Data Structure Assignment-1

NAME : Shaikh Muaz Khalid

Roll no. : 22

PRN no. : 12111218

Insertion Sort:

CODE:

#include <stdio.h>

#include <string.h>

struct classroom

{

int Roll\_no;

int total\_marks;

char student\_Name[70];

};

int P = 0;

void assign(struct classroom \* f ,int first,struct classroom \* g,int last){

f[first].total\_marks = g[last].total\_marks;

f[first].Roll\_no = g[last].Roll\_no;

strcpy(f[first].student\_Name,g[last].student\_Name);

P++;

}

void display(struct classroom \* arr, int n) {

int i;

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

printf("Student's Student Name: %s\n", arr[i].student\_Name);

printf("Student's Roll no: %d\n", arr[i].Roll\_no);

printf("Student's Total Marks: %d\n", arr[i].total\_marks);

}

}

void insertionSort(struct classroom \* arr, int n) {

for (int i = 1; i < n; i++) {

struct classroom tmp[1];

assign(tmp,0,arr,i);

int k = i - 1;

while (tmp[0].Roll\_no < arr[k].Roll\_no && k >= 0) {

assign(arr,k+1,arr,k);

--k;

}

assign(arr,k+1,tmp,0);

}

}

int main() {

int i, n;

printf("Number of students in class: ");

scanf("%d",&n);

struct classroom arr[n];

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

printf("Enter %d Student Name: ", i+1);

scanf("%s",&arr[i].student\_Name);

printf("Enter %d Students Roll no: ", i+1);

scanf("%d",&arr[i].Roll\_no);

printf("Enter %d students Total Marks: ", i+1);

scanf("%d",&arr[i].total\_marks);

}

printf("NOT Sorted:\n");

display(arr, n);

insertionSort(arr, n);

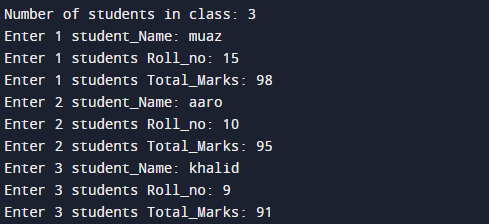
printf("Sorted with key as student roll no.:\n");

display(arr, n);

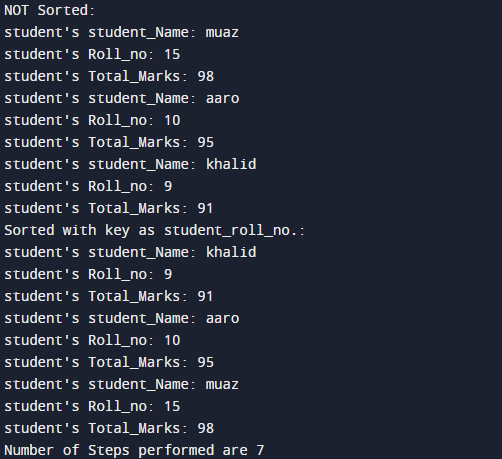
printf("Number of Steps performed are %d\n",P);

}

Input:



Output:



Quick Sort:

CODE:

#include<stdio.h>

#include <string.h>

struct classroom

{

int Roll\_no;

int Total\_Marks;

char student\_Name[70];

};

int n = 0 ;

void swap(struct classroom \* f ,int first,int last){

int temp;

char tempchr[70];

temp = f[first].Total\_Marks;

f[first].Total\_Marks = f[last].Total\_Marks;

f[last].Total\_Marks = temp;

temp = f[first].Roll\_no;

f[first].Roll\_no = f[last].Roll\_no;

f[last].Roll\_no = temp;

strcpy(tempchr,f[first].student\_Name);

strcpy(f[first].student\_Name,f[last].student\_Name);

strcpy(f[last].student\_Name,tempchr);

}

void quicksort(struct classroom \* f ,int first,int last){

int i, k, pivot, temp;

if(first<last){

pivot=f[first].Roll\_no;

i=first;

k=last;

while(i<k){

while(f[i].Roll\_no<=pivot&&i<last){

i++;

}

while(f[k].Roll\_no>pivot){

k--;

}

if(i<k){

swap(f,i,k);

n++;

}

}

swap(f,k,first);

n++;

quicksort(f,first,k-1);

quicksort(f,k+1,last);

}

}

int main(){

int i, count;

printf("Number of students in class: ");

scanf("%d",&count);

struct classroom arr[count];

for(i=0;i<count;i++){

printf("Enter %d Students Roll\_no: ", i+1);

scanf("%d",&arr[i].Roll\_no);

printf("Enter %d Student Student\_Name: ", i+1);

scanf("%s",&arr[i].student\_Name);

printf("Enter %d Students Total\_Marks: ", i+1);

scanf("%d",&arr[i].Total\_Marks);

}

quicksort(arr,0,count-1);

printf("Sorted with key as Student\_roll\_no.: \n");

for(i=0;i<count;i++){

printf("Student's Student\_Name: %s\n", arr[i].student\_Name);

printf("Student's Roll\_no: %d\n", arr[i].Roll\_no);

printf("Student's Total\_Marks: %d\n", arr[i].Total\_Marks);

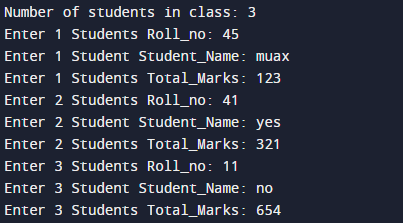
}

printf("Number of swaps performed are %d\n",n);

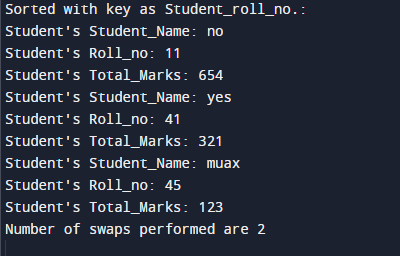
return 0;

}

Input:



Output:



Thank You :)