MCA Semester 1	Subject : Advanced Data Structures Lab
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Roll No. : MCA2511	Date : 29-09-2025

1. Program to perform Insertion Sort on an array of numbers.

Code:

03InSort.java

```
import java.util.Scanner;
class InSort
{
	public static void main(String[] args)
	{
		int num, i, j, key;
		Scanner input = new Scanner(System.in);

		System.out.println("Enter the number of integers to sort: ");
		num = input.nextInt();

		int array[] = new int[num];
		System.out.println("Enter "+ num + " integers");

		for(i=0; i<num; i++)
		{
			array[i] = input.nextInt();
		}//end of element inserting loop

		//Insertion Sort Algorithm
		for(i=1; i<num; i++)
		{
			key = array[i];
			j = i-1;

			while(j>=0 && key<array[j])
			{
				array[j+1] = array[j];
				j = j-1;
			}

		//Write the key in its correct position
		array[j+1] = key;
		}//end of for i

		System.out.println("Sorted Array: ");
		for(i=0; i<num; i++)
		{
```

```
                System.out.println(array[i]);
            }
        }//end of psvm
}//end of class
```

Output:

```
C:\Users\mcamock\Desktop\DS_Lab>javac 03InSort.java

C:\Users\mcamock\Desktop\DS_Lab>java InSort
Enter the number of integers to sort:
5
Enter 5 integers
12
45
3
2
8
Sorted Array:
2
3
8
12
45
```

2. Program to perform Shell Sort on an array of numbers.

Code:

04ShellSort.java

```
import java.util.*;

class ShellSort
{
        public static void main(String[] args)
        {
                int num, i, j, gap;
                Scanner input = new Scanner(System.in);

                System.out.println("Enter the number of integers to sort: ");
                num = input.nextInt();

                int array[] = new int[num];
                System.out.println("Enter "+ num + " integers");
                for(i=0; i<num; i++)
                {
                        array[i] = input.nextInt();
                }
```

```
                for(gap= num/2; gap>0; gap=gap/2)
                {
                        for(i=gap; i<num; i++)
                        {
                                int temp = array[i];
                                j=i;
                                while(j>=gap && array[j-gap]> temp)
                                {
                                        array[j] = array[j-gap];
                                        j = j-gap;
                                }

                                array[j] = temp;
                        }//end of for i
                }//end of for gap

                System.out.println("Sorted Array");

                for(i=0; i<num; i++)
                {
                        System.out.println(array[i]);
                }
        }//end of psvm
}//end of class
```

Output:

```
C:\Users\mcamock\Desktop\DS_Lab>javac 04ShellSort.java

C:\Users\mcamock\Desktop\DS_Lab>java ShellSort
Enter the number of integers to sort:
5
Enter 5 integers
12
2
3
4
85
Sorted Array
2
3
4
12
85
```