

We only need to compare mid with right one in the binary search. This will automatically handle the edge case of already sorted array.

4 5 6 7 8 9 0 1 2 3

l m r

m > r => l = m + 1

4 5 6 7 8 9 0 1 2 3

l m r

m < r => r = m

4 5 6 7 8 9 0 1 2 3

l m r

m < r => r = m

4 5 6 7 8 9 0 1 2 3

l r

m > r => l = m + 1

7 8 0 1 2 3 4 5 6

l r

r >= l => return l

7 8 0 1 2 3 4 5 6

l m r

m < r => r = m

7 8 0 1 2 3 4 5 6

l m m

m > r => l = m + 1

7 8 0 1 2 3 4 5 6

l m r

m < l => r = m

7 8 0 1 2 3 4 5 6

l r

m < r => r = m

7 8 0 1 2 3 4 5 6

l r

r >= l => return l

8 0 1 2 3 4 5 6 7

l m r

m < r => r = m

8 0 1 2 3 4 5 6 7

l m r

m < r => r = m

8 0 1 2 3 4 5 6 7

l m r

```
m < r => r = m
8 0 1 2 3 4 5 6 7
l r
m > r => l = m + 1
8 0 1 2 3 4 5 6 7
  lr
r >= l => return l
```

```
0 1 2 3 4
l   m   r
m < r => r = m
0 1 2 3 4
l m r
m < r => r = m
0 1 2 3 4
l r
m < r => r = m
0 1 2 3 4
lr
r >= l => return l
```