G. H. Raisoni College of Engineering & Management, Wagholi, Pune – 412 207			
Department of Information and Technology Engineering SUBJECT :			
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ASSIGNMENT NO: 1

PROBLEM DEFINITION: Implementation of Different Sorting Methods and Techniques.

1. **INSERTION SORT**

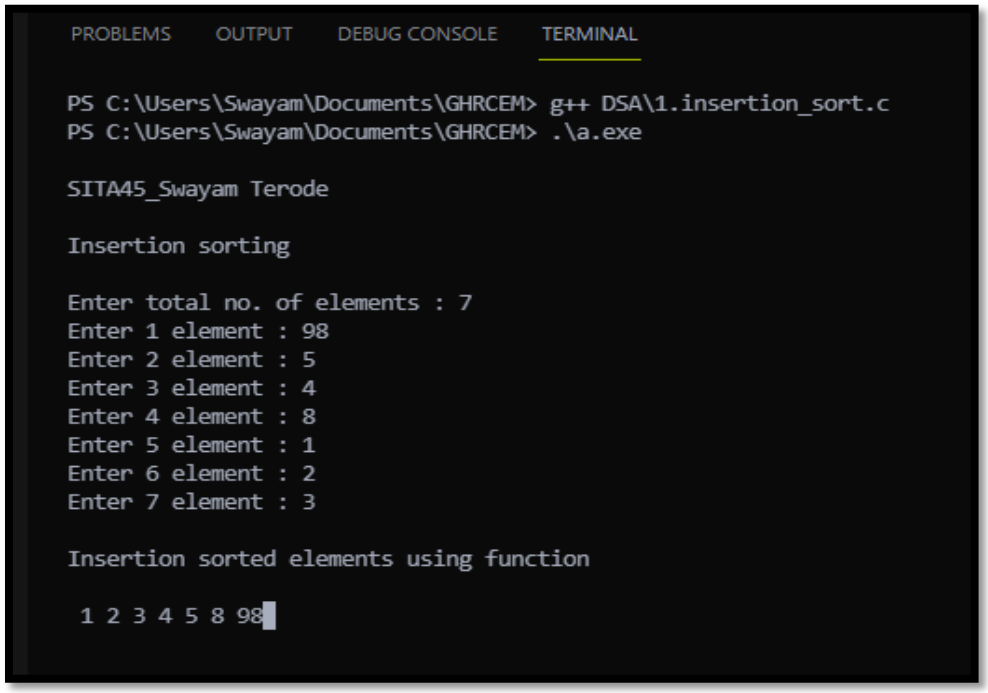
SOURCE CODE:

```
/* c program for insertion sorting */
#include<stdio.h>
#include<conio.h>
void insertion(int [], int );
int main()
{
  int i, size;
  int arr[100];
  printf("\nSITA45_Swayam Terode\n");
  printf("\nInsertion sorting\n\n");
  printf("Enter total no. of elements : ");
```

```
  scanf("%d", &size);
  for (i = 0; i < size; i++){
    printf("Enter %d element : ", i + 1);
    scanf("%d", &arr[i]);
  }
  insertion(arr, size);
  printf("\nInsertion sorted elements using function \n\n");
  for (i = 0; i < size; i++)
    printf(" %d", arr[i]);
  getch();
  return 0;
}
void insertion(int arr[], int size){
  int i, j, tmp;
  for (i = 0; i < size; i++) {
    for (j = i - 1; j >= 0; j--)
    {
      if (arr[j] > arr[j + 1]) {
        tmp = arr[j];
        arr[j] = arr[j + 1];
        arr[j + 1] = tmp;
      }
```

```
        else
      break;
   }
 }
}
```

OUTPUT:



CONCLUSION:

Insertion sort takes maximum time to sort if elements are sorted in reverse order. And it takes minimum time (Order of n) when elements are already sorted.

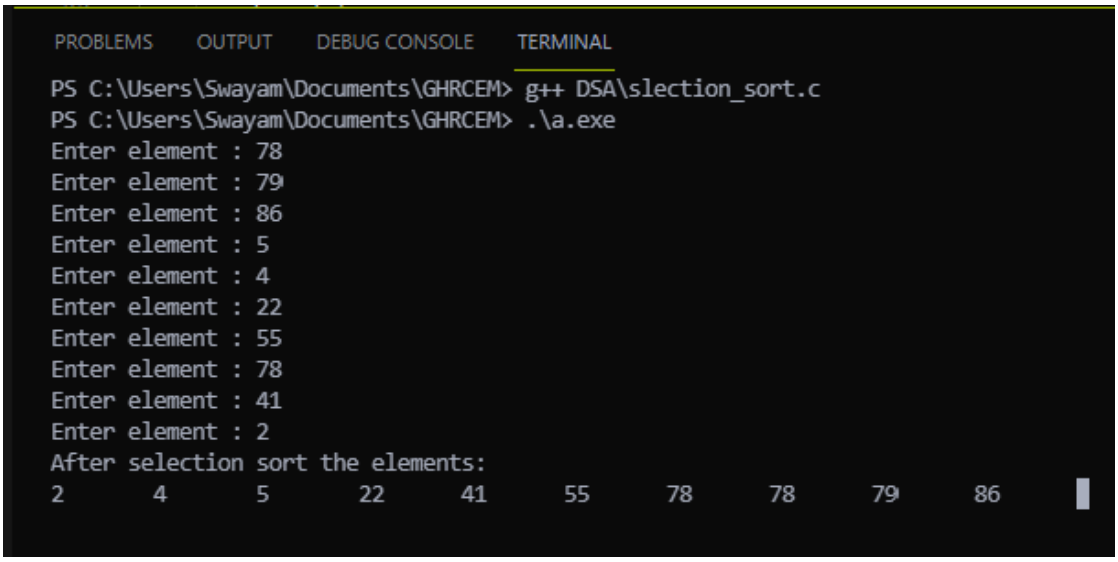
Time Complexity: O(n^2)

- **B: Selection Sort**

SOURCE CODE:

```
/*program to demonstration of selection method*/
#include<stdio.h>
#include<conio.h>
#define SIZE 10
int main()
{
 int i,j,min,temp;
 int arr[SIZE];
 for(i=0; i<SIZE; i++)
 {
  printf("Enter element : ");
  scanf("%d",&arr[i]);
 }
 for(i=0; i<SIZE; i++)
 {
   min=i;
   for(j=i+1; j<SIZE; j++)
     if(arr[j]<arr[min])
        min=j;
     temp=arr[i];
     arr[i]=arr[min];
     arr[min]=temp;
 }
 printf("After selection sort the elements:\n");
 for(i=0; i<SIZE; i++)
    printf("%d\t",arr[i]);
 getch();
 return 0;
}
```

OUTPUT:



CONCLUSION:

Time Complexity: O(n2) as there are two nested loops.