Agenda

1) Inversion count (**)

2) custom comparison
   - sort on the basis of no. of factors etc.

3) Largest number

Q.1 Given an A[], count total no. of inversions. (i, j) is an inversion if i < j but A[i] > A[j].

A[] = [2 3 0 1]
      0 1 2 3

(value based)

2, 0
2, 1
3, 0
3, 1

i) Brute force : O(n²)

```
int inversion_count(int[] A) {
    int n = A.length;
    int count = 0;
    for(int i=0; i<n; i++) {
        for(int j=i+1; j<n; j++) {
            if(A[i] > A[j]) {
                count++;
            }
        }
    }
    return count;
}
```

TC: O(n²)

A[] ⇒ 8 5 3 4 1 6 2

0 1 2 3 4 5 6

cnt = 15

8,5 8,3 8,4 8,1 8,6 8,2

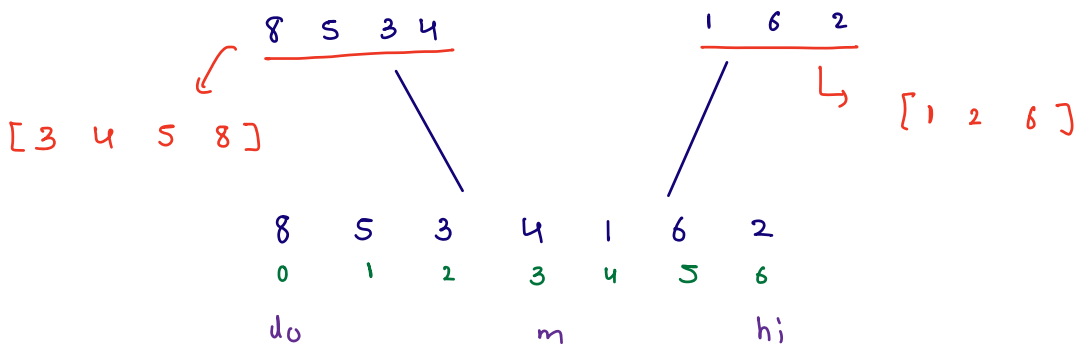
5,3 5,4 5,1 5,2 3,1 3,2

4,1 4,2 6,2

Expected TC: O(nlogn)

A[] ⇒ 8 5 3 4 1 6 2

0 1 2 3 4 5 6



A = [3 4 5 8]

B = [1 2 6]

ans = [1 2 3 4 5 6 8]

cnt = 4 + 4 + 1

inversions
=

(3,1) (4,1) (5,1) (8,1)

(3,2) (4,2) (5,2) (8,2)

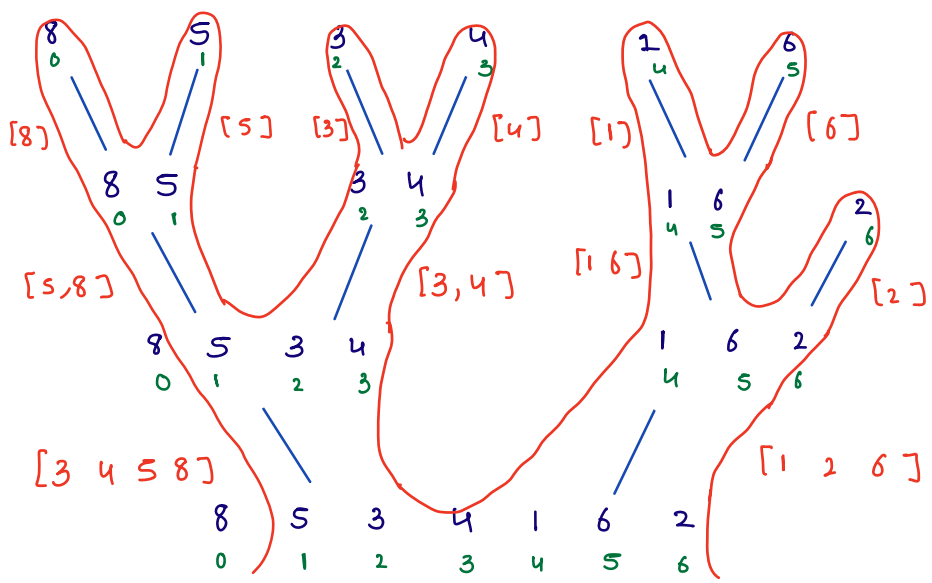
(8,6)

inversions : (8,5), (5,3), (8,3), (5,4), (8,4)
=

(6,2) (3,1) (4,1) (5,1) (8,1)

(3,2) (4,2) (5,2) (8,2) (8,6)

cnt = 1 + 2 + 2 + 1
4 + 4 + 1
= 15



A = [3 4 5 8]

B = [1 2 6]

ans = 1 2 3 4 5 6 8

A[i] > B[j]

inversions

[1 2 3 4 5 6 8]

Custom comparison

```
int [] A = {2, 3, 0, 1, 7};

Arrays.sort(A);
```

↳ A will get sorted in inc. order

values of element

Q.2 Given an int[] A, arrange values in A to form largest number.

A[] ⇒ 3 30 34 5 9 ⇒ 9 5 34 3 30

A[] ⇒ 2 3 9 0 ⇒ 9 3 2 0

A[] ⇒ 95 34 ⇒ 9534

A[] ⇒ 49 43

✓ "4943"

"4349"

String largest_no(int[] A) {

3

A[] = 49 5 43

ans: 5 49 43

String array ⇒

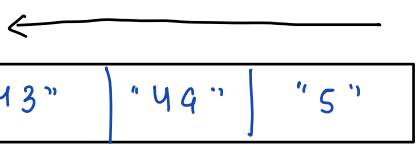
"49"	"5"	"43"

Ascending order

"49", "5" ⇒ "495", "549" "49" < "5"

"49", "43" ⇒ "4943", "4349" "43" < "49"

"5", "43" ⇒ "543", "435" "43" < "5"



ans: "54943"

A = [30, 3, 95]

ans = "95330"

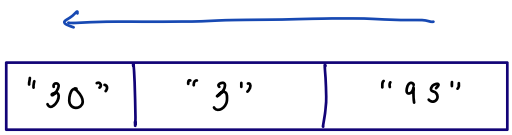
⇒ ascending order

["30", "3", "95"]

"30", "3" ⇒ "303", "330" "30" < "3"

"30", "95" ⇒ "3095", "9530" "30" < "95"

"3", "95" ⇒ "395", "953" "3" < "95"



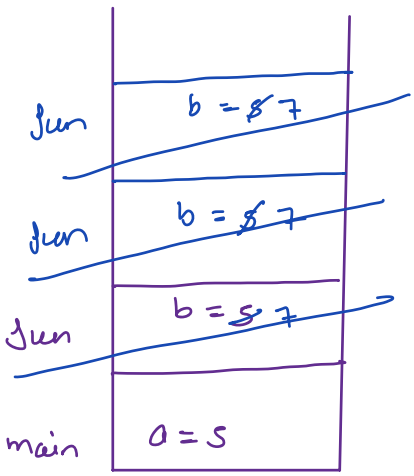
"95330"

Doubts

```
class Main {
    static int count = 0;

    void static fun ( int b ) {
        b = b+2;
        count++;
    }

    p s v main ( ) {
        int a = 5;
        fun(a);
        fun(a);
        fun(a);
    }
}
```



count = 0 1 2 3

```
void main( ) {
    int [] arr ;
    arr = new int [3];
}
```