4. Bubble sort

Theory-

→ Bubble sort is a sorting algorithm that compares two adajacent elements & swaps them until they are not in intended order.

→ Just like movement of air bubbles in water that rise up to surface, each element of array move to end in each iteration. Therefore it is bubble sort

Algorithm-

Here DATA is an array with N elements. This algorithm sorts the elements M DATA.

```
1. Repeat steps 2 and 3 for K=1 to n-1
2. Set PTR=1 [Initialize PRSS pointer PTR]
3. Repeat while PTR ≤ N-K [Execute PRSS]
     a) If DATA,[PTR] ≥ DATA[PTR+1] then
            Interchange DATA[PTR] and DATA[PTR+1]
        [End of structre]
     b) Set PTR = PTR+1
          [End of inner loop]
   [End of step 1 outer loop]

4. Exit
```

Process -

* Let us take an array of 5 elements R={32,56,78,12,6}

* In the bubble sort -

During first outer loop -

32, 56, 78, 12, 6

① - 32, 56, 78, 12, 6

② - 32, 56, 12, 78, 6

③ - 32, 56, 12, 6, 78

During second outer loop -

32, 56, 12, 6, 78

① -> 32, 56, 12, 6, 78

② -> 32, 12, 56, 6, 78

③ -> 32, 12, 6, 56, 78

During third outer loop -

32, 12, 6, 56, 78

① -> 32, 12, 6, 56, 78

② -> 12, 32, 6, 56, 78

③ -> 12, 6, 32, 56, 78

During fourth outer loop -

12, 6, 32, 56, 78

① -> 6, 12, 32, 56, 78

*After (n-1) outer loops we get the sorted list

Output-

```
Enter no.of elements: 5
Enter elements:
8
9
1
7
0
Before sorting: 8 9 1 7 0
After sorting: 0 1 7 8 9
```

Code-

```
#include<stdio.h>
int swap(int a,int b){
    int temp;
    temp=a;
    a=b;
    b=temp;}
int main(){
    int i,j,A[],n;
    printf("Enter no.of elements:");
    scanf("%d",&n);
    Printf("Enter elements:\n");
        for(i=0;i<n;i++)
            scanf("%d",&A[i]);
    Printf("Before sorting:");
    for(i=0;i<n-1;i++){
      for(j=0;j<n-i-1;j++){
          if(A[j]>A[j+1])
            swap(A[j],A[j+1]);}
    }
    Printf("After sorting:");
    for(i=0;i<n;i++)
        Printf("%d\t",A[i]);
    return0;
}
```