* Sort binary array

→ Given an array which only contains 0s & 1s in a random shuffled order, rearrange the array such that all the 0s are placed before 1s.

I/p :- [1, 0, 0, 1, 0]

O/p :- [0, 0, 0, 1, 1]

* Conditions :-

1) You can iterate over the array only once.
2) You cannot create any additional array. Do it in-place.

* Solution :-

* Approach 1 :- Bruteforce

→ Consider if we don't have to follow the mentioned conditions, then we can just iterate over the array, count the no. of 0s & update the first count elements of the array with 0 & the rest count elements to 1.

```
function foo(arr) {
    let countZero = 0;
    for (let i=0 ; i< arr.length ; i++) {
        if (arr[i] === 0) countZero++;
    }
    for (let i=0 ; i< countZero; i++) {
        arr[i] = 0;
    }
    for (let i= countZero ; i < arr.length ; i++) {
        arr[i] = 1;
    }
}
```

TC :- O(n)

SC :- O(1)

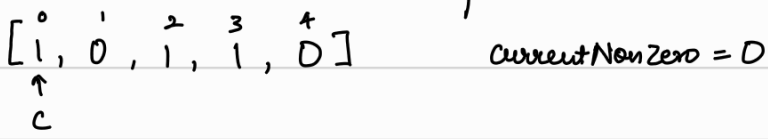
* Approach 02 :- Simplest approach

[1, 0, 1, 1, 0]

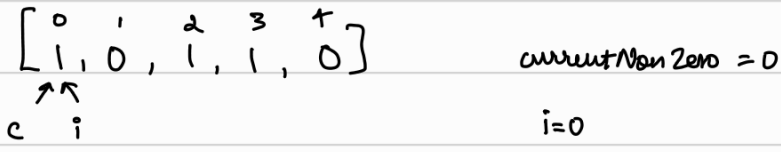
→ The element at index 0 is not at its correct position.

→ We don't know how many 0s exists in the array, but we are sure that 0 should be placed at index 0.

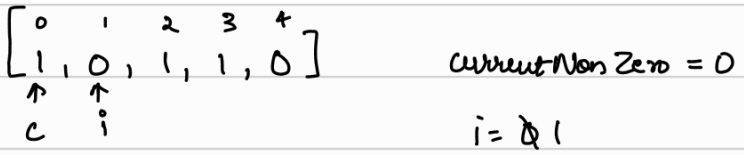
→ We create a variable currentNonZero, that keeps a track on where we need to place 0.



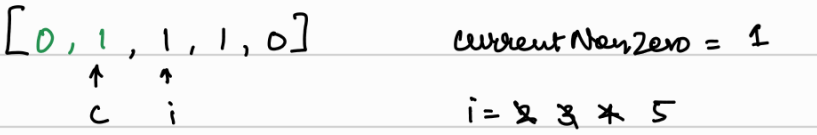
→ We iterate over the array & check if the current element is 0.

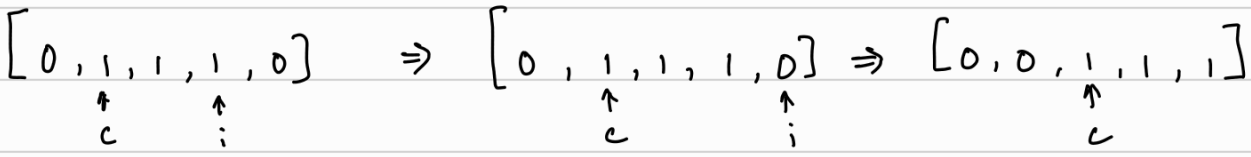


→ Check if arr[i] == 0 → false, then do i++



→ Check if arr[i] == 0 → true, swap (arr[i], arr[currentNonZero]) & do currentNonZero++ & i++





* Code :-

```
function foo (arr) {
    let currentNonZero = 0;
    for (let i=0 ; i < arr.length ; i++) {
        if (arr[i] == 0) {
            [arr[i], arr[currentNonZero]] = [arr[currentNonZero], arr[i]];
```

```
            currentNonZero++;
        }
    }
}
```

* Approach 3 :- Two pointer approach :-

```
function foo(arr) {
    let i=0, j=arr.length-1;
    while (i<=j) {
        if (arr[i]==1) {
            swap(arr[i], arr[j]);
            j--;
        } else {
            i++;
        }
    }
}
```