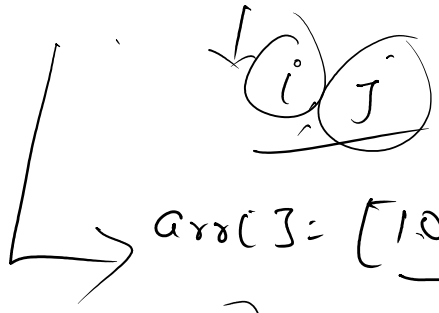
Selection Sort → $O(n^2)$



arr[] = [100, 5, 60, 7, 8, 120]

Sorted - [5, 7, 8, 60, 100, 120]

- Find the smallest element
- move to beginning

arr[] = [100, 5, 60, 7, 8, 120] → (0)

```
int minelement = arr[0] → 100, minindex = 0 = i;
for(int j = 1; j < n; j++){
  if (arr[j] < minelement)
    minelement = arr[j]; → minindex = j;
}
minelement → 5
Swap(minelement, arr[0])
```

[5, 100, 60, 7, 8, 120] → (1)

```
minelement = arr[1];
for(int j = 2; j < n; j++){
  if (arr[j] < minelement){
    minelement = arr[j]; → minindex = j;
  }
}
minelement → 7
Swap(minelement, arr[1]);
```

arr[i], arr[minindex]

arr[i] ← arr[minindex]

arr[minindex] ← arr[i]

swap (minelement, arr[1]);

[5, 7, 60, 100, 8, 120] → (2)

int minelement = arr[2];

for (int j = 3; j < n; j++) {

if (arr[j] < minelement) { → minindex = j;

minelement = arr[j];

}

}

minelement → 8.

swap (minelement, arr[2]);

0 1 2 3

[5, 7, 8, 100, 60, 120] → (3)

↓ minelement = arr[3]

[5, 7, 8, 60, 100, 120] minelement → 4.

n = 6.

i = 0 to 4

i = 0; i < n-1

int minindex = i;

→ j = i+1; j < n; j++

if (arr[j] < arr[minindex]) {

minindex = j;

}

}

i → minindex

i -> minindex

swap(arr[i], arr[minindex])

```
for(int i=0; i<n-1; i++){
 int minindex=i;
for(int j=i+1; j<n; j++){
   if(arr[j]<arr[minindex]){
      minindex=j;
    }
   }
  int temp=arr[i];
  arr[i]=arr[minindex];
  arr[minindex]=temp;
 }
for(int i=0; i<n; i++){
 S.o.p(arr[i]+" ");
   }
```

{ swap.

arr[0], arr[1]

```
int temp=arr[0];
arr[0]=arr[1];
arr[1]=temp;
```

Insertion Sort → for every element, find the correct position in left

arr[]: [100, 6, 40, 15, 90]
0 1 2 3 4
i

↓ [100, 100, 40, 15, 90]
2 3 4

[6, 100, 40, 15, 90]
0 1 2 3 4
i

int temp = arr[2]

↓

[6, 40, 100, 15, 90]
0 1 2 3 4
i

temp = arr[3] = 15.

[6, 15, 40, 100, 90]
0 1 2 3 4
i

[6, 15, 40, 90, 100]

2nd Example:

arr[]: [100, 75, 4, 95, -10]
i

temp = 75; arr[i] = arr[i],

[100, 100, 4, 95, -10]
↓

[100, ...]

↓

[75, 100, 4, 95, -10]

0 1 2 3 4

i = 2. ↑ temp = arr[2] = 4.

[75, 100, 100, 95, -10]

temp = 4;

[75, 75, 100, 95, -10]

[4, 75, 100, 95, -10]

0 1 2 3 4

i = 3. ↑ [4, 75, 100, 100, -10]

[4, 75, 95, 100, -10]

i = 4 temp = -10 ←

[4, 75, 95, 100, 100]

[4, 75, 95, 95, 100]

[4, 75, 75, 95, 100]

[4, 4, 75, 95, 100]

[-10, 4, 75, 95, 100]

i = 1 to n-1

```
for(int i=1; i<n; i++){

    int temp= arr[i];
    for(int j=i-1; j>=0; j--){
        if(arr[j]>temp){
            arr[j+1] =arr[j];
        }else{
            break;
            }
        }
    arr[j+1]=temp;
}
```