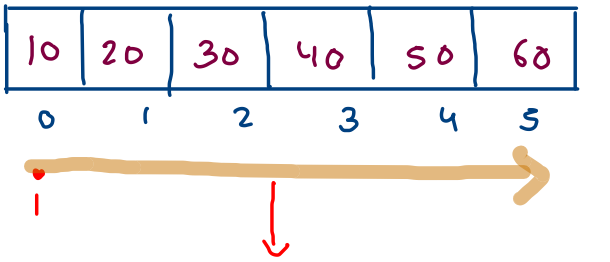
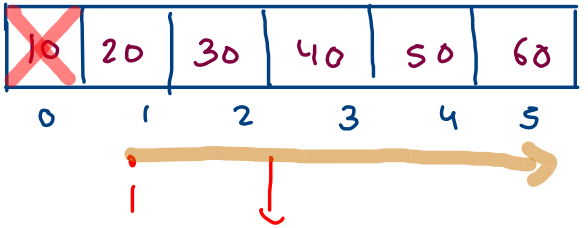
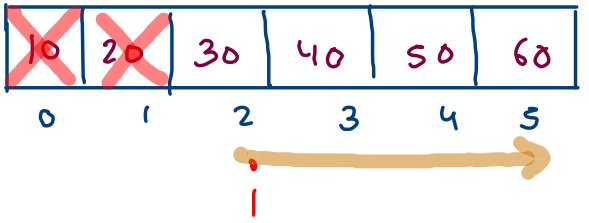
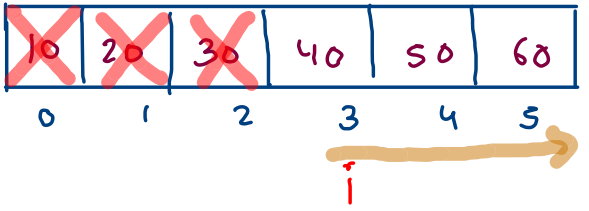
# Recursion with arrays

Virtually short array



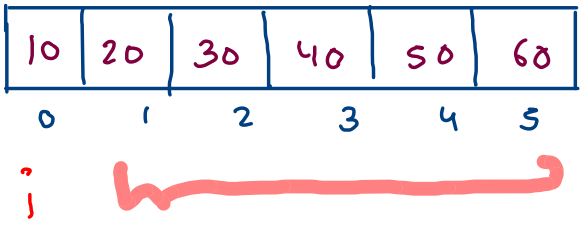



Display array

L to R




faith → display (arr, i+1);

expectation

```
print (arr[i]);
display (arr, i+1);
```

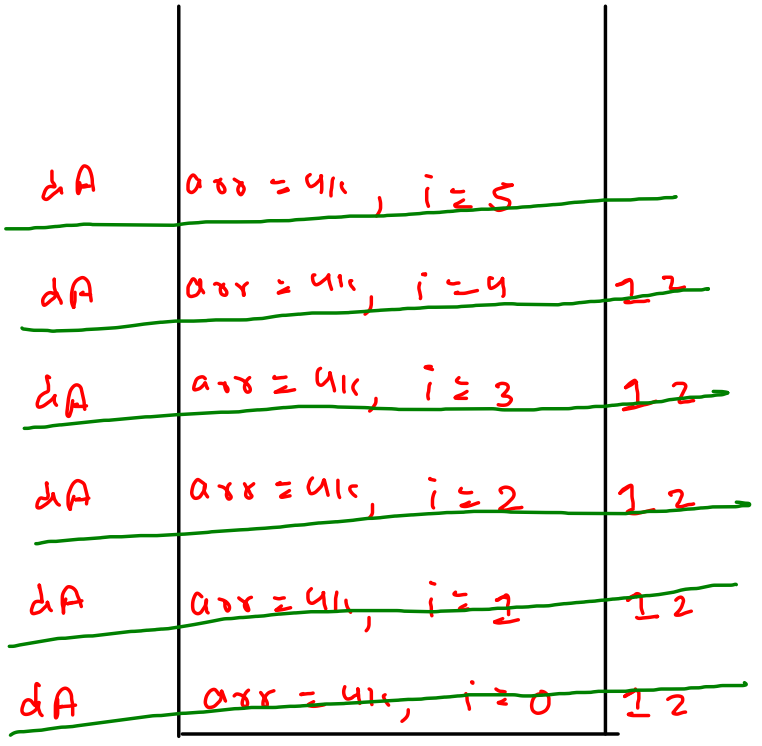
arr =

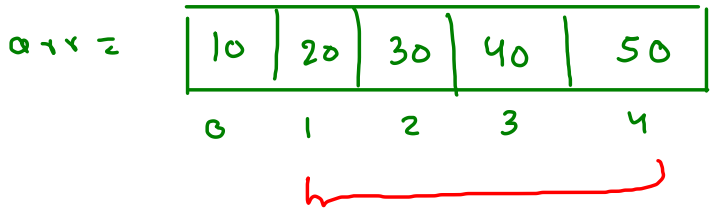
| 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

arr = 41c

```java
public static void displayArr(int[] arr, int idx){
    if(idx == arr.length) {
        return;
    }

1   System.out.println(arr[idx]);
2   displayArr(arr,idx+1);
}
```

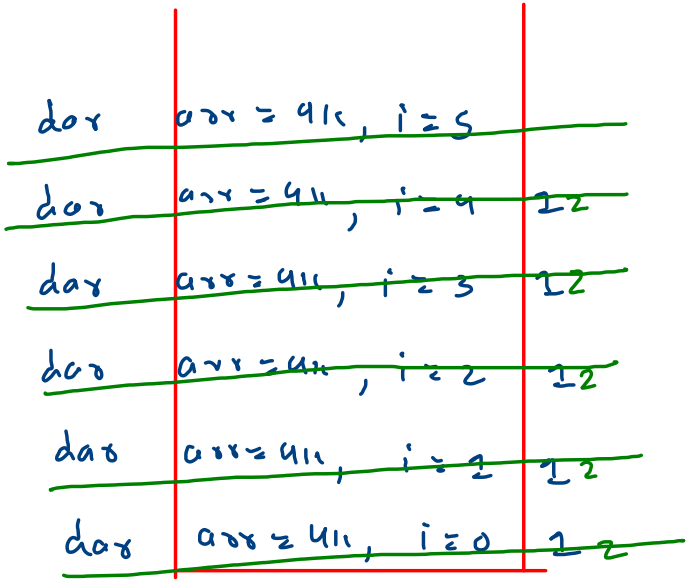
10 20 30 40 50

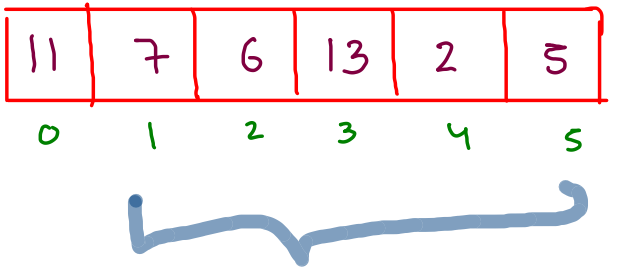





```java
public static void displayArrReverse(int[] arr, int idx) {
    if(idx == arr.length) {
        return;
    }

    displayArrReverse(arr,idx+1);
    System.out.println(arr[idx]);
}
```

50 40 30 20 10

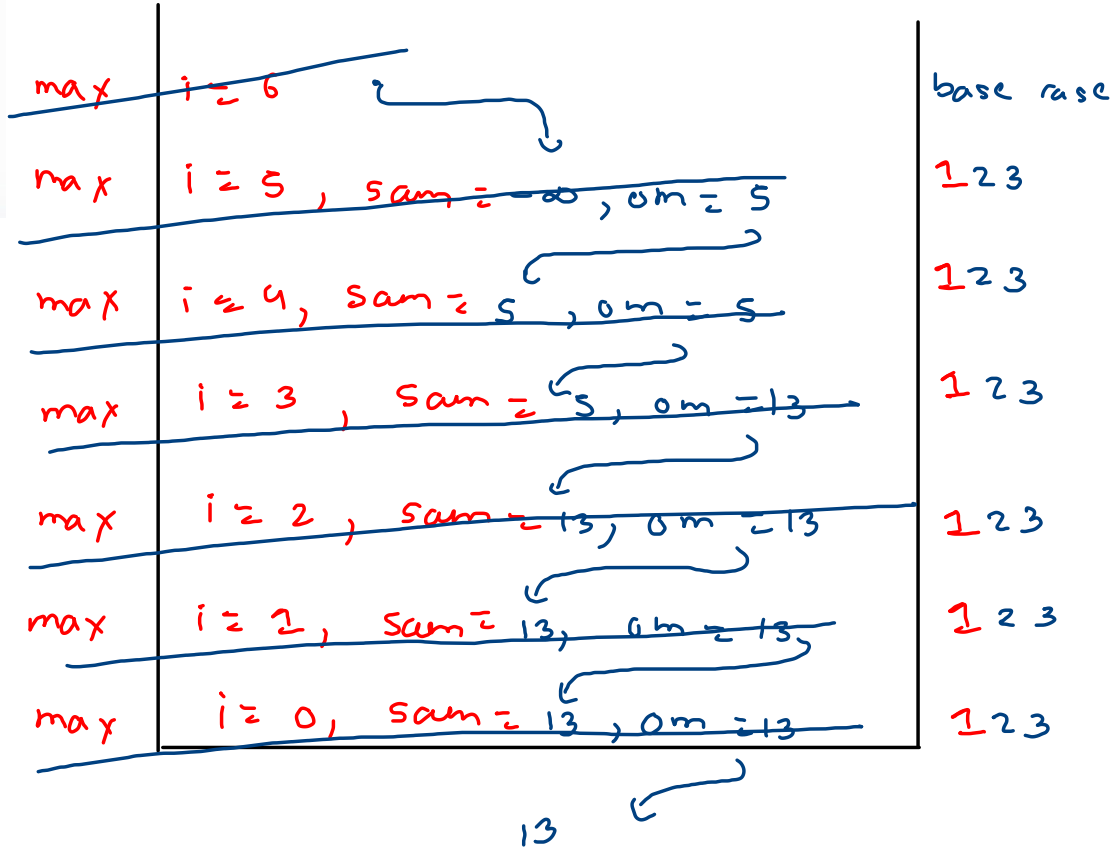




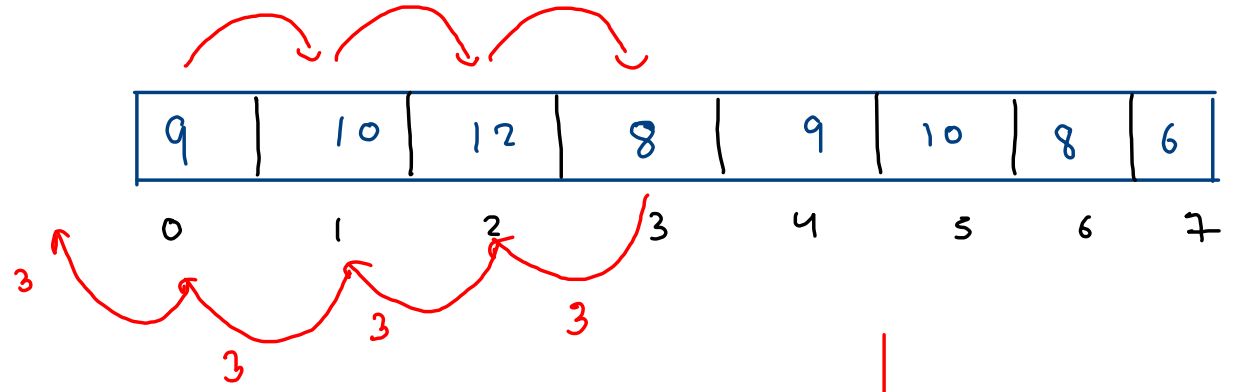

```
sam =        max(arr, idx+1);
(small array
 max)

omax = Math.max(arr[idx], sam);

return omax;
```

```java
public static int maxOfArray(int[] arr, int idx){
    if(idx == arr.length) {
        return Integer.MIN_VALUE; //max identity -> -Infinity
    }

    int sam = maxOfArray(arr,idx+1); //smaller array max
    int omax = Math.max(arr[idx],sam);

    return omax;
}
```

| 11 | 7 | 6 | 13 | 2 | 5 |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |



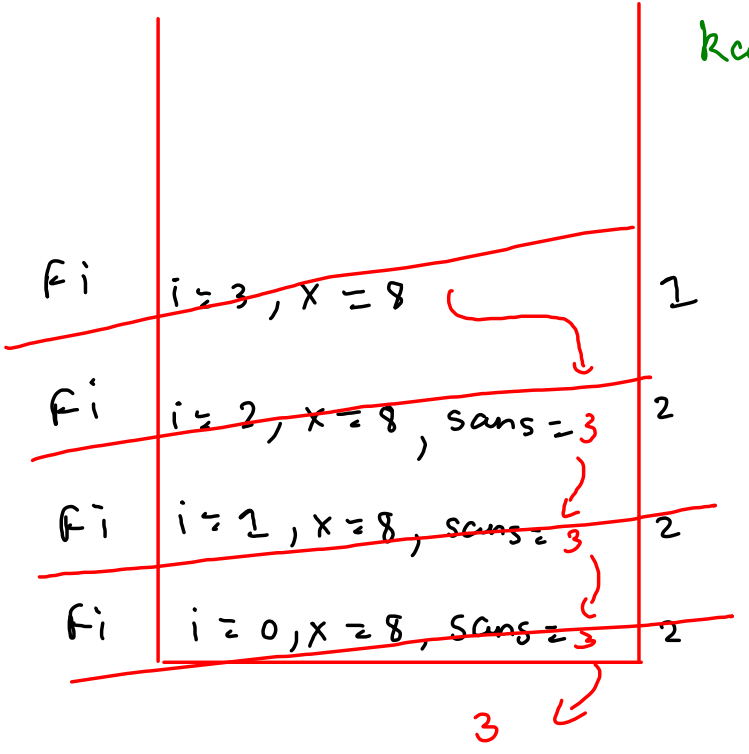
First index




```java
public static int firstIndex(int[] arr, int idx, int x){
    if(idx == arr.length) {
        return -1;
    }

    if(arr[idx] == x) {
        return idx;
    }
    else {
        int sans = firstIndex(arr,idx+1,x); //smaller array ans
        return sans;
    }
}
```

1

2



last index

| 9 | 8 | 12 | 8 | 9 | 10 | 8 | 6 |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

X = 8

```
public static int lastIndex(int[] arr, int idx, int x){
    if(idx == arr.length) {
        return -1;
    }

    int lisa = lastIndex(arr,idx+1,x); //last index in smaller array

    if(lisa != -1) {
        return lisa;
    }
    else {
        if(arr[idx] == x) {
            return idx;
        }
        else {
            return -1;
        }
    }
}
```

2

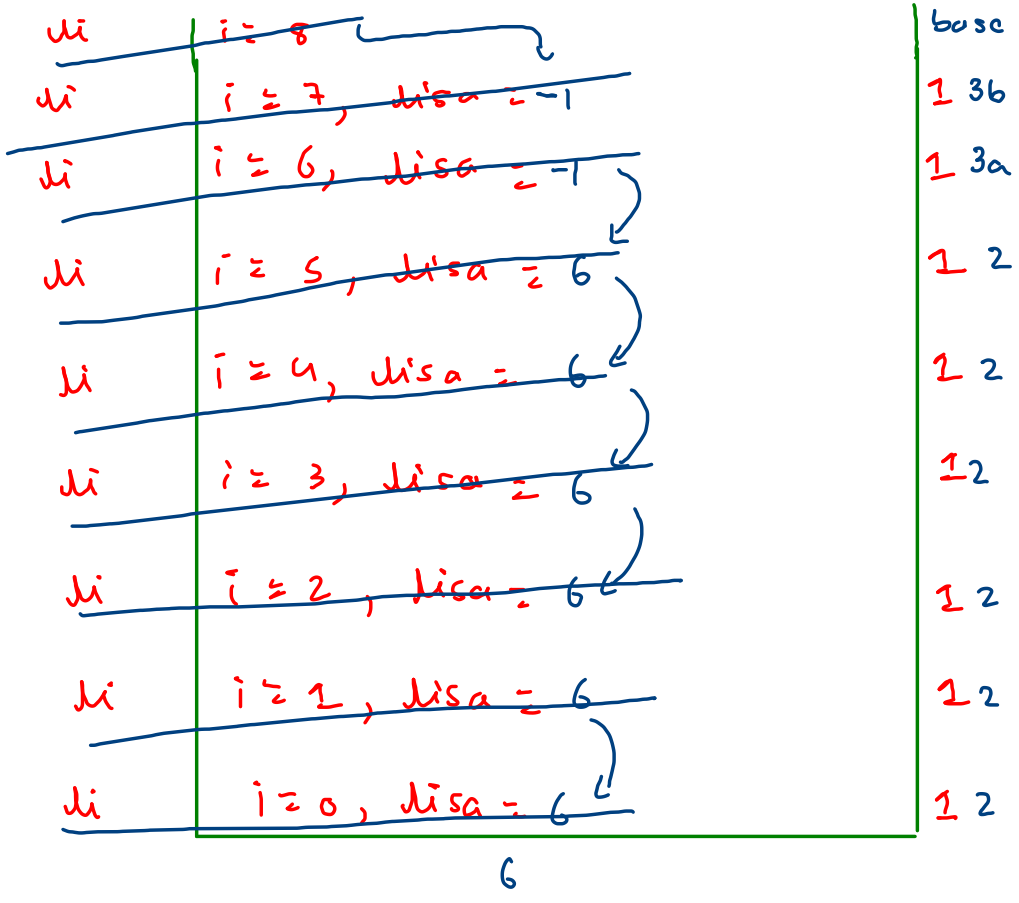
2

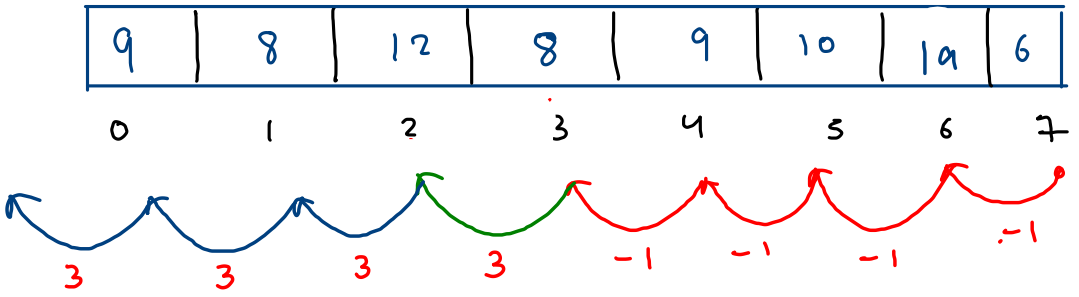
3

a

b

You are screen sharing






x = 8

```java
public static int lastIndex(int[] arr, int idx, int x){
    if(idx == arr.length) {
        return -1;
    }

    int lisa = lastIndex(arr,idx+1,x); //last index in smaller array

    if(lisa != -1) {
        return lisa;
    }
    else {
        if(arr[idx] == x) {
            return idx;
        }
        else {
            return -1;
        }
    }
}
```

1 2 3 a b

You are screen sharing

3b

3a

2