DSA LAB

Lab Assignment number 17

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Aim: To implement Selection sort and Insertion sort

Program:

```
#include <stdio.h>

/*Array to store the list*/
int array[100];

/*Function to swap */
void swap(int *a, int *b)
{
   int temp = *a;
   *a = *b;
   *b = temp;
}

/*Insertion Sort*/
void insertion_sort(int n)
{
   int i,j,temp,flag;
   for (i = 1 ; i <= n - 1; i++)
   {
      temp = array[i];
      for (j = i - 1 ; j >= 0; j--)
      {
         if (array[j] > temp)
         {
            array[j+1] = array[j];
            flag = 1;
         }
         else
         {
            break;
         }
      }
      if (flag)
      {
         array[j+1] = temp;
      }
   }
}

/*Selection Sort*/
void selection_sort(int n)
{
```

```
    int i, j, min;

    for (i = 0; i < n-1; i++)
    {
        min = i;
        for (j = i+1; j < n; j++)
        {
            if (array[j] < array[min])
            {
                min = j;
            }
        }
        swap(&array[min], &array[i]);
    }
}

/*Print a sorted array*/
void print_sorted_array(int n)
{
    int i;
    printf("Sorted Array:");
    for(i=0;i<n;i++)
    {
        printf("%d ",array[i]);
    }
}

int main()
{
    int n,i, choice;

    printf("Enter number of elements\n");
    scanf("%d", &n);

    printf("Enter %d integers\n", n);

    for (i = 0; i < n; i++)
    {
        scanf("%d", &array[i]);
    }

    printf("Type of sort to perform:\n1.Selection Sort\n2.Insertion Sort\n3.Exit");
    printf("Enter the choice to be performed: ");
    scanf("%d",&choice);

    switch(choice)
    {
        case 1:
            selection_sort(n);
            print_sorted_array(n);
            break;
```

```
        case 2:
            insertion_sort(n);
            print_sorted_array(n);
            break;

        case 3:
        default:
            printf("Thank You!!");
    }

    return 0;
}
```

Output:

```
Enter number of elements
5
Enter 5 integers
12
34
2
17
8
Type of sort to perform:
1.Selection Sort
2.Insertion Sort
3.ExitEnter the choice to be performed: 1
Sorted Array:2 8 12 17 34
```

```
Enter number of elements
5
Enter 5 integers
22
98
56
3
11
Type of sort to perform:
1.Selection Sort
2.Insertion Sort
3.ExitEnter the choice to be performed: 2
Sorted Array:3 11 22 56 98
```