***DATA STUCTURES AND ALGORITHM***

***LAB-4***

Object: Code a menu based program of Sorting Techniques which have the following options:

1. Bubble Sort
2. Selection Sort
3. Insertion Sort
4. Merge Sort / Quick Sort
5. Exit

**Code:**

**#include<iostream>**

**#include<conio.h>**

**using namespace std;**

**void merge\_sort(int, int);**

**void merge\_array(int, int, int, int);**

**int arr\_sort[20];**

**void main()**

**{**

**start:**

**int choice;**

**cout<<"SORTING TECHNIQUES \n1) Bubble Sort \n2) Selection Sort \n3) Insertion Sort \n4) Merge Sort / Qiuck Sort \n5) EXIT \nSelect You're Favorite Sorting Techniques: ";**

**cin>>choice;**

**system("cls");**

**switch(choice)**

**{**

**case 1:**

**cout<<"BUBBLE SORT";**

**int arr[20],n,i,j,temp;**

**cout<<"\nInput Array Size: ";**

**cin>>n;**

**cout<<"\nInput The Elements of Array: \n";**

**for(i=0;i<n;++i)**

**{**

**cin>>arr[i];**

**}**

**for(i=1;i<n;++i)**

**{**

**for(j=0;j<(n-i);++j)**

**{**

**if(arr[j]>arr[j+1])**

**{**

**temp=arr[j];**

**arr[j]=arr[j+1];**

**arr[j+1]=temp;**

**}**

**}**

**}**

**cout<<"The Sorted List of Elements is:";**

**for(i=0;i<n;++i)**

**{**

**cout<<" "<<arr[i];**

**}**

**cout<<endl<<endl<<endl;**

**break;**

**case 2:**

**cout<<"SELECTION SORT";**

**int i\_loop,j\_loop,num,loc,tem,min,a[30];**

**cout<<"\nInput Array Size: ";**

**cin>>num;**

**cout<<"\nInput The Elements of Array: \n";**

**for(i\_loop=0;i\_loop<num;i\_loop++)**

**{**

**cin>>a[i\_loop];**

**}**

**for(i\_loop=0;i\_loop<num-1;i\_loop++)**

**{**

**min=a[i\_loop];**

**loc=i\_loop;**

**for(j\_loop=i\_loop+1;j\_loop<num;j\_loop++)**

**{**

**if(min>a[j\_loop])**

**{**

**min=a[j\_loop];**

**loc=j\_loop;**

**}**

**}**

**tem=a[i\_loop];**

**a[i\_loop]=a[loc];**

**a[loc]=tem;**

**}**

**cout<<"\nThe Sorted List of Elements is:";**

**for(i\_loop=0;i\_loop<num;i\_loop++)**

**{**

**cout<<" "<<a[i\_loop];**

**}**

**cout<<endl<<endl<<endl;**

**break;**

**case 3:**

**cout<<"INSERTION SORT";**

**int f,l,number,t,ar[30];**

**cout<<"\nInput Array Size:";**

**cin>>number;**

**cout<<"\nInput The Elements of Array: \n";**

**for(f=0;f<number;f++)**

**{**

**cin>>ar[f];**

**}**

**for(f=1;f<=number-1;f++)**

**{**

**t=ar[f];**

**l=f-1;**

**while((t<ar[l])&&(l>=0))**

**{**

**ar[l+1]=ar[l];**

**l=l-1;**

**}**

**ar[l+1]=t;**

**}**

**cout<<"\nThe Sorted List of Elements is:";**

**for(f=0;f<number;f++)**

**{**

**cout<<" "<<ar[f];**

**}**

**cout<<endl<<endl<<endl;**

**break;**

**case 4:**

**cout<<"Merge Sort / Quick Sort";**

**int value,b;**

**cout<<"\nInput Array Size: ";**

**cin>>value;**

**cout<<"\nInput The Elements of Array: \n";**

**for(b=0;b<value;b++)**

**{**

**cin>>arr\_sort[b];**

**}**

**merge\_sort(0,value-1);**

**cout<<"\nThe Sorted List of Elements is: ";**

**for(b=0;b<value;b++)**

**{**

**cout<<" "<<arr\_sort[b];**

**}**

**cout<<endl<<endl;**

**break;**

**case 5:**

**exit(0);**

**break;**

**default:**

**cout<<"Invalid Input!!";**

**cout<<endl<<endl<<endl;**

**break;**

**}**

**goto start;**

**getch();**

**}**

**void merge\_sort(int i, int j)**

**{**

**int m;**

**if (i<j)**

**{**

**m=(i+j)/2;**

**merge\_sort(i, m);**

**merge\_sort(m+1, j);**

**merge\_array(i, m, m+1, j);**

**}**

**}**

**void merge\_array(int a, int b, int c, int d)**

**{**

**int t[50];**

**int i=a, j=c, k=0;**

**while (i<=b && j<=d)**

**{**

**if(arr\_sort[i]<arr\_sort[j])**

**t[k++]=arr\_sort[i++];**

**else**

**t[k++]=arr\_sort[j++];**

**}**

**while(i<=b)**

**t[k++]=arr\_sort[i++];**

**while (j<=d)**

**t[k++]=arr\_sort[j++];**

**for(i=a, j=0; i<=d; i++, j++)**

**arr\_sort[i]=t[j];**

**}**

**Output:**





