Experiment - 2.2

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Subject Name: Data Structures **Subject Code: 21CSH211**

1. **Aim:** Write a program to sort an array of integers in ascending/descending order using
   a) Insertion sort.

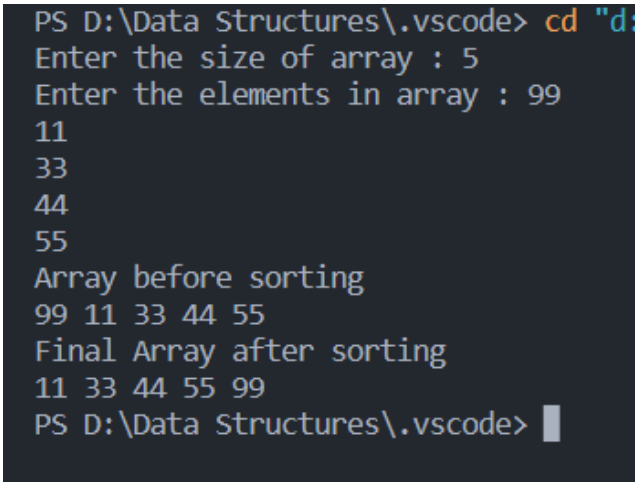
2. **Algorithm:**
   Step 1. Start
   Step 2. Create an array and declare the size of array.
   Step 3. Enter the elements of array.
   Step 4. Initialize i, j and key.
   Step 5. Use for loop for passes/predecessor
   Step 6. key=A[i];
   j=i-1;
   Step 7. Perform insertion
   while(j>=0 && A[j] > key)
   {
   A[j+1] = A[j];
   j--;
   }
   A[j+1] = key;
   Step 8. Using printArray() , print the final array.
   Step 9. Exit

3. **Program Code:**

```
#include<stdio.h>

void printArray(int A[], int n)
{
   for (int i = 0; i < n; i++)
   {
      printf("%d ", A[i]);
   }
   printf("\n");
}

void insertionSort(int A[], int n){
   int key, j;
   // Loop for passes
   for (int i = 1; i <= n-1; i++)
   {
      key = A[i];
      j = i-1;
      // Loop for each pass
      while(j>=0 && A[j] > key)
      {
         A[j+1] = A[j];
         j--;
      }
      A[j+1] = key;
   }
}

int main(){

   int n;
   printf("Enter the size of array : ");
```

```
    scanf("%d",&n);
    int A[n];
    printf("Enter the elements in array : ");
    for(int i=0; i<n; i++)
    {
    scanf("%d", &A[i]);
    }
    printf("Array before sorting \n");
    printArray(A,n);
    insertionSort(A, n);
    printf("Final Array after sorting \n");
    printArray(A, n);
    return 0;
}
```

4. **Output:**



5. **Learning outcomes (What I have learnt):**

1. Creating an array.
2. Insertion sort.
3. Swap and compare in insertion sort.