Qus   Rotate Array

```
       0   1   2   ③   ④   5   6
    [  1 , 2 , 3,  4 , 5 , 6 , 7  ]        k = 3        4
```

Sol ⇒   [5 , 6 , 7 , 1 , 2 , 3 , 4]   arr.length − K − 1
                                                 7 − K − 1

● reverse (arr, 0, arr.length − k − 1);

   [4 ; 3 , 2 , 1 , 5 , 6 , 7]

● reverse (arr, arr.length − k , arr.length − 1);

|| [4, 3, 2, 1, 7, 6, 5]

● reverse (arr, 0, arr.length − 1);

   [5 , 6 , 7 , 1 , 2 , 3 , 4]

```
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();
    int[] arr = new int[n];
    for(int i=0;i<arr.length;i++){
        arr[i]= scn.nextInt();
    }
    int k= scn.nextInt();
    reverse(arr,0,arr.length-k-1);
    reverse(arr,arr.length-k,arr.length-1);
    reverse(arr,0,arr.length-1);

    for(int i=0;i<arr.length;i++){
        System.out.print(arr[i]+" ");
    }
    /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be na
}

public static void reverse(int[] arr, int left, int right){
    while(left<right){
        int temp = arr[left];
        arr[left]= arr[right];
        arr[right]= temp;
        left++;
        right--;
    }
}
```

arr = [1 , 2 , 3 , 4 , 5]   k = 2
        0   1   2   3   4

arr.length = 5

→ [3 , 2 , 1 , 54 , 54]
     4 0   1   2 3 4

   [3 , 2 , 1 , 5 , 4]
     0   1   2   3   4

O(n)   O   2
                4
O(n)   −3
O(n)   0   4

[3, 2, 1, 54)   0   4

              0 1   2 3 4
    [3 , 2 , 3 , 4 , 5]

   [3 , 2 , 1 , 4 , 5]

O(n) + O(n) + O(n)
= 3 (O(n)' = TC = O(n)

Question

$arr[x_1, x_2, x_3, x_4, y_1, y_2, y_3, y_4]$

index: 0 1 2 3 4 5 6 7

i i j j j

$i=0$

$j = n/2$

Sol $[x_1, y_1, x_2, y_2, x_3, y_3, x_4, y_4]$

index: 0 1 2 3 4 5 6 7

new array

$[\; x_1 \quad y_1 \quad x_2 \quad y_2 \qquad\qquad\qquad]$

0 1 2 3 4 5 6 7

k k k k k

```java
Scanner scn = new Scanner(System.in);
int n = scn.nextInt();
int[] arr = new int[n];
for(int l=0;l<n;l++){
    arr[l]= scn.nextInt();
}
int[] ans = new int[arr.length];

int k =0;
int i=0;
int j= arr.length/2;

while(k<ans.length){
    if(k%2==0){
        ans[k]=arr[i];
         i++;
    }else{
        ans[k]=arr[j];
         j++;
    }
    k++;
}

for(int l =0;l<ans.length;l++){
    System.out.print(ans[l]+" ");
}
/* Enter your code here. Read input from STDIN. Print out;
```

Qu Sort 0, 1

$arr = \begin{bmatrix} 0, & 0, & 1, & 1, & 1, & 0, & 1, & 0 \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \end{bmatrix}$

$ans = [\ 0, \ 0, \ 0, 0, \ 1, \ 1, \ 1, \ 1\ ]$

* const in array is not allowed

* no extra space allowed

Soln
arr: $[\ \underset{\underset{\underset{0}{i}}{}}{\underset{\underset{}{\overset{J}{0}}}{0}}, \ \underset{}{0}, \ \underset{}{0}, \ \underset{}{0}, \ 1, \ 1, \ 1, \ 1\ ]$ ①

```
    0   1   2   3   4   5   6   7
```

[i = to hold 1's
  J = to find 0's in array]

int i = 0

while (J < arr.length) {
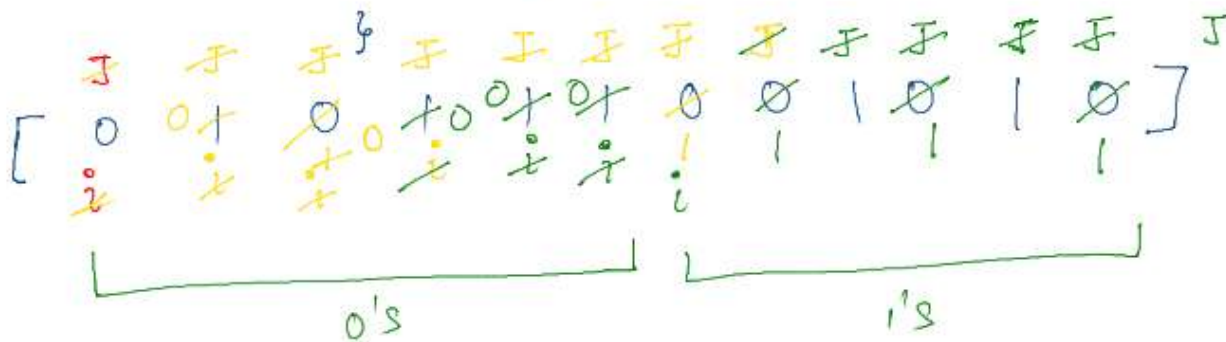
    if (arr [J] == 0) {
        swap (i, J);
        i++;
        J++;
    }

    else {
        J++; }
}

$[\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 1\ 0\ 1\ 0\ ]$

```
      0's                              1's
```

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();
    int[] arr = new int[n];
    for(int l=0;l<n;l++){
        arr[l]= scn.nextInt();
    }

    int i=0;
    int j=0;
    while(j<arr.length){
        if(arr[j]==0){
            int temp = arr[i];
            arr[i]=arr[j];
            arr[j]= temp;
            i++;
            j++;
        }else{
            j++;
        }
    }



    for(int l=0;l<arr.length;l++){
        System.out.print(arr[l]+" ");
    }
    /* Enter your code here. Read input from STDIN. Print output to STI
}
```

Question arr = [0, 1, 1, 2, 0, 2, 0, 1, 0, 2]

Sol = [0, 0, 0, 0, 1, 1, 1, 2, 2, 2]

count of elements not allowed

sorting is also not allowed

Ans [0, 0, 0, 2, 0, 0, 2, 0, 1, 0, 2]
    0   1   2   3   4   5   6   7   8   9

```
if (arr[j] == 0) {
    swap(i, j)
    i++, j++;
}
```

[0 0 0 0 1 1 1 2 2 2]

i = 0;
J = 0;
k = arr.length - 1;

```
} else if (arr[j] = 1) {
    j++;
}
```

```
} else {
    swap(J, k)
    k--;
}
```

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();
    int[] arr = new int[n];
    for(int l=0;l<n;l++){
        arr[l]= scn.nextInt();
    }

    int i =0;
    int j=0;
    int k=arr.length-1;
    while(j<=k){
        if(arr[j]==0){
            swap(arr,i,j);
            j++;
            i++;
        }else if(arr[j]==1){
            j++;
        }else{
            swap(arr,j,k);
            k--;
        }
    }

    for(int l=0;l<arr.length;l++){
        System.out.print(arr[l]+" ");
    }
    /* Enter your code here. Read input from STDIN. Print ou
}
public static void swap(int[] arr, int left, int right){
    int temp = arr[left];
    arr[left]= arr[right];
    arr[right]= temp;
```