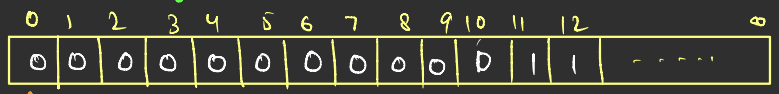
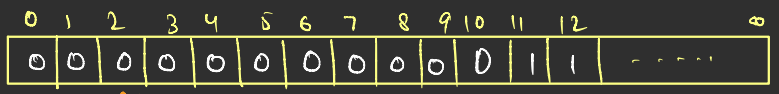
(10) Index of first 1 in an infinite Binary sorted array

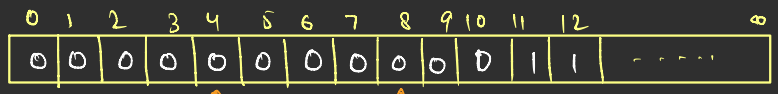


a[r] == 0 → l = r+1, r = r*2 = 2

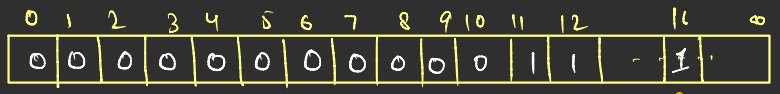


a[r] = 0 → r = 4

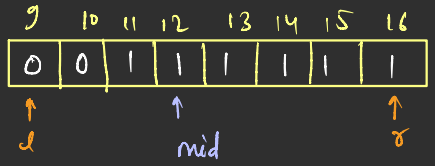
a[4] = 0 → l = 4, r = 8



a[8] = 0 → l = 9, r = 16



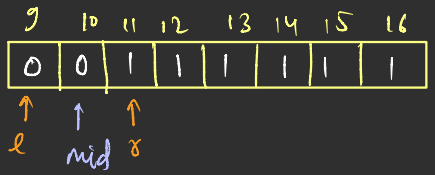
now find first occurrence of 1 in [9, 16]



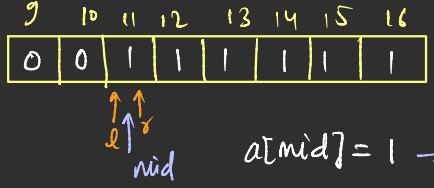
a[mid] = 1 → This could be a possible answer

first = 12 But first occurrence might be on left

↳ r = mid-1



a[mid] = 0 → Go right ⇒ l = mid+1



a[mid] = 1 → This could be a possible answer

But first occurrence might be on left

↳ r = mid-1

first = 11

r < l → Exit

↑

Ans