Selection Sort → $O(n^2)$

i, j

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]
```

$[\overset{0}{5}, \overset{1}{100}, \overset{2}{60}, \overset{3}{7}, \overset{4}{8}, \overset{5}{120}]$ → 1

arr[1], arr[3]

↑ ↑

arr[i] arr[minindex]

arr[i] ← arr[minindex]

arr[minindex] ← arr[i]

```
  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]),
  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
                                    dex])
```

```
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

i
0 1 2 3 4

Grr[ ] = [100, 6, 40, 15, 90]

↓ [100, 100, 40, 15, 90]

0 1 2 3 4

[6, 100, 40, 15, 90]

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;

}
```