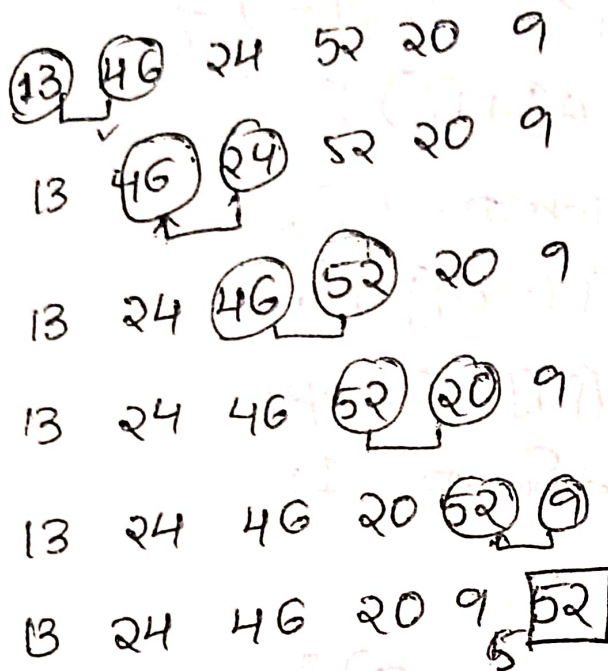


② Bubble Sort.

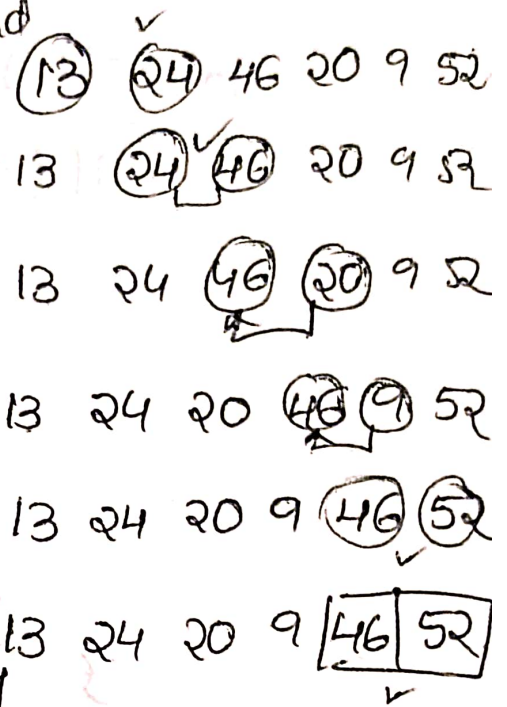
ip: $N=6$, $arr[] = \{13, 46, 24, 52, 20, 9\}$

op: $\{9, 13, 20, 24, 24, 52\}$

1st

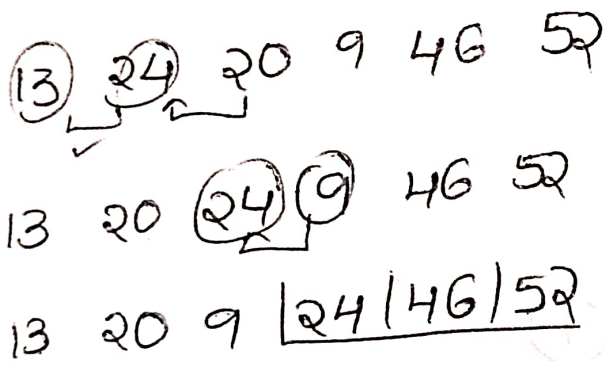


2nd

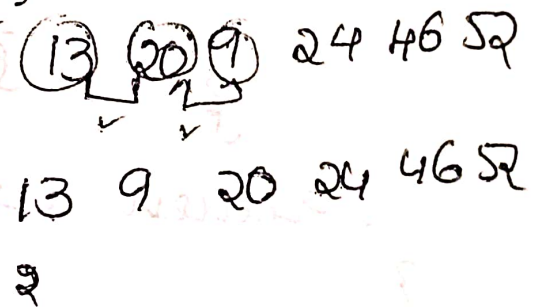


Max sets at last

3rd



4th



5th
1 9 13 20 24 46 52

dry run

for i $n-1$ to 0

for j 0 to $i-1$

if $a[j] > a[j+1]$

swap($a[j]$, $a[j+1]$)

return arr .

TC: $O(N^2)$

SC: $O(1)$

Optimised. if already sorted?

```
for(int i = n-1; i > 0; i--){
```

```
    int didSwap = 0;
```

```
    for(int j = 0; j < i-1; j++){
```

```
        if(a[j] > a[j+1]){
```

```
            int temp = a[j];
```

```
            a[j] = a[j+1];
```

```
            a[j+1] = temp;
```

```
            didSwap = 1;
```

```
        }
```

```
    } if(didSwap == 0){
```

```
        break;
```

```
    }
```

```
return arr;
```

```
}
```

TC: $O(N)$, SC: $O(1)$