9101 Assignment 1
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Question 4

Assuming that the sequence of consecutive positive integers which missing one number is array A.
The main method is using binary search to check the missing item.

Specially, by the binary search within the index range (the index range is 0 to $2^n$.), each search can locate the middle position of the corresponding number group.
Then, if the corresponding value in array A is same to the index ($A[index] == index$), it means the missing number in the second half of the array. If $A[index] \neq index$, it means the missing one in the first half of the array.
Repeat the above method until the range is reduced to 3 numbers, then we can find the missing value.

In this process, the total cost is $O(\log 2^n) = O(\text{n} \log 2) = O(n)$.