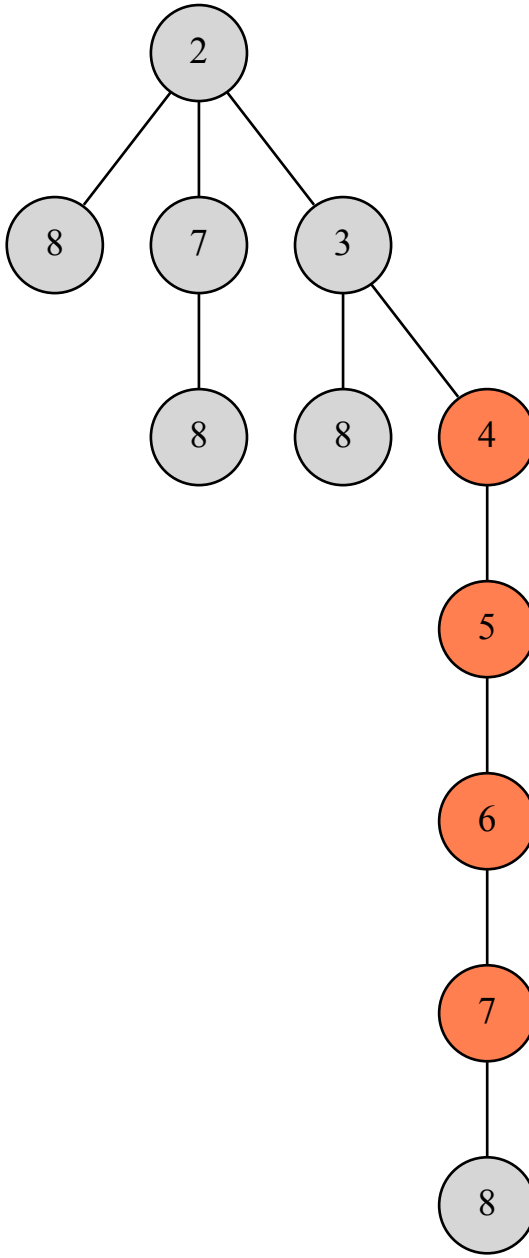
Extracting Minimum
Trees with roots 2 and 3 have the same degree (2)...



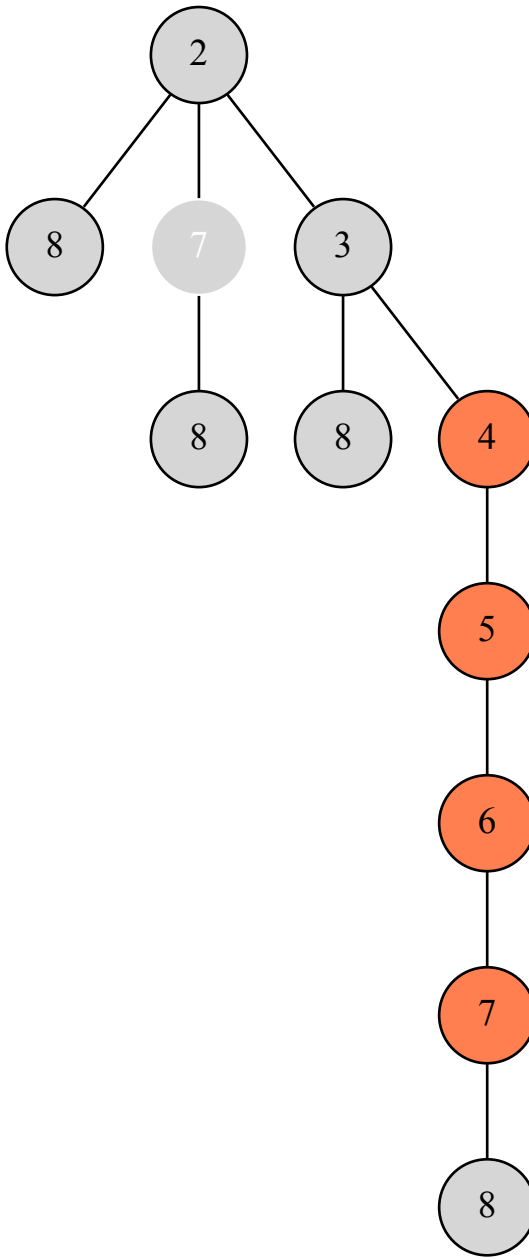
Extracting Minimum
... so we append 3 to the child list of 2;



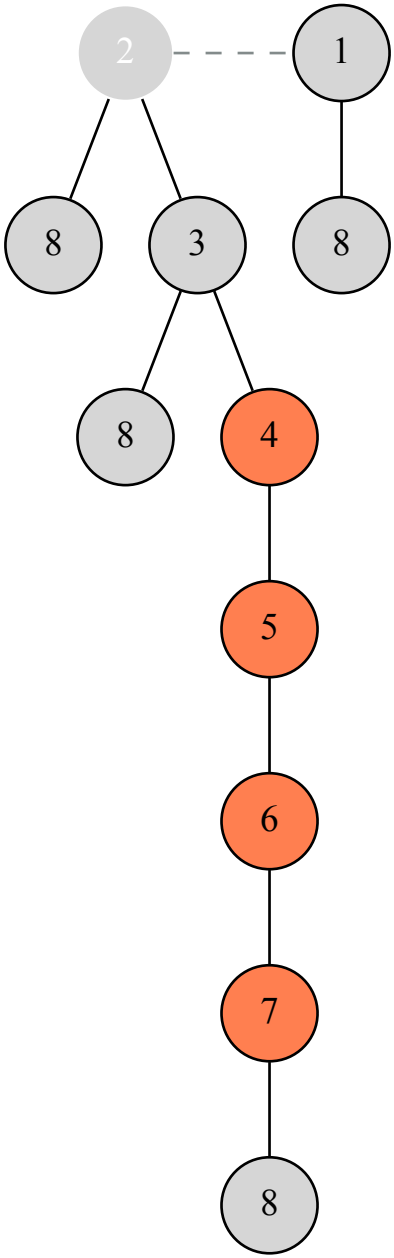
Extracting Minimum
And we are done.



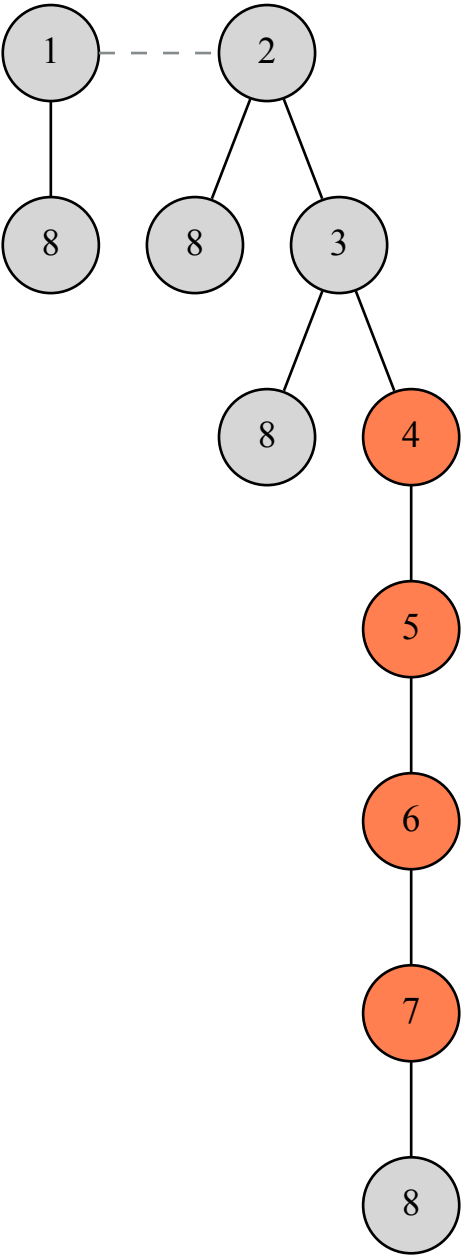
Decreasing Key
Decreasing key of node 7 to 1;



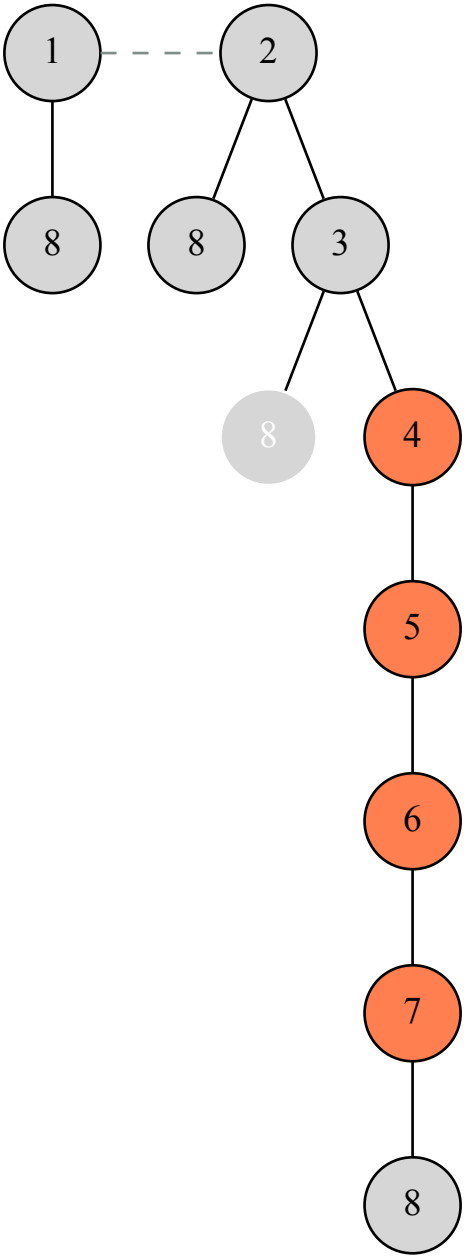
Decreasing Key
Since we have reached the root, we finish.

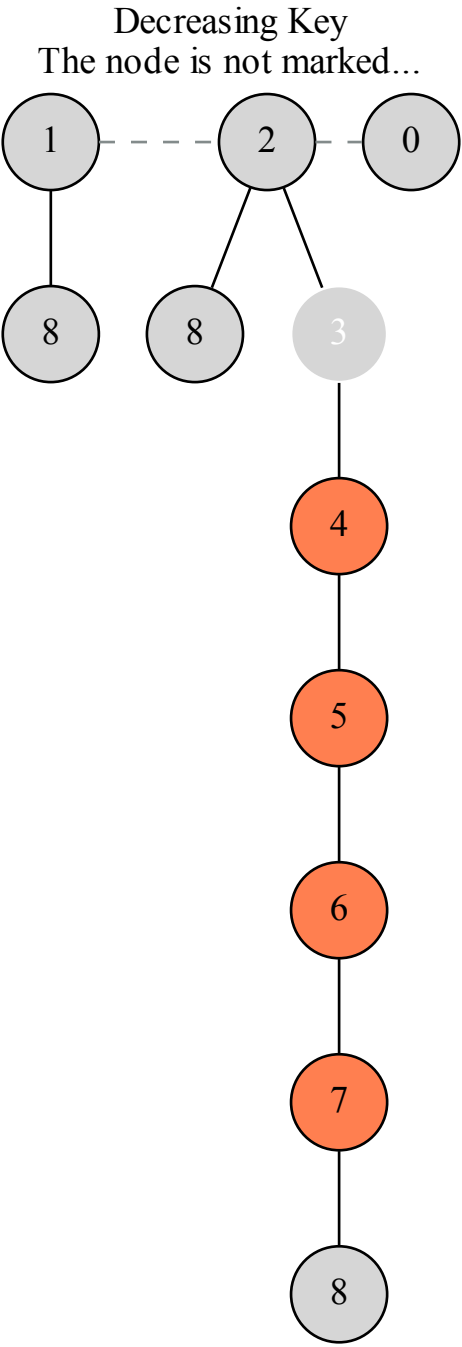


Decreasing Key
And we are done.

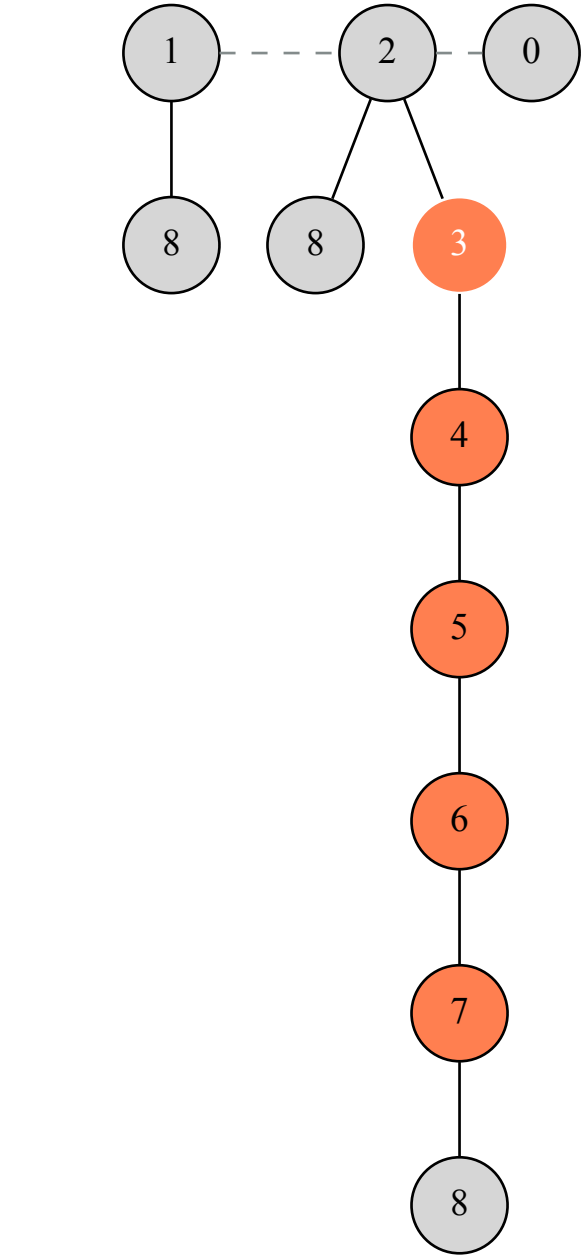


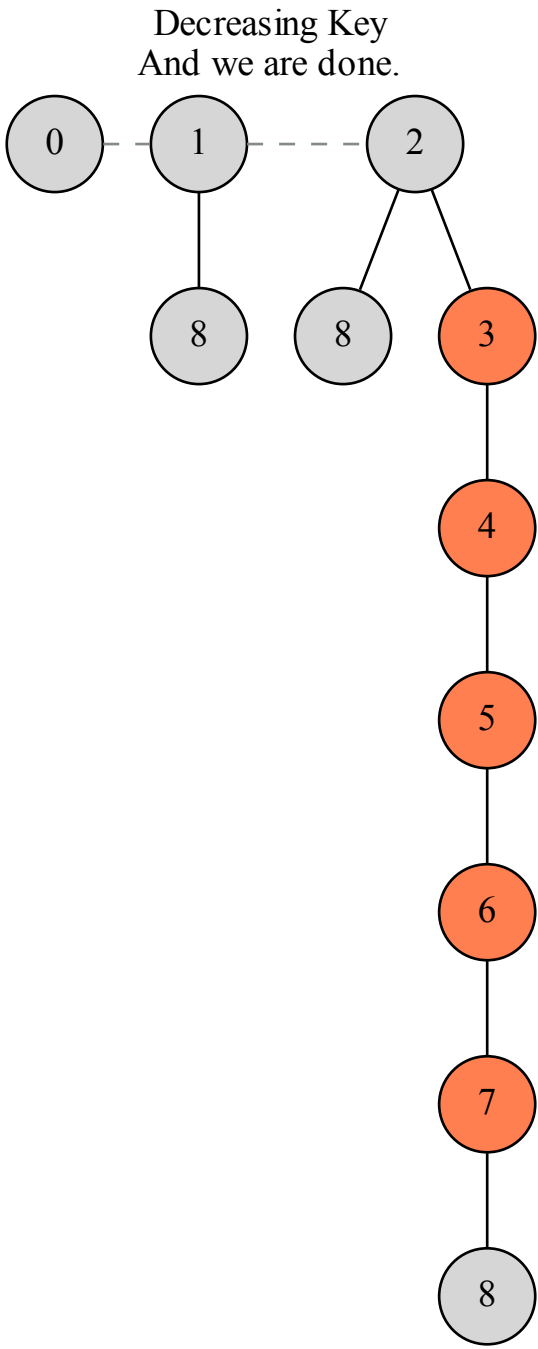
Decreasing Key
Decreasing key of node 8 to 0;

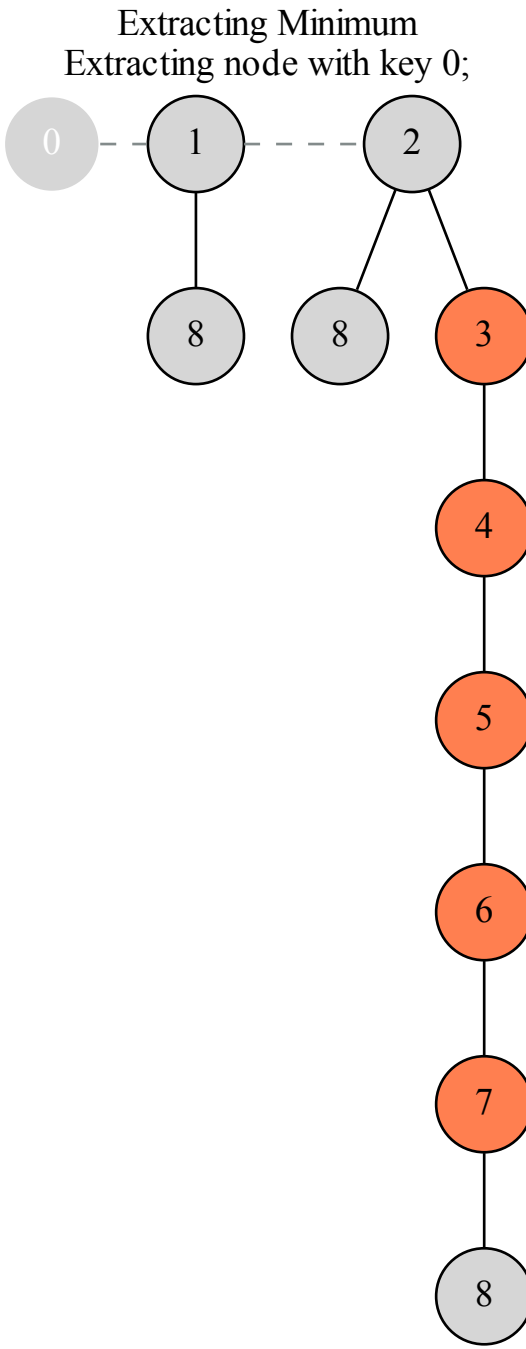



Decreasing Key
The node is not marked...
1
2
0
8
8
3
4
5
6
7
8

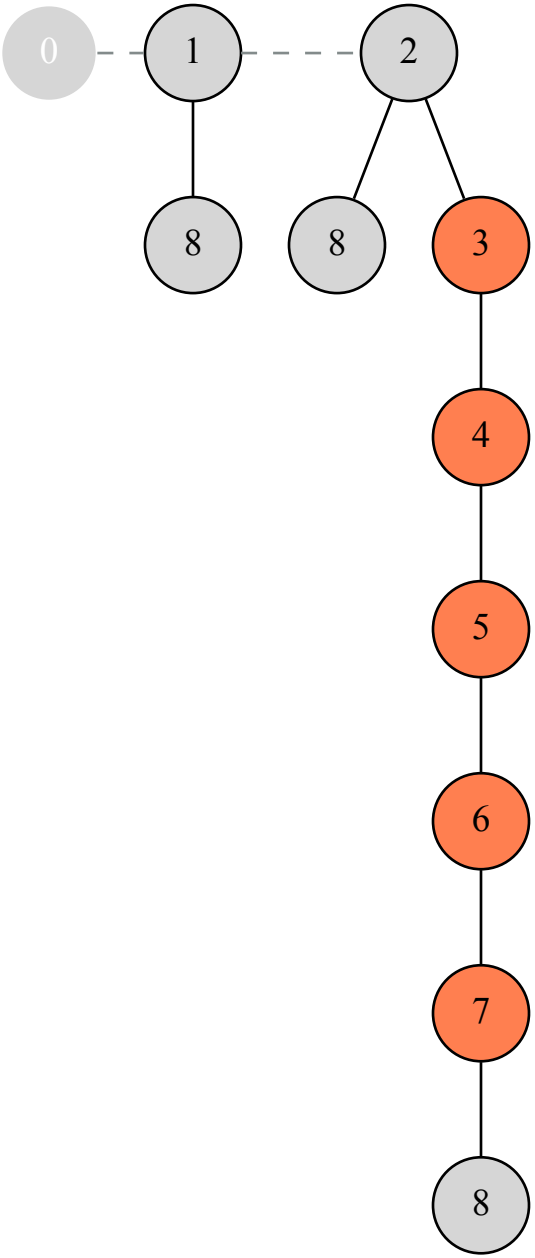
Decreasing Key
... so we mark it and finish the cascading cut.



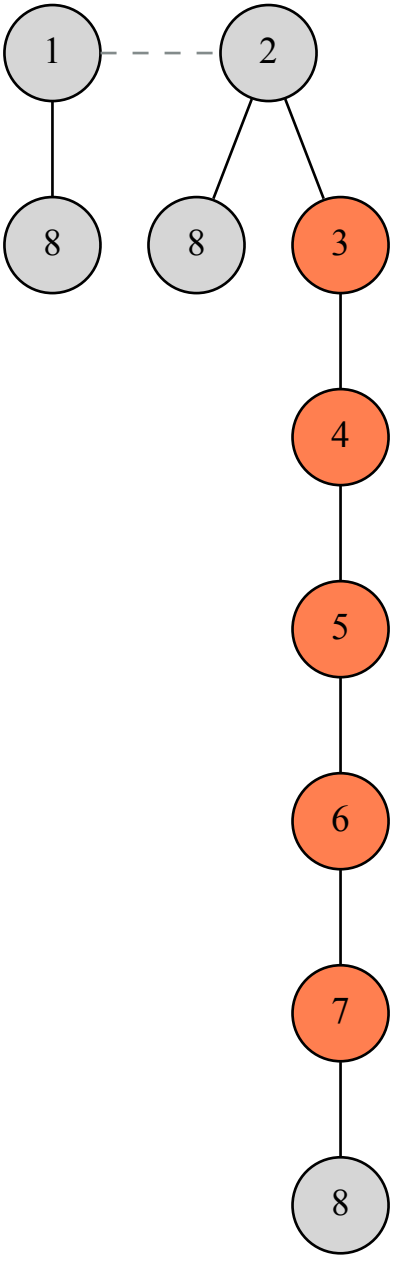

Decreasing Key
And we are done.
0
1
2
8
8
3
4
5
6
7
8


Extracting Minimum
Extracting node with key 0;
0
1
2
8
8
3
4
5
6
7
8

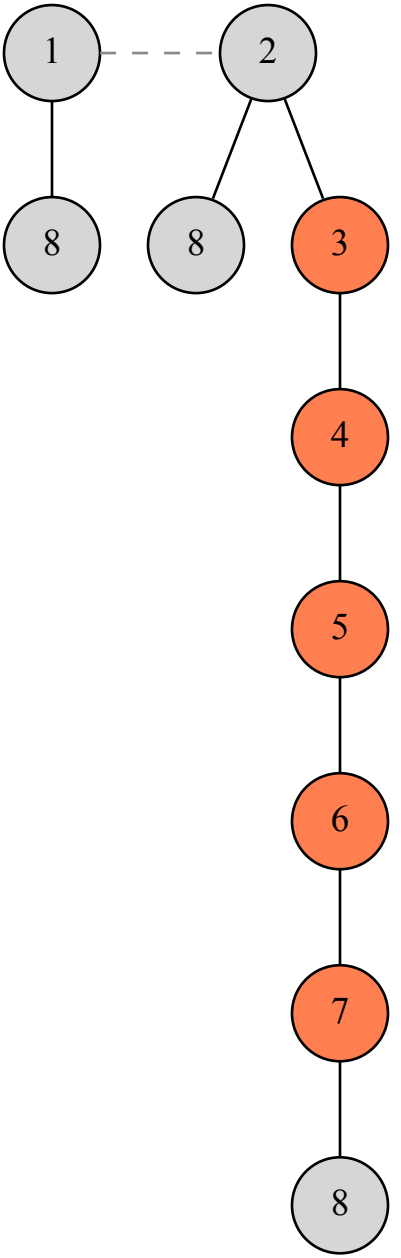
Extracting Minimum
We first meld the child list of 0 into the root list...



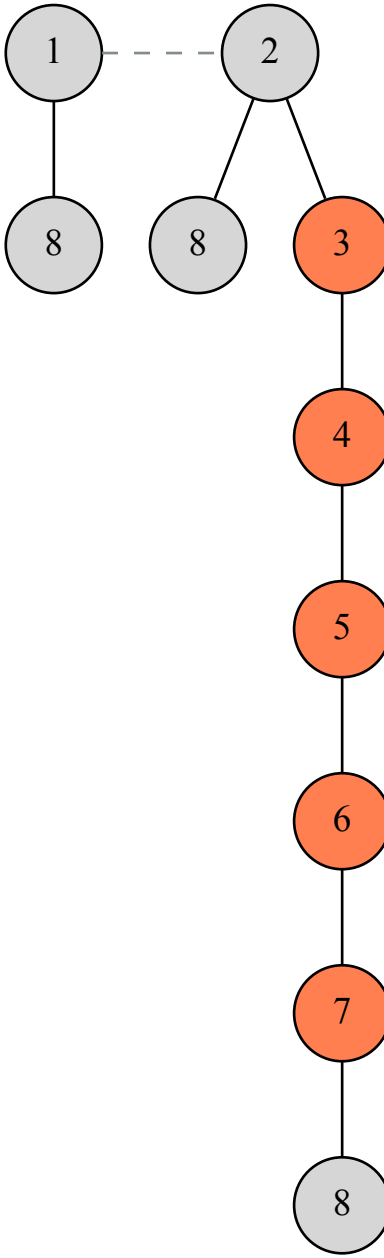
Extracting Minimum
... and remove the minimum node form the root list;



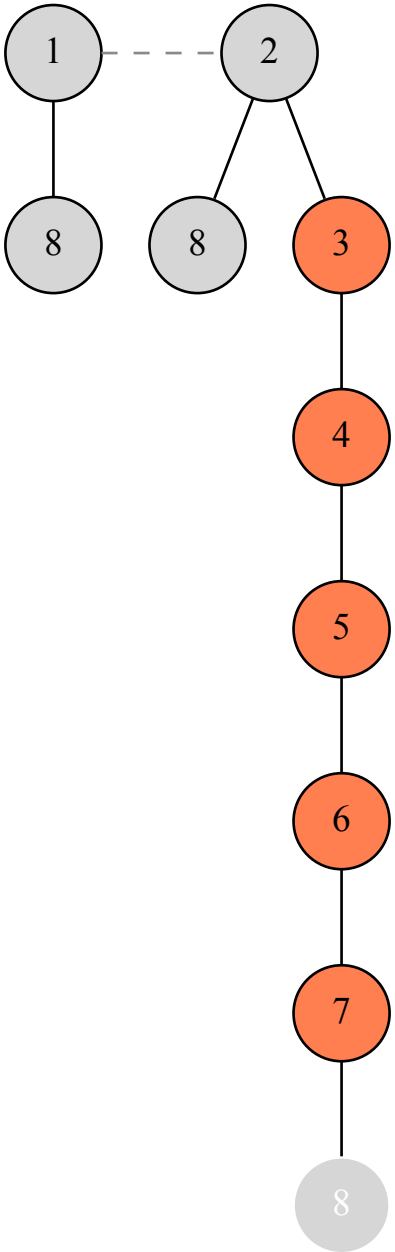
Extracting Minimum
Now we consolidate the Fibonacci heap;

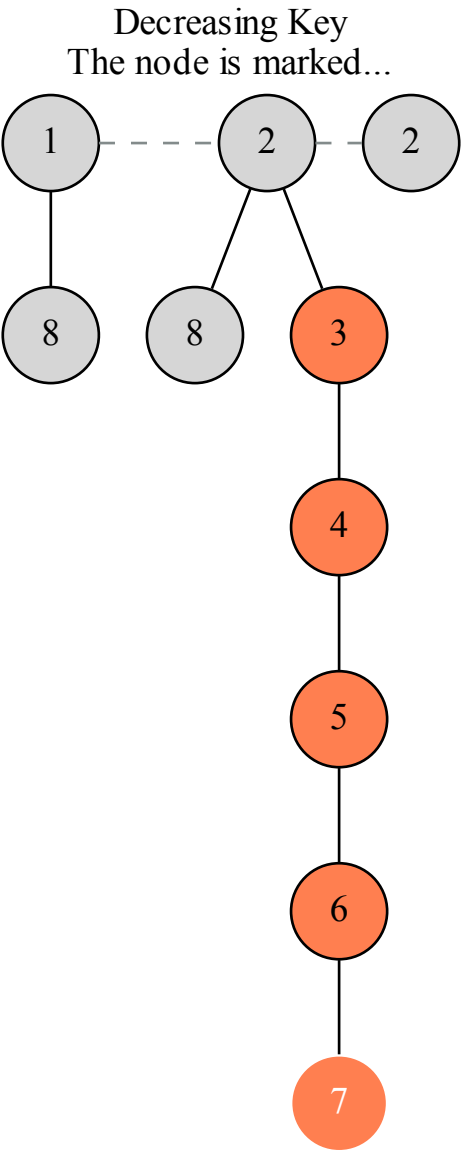


Extracting Minimum
And we are done.

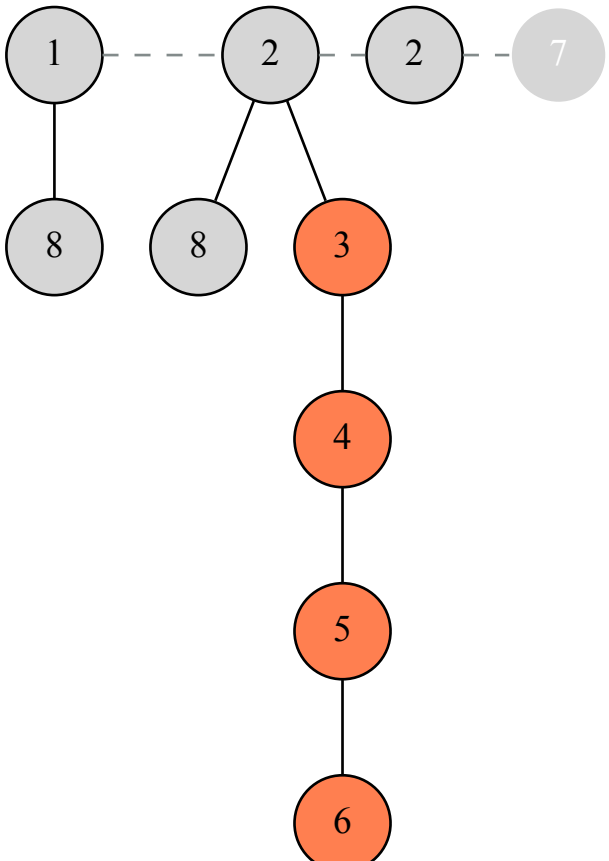


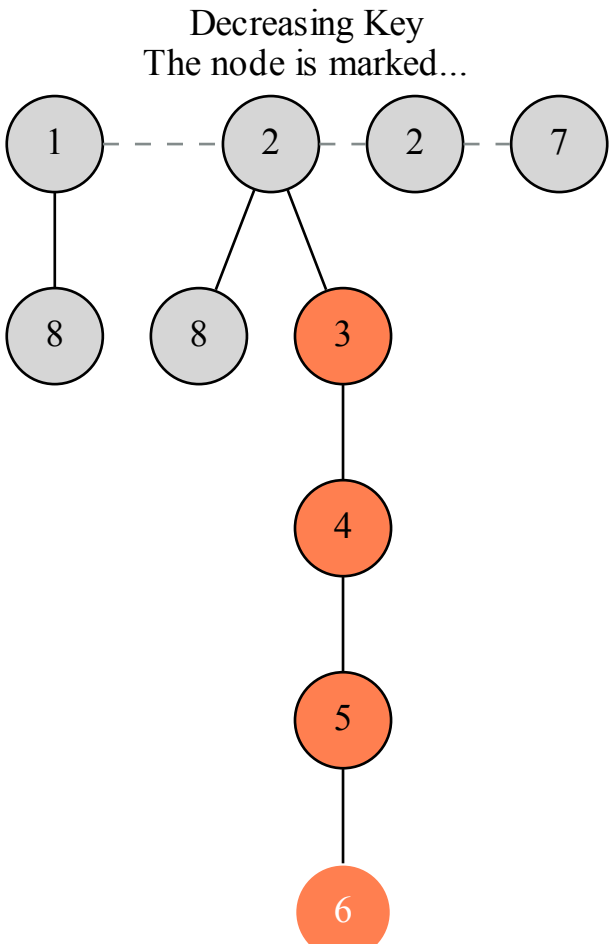
Decreasing Key
Decreasing key of node 8 to 2;



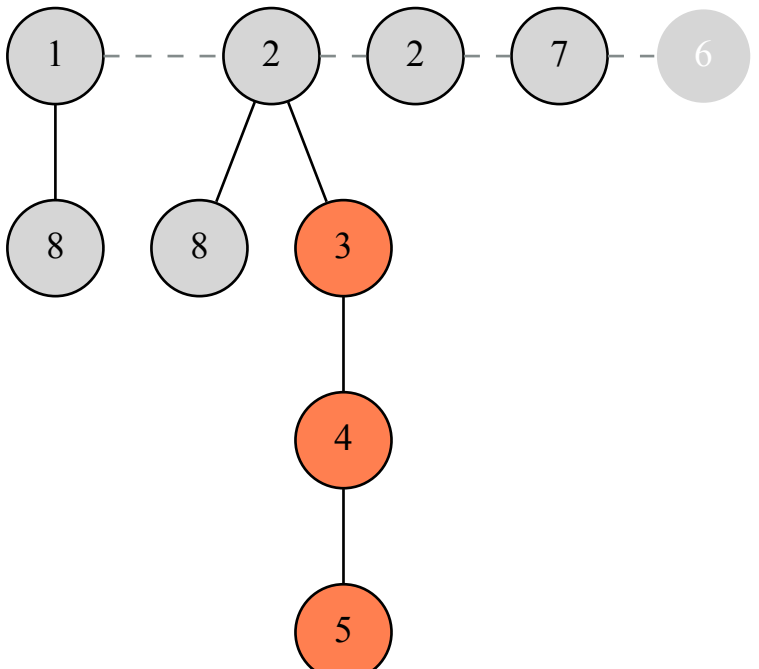

Decreasing Key
The node is marked...
1
2
2
8
8
3
4
5
6
7

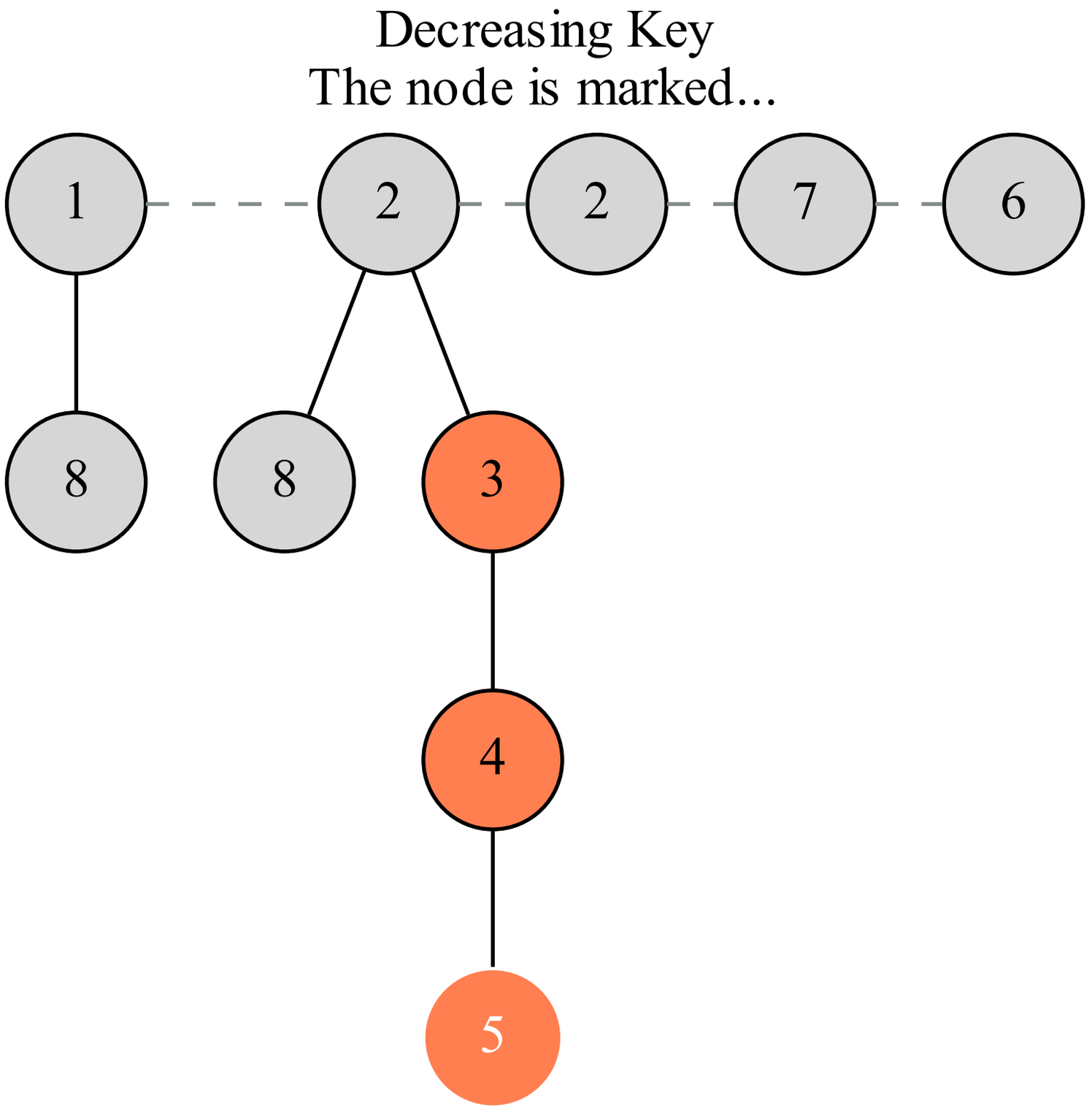
Decreasing Key
... so we cut it and continue with the cascading cut;



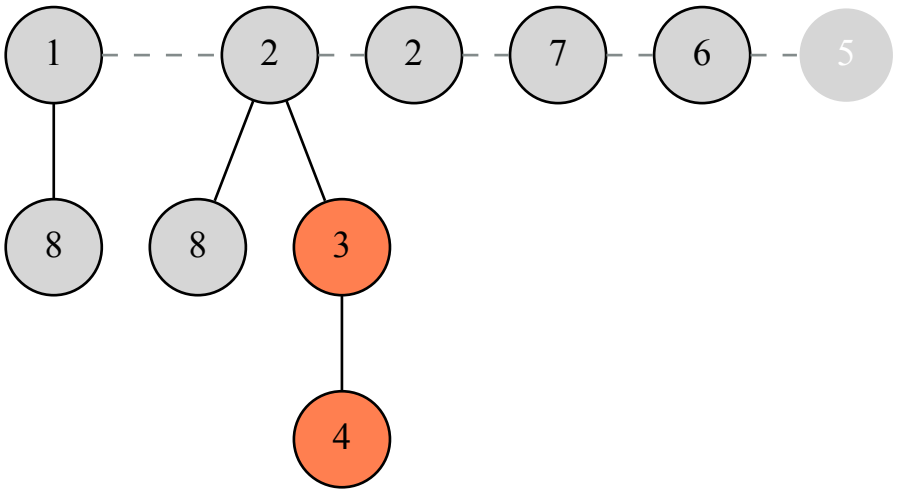

Decreasing Key
The node is marked...
1
2
2
7
8
8
3
4
5
6

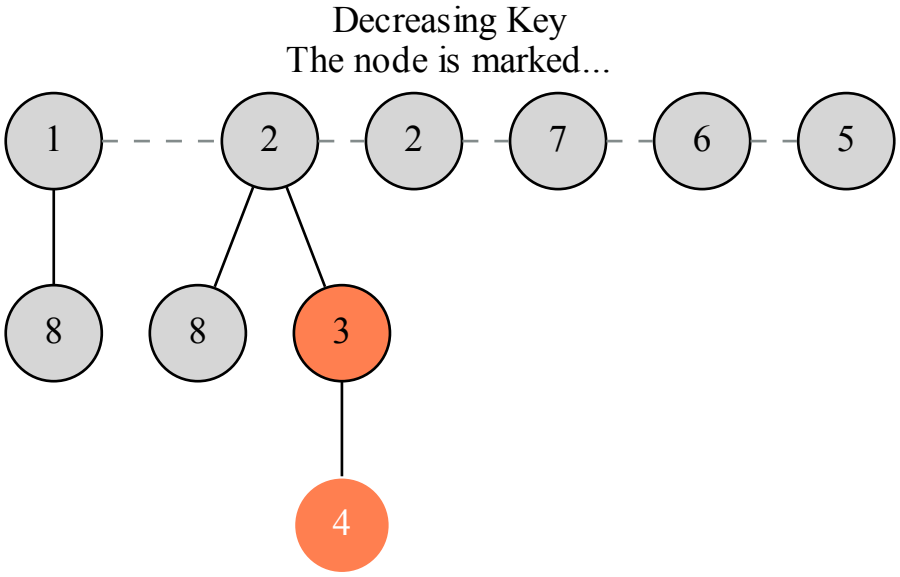
Decreasing Key
... so we cut it and continue with the cascading cut;



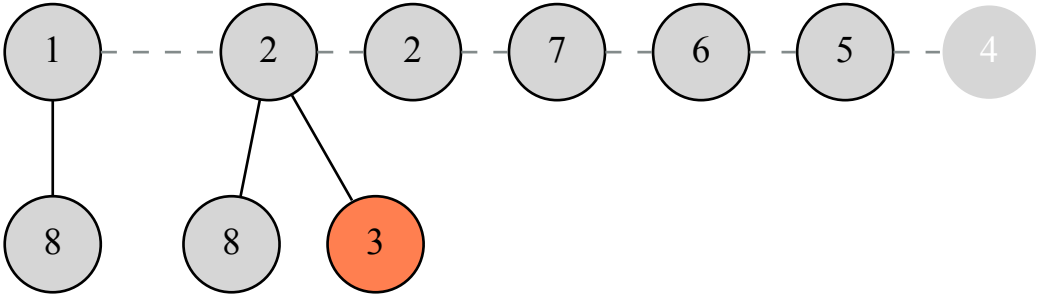

Decreasing Key
The node is marked...
1
2
2
7
6
8
8
3
4
5

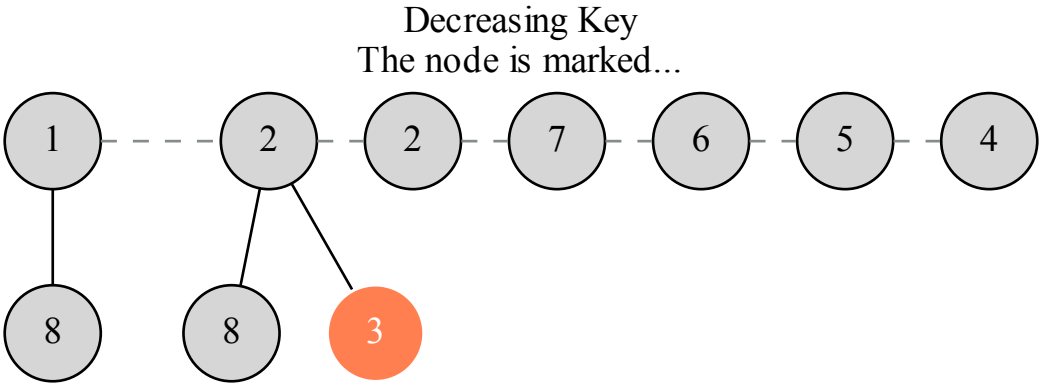
Decreasing Key
... so we cut it and continue with the cascading cut;



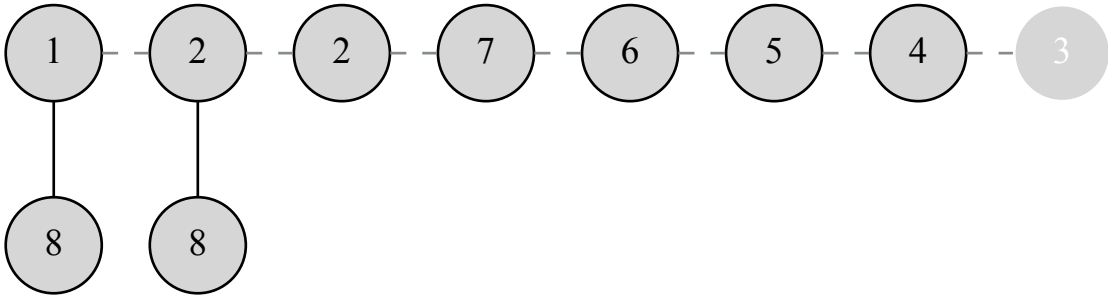

Decreasing Key
The node is marked...
1
2
2
7
6
5
8
8
3
4

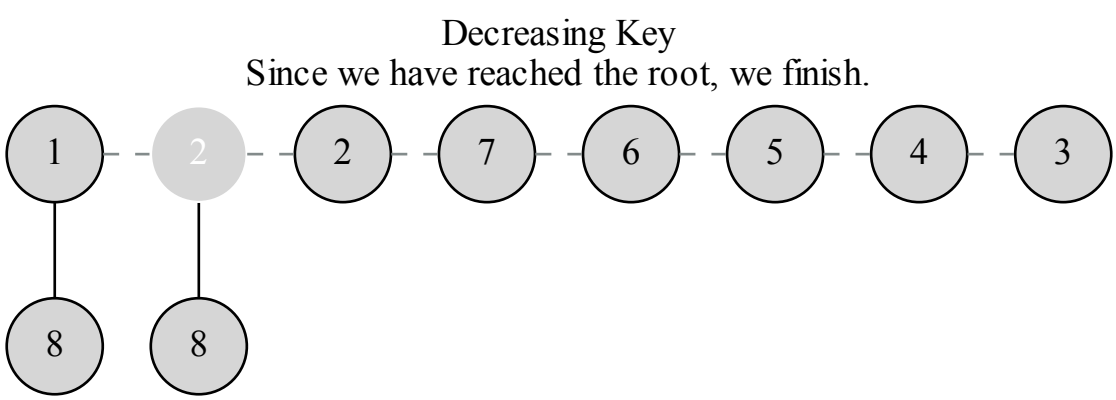
Decreasing Key
... so we cut it and continue with the cascading cut;

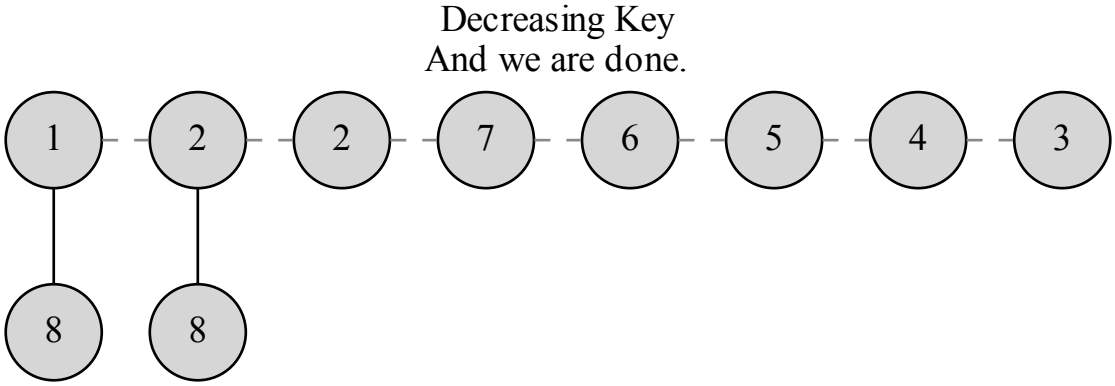



Decreasing Key
The node is marked...
1
2
2
7
6
5
4
8
8
3

Decreasing Key
... so we cut it and continue with the cascading cut;




Decreasing Key
Since we have reached the root, we finish.
1
2
2
7
6
5
4
3
8
8


Decreasing Key
And we are done.
1
2
2
7
6
5
4
3
8
8