**Experiment 4**

**Aim:** To implement quick sort.

**Code:**

#include <iostream>

using namespace std;

int Pivot(int \*arr, int si, int ei){

int x = arr[si];

int c = 0;

for(int i=si+1; i<=ei; i++){

if(x>=arr[i]){

c++;

}

}

int p = si+c;

int temp = arr[si];

arr[si] = arr[p];

arr[p] = temp;

int i = si, j = ei;

while(i<p && j>p){

if(arr[i] <= x){

i++;

}

else if(arr[j] > x){

j--;

}

else{

temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

i++;

j--;

}

}

return p;

}

void Quick(int \*arr, int si, int ei){

if(si >= ei){

return;

}

int c = Pivot(arr,si,ei);

Quick(arr,si,c-1);

Quick(arr,c+1,ei);

}

void Quick\_Sort(int \* arr, int n){

int si = 0, ei = n-1;

Quick(arr,si,ei);

}

int main(){

int n;

cout<<"Quick Sort Algorithm"<<endl;

cout<<"Best Case Time Complexity is: O(n\*logn)"<<endl;

cout<<"Worst Case Time Complexity is: O(n^2)"<<endl;

cout<<"Space Complexity is: O(n)"<<endl;

cout<<"Enter the size of an array (Total entries should not be more than 100): ";

cin>>n;

int \*arr = new int [100];

cout<<"Enter the array elements: ";

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

cin>>arr[i];

}

cout<<"The original array is: ";

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

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

}

cout<<endl;

Quick\_Sort(arr,n);

cout<<"The sorted array in ascending order is: ";

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

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

}

cout<<endl;

delete arr;

}

**Output:**

1. **Best Case:**

A picture containing text, screenshot, computer, monitor

Description automatically generated

1. **Worst Case:**

A picture containing text, screenshot, computer, monitor

Description automatically generated

**Conclusion:** The quick sort sorting algorithm has been implemented successfully.