Assignment no:- 12 SYCOA124

1] What is sorting.?
→ A sorting algorithm is just a sorting of orders or instructions. In an array in an input, on which sorting algorithm performs operations given out a sorted array. There are 2 types of sorting:-
1] internal sorting :- If the input data such that it can be adjusted in the memory at once, it is internally sorted.
2] External sorting :- If the input data is that it can't be adjusted in the memory internally at once, it needs to be sorted storage device.

2] What is quick sort ?
→ Quick sort is highly efficient sorting algorithm and is based on partitioning of array data into smaller array Quicksort partitions on array and then calles itself recurssively twice to sort the resulting sub array.

Algorithm of quicksort :
Step 1 :- Select a pivot element.
Step 2 :- Stat int i from the start of array and int j from the end of array.
Step 3 :- If the element at i is less than pivot make i++ and if element at j is greater than pivot make J ++.

step 4:- Do this till the i ~~become~~ stays less than j.
step 5:- after this ~~so~~ swap the element at i and j position.
step 6:- swap the element at low and j position.
step 7:- return the j position.

Time complexity:-
The time complexity for quick sort technique is O(n log n).

Conclusion:-
The quick sort algorithm is implemented and studied effectively.

CODE:

```
/*
NAME: SARVESH BAPUSAHEB CHAVAN
ROLL NO : SYCOA124

*/
#include <iostream>
#include <iomanip>
using namespace std;
int partition(int A[], int low, int high);
void quick_sort(int A[], int low, int high);

int main()
{
    int i = 0, n, arr[100];
    cout << "Enter the number of employees:";
    cin >> n;
    cout << endl;
    cout << "Enter the salary of " << n << " employees" << endl;
    for (i = 0; i < n; i++)
    {
        cin >> arr[i];
    }
    cout << endl
         << "The array before sorting," << endl;
    for (i = 0; i < n; i++)
    {
        cout << arr[i] << " ";
    }
    cout << endl;
    quick_sort(arr, 0, n - 1);
    cout << endl
         << "Top 5 performers are," << endl;
    int count = 0;
    for (i = n - 1; i >= 0; i--)
    {
        if (count == 5)
        {
            break;
        }
        cout << arr[i] << " ";
        count++;
    }
    return 0;
}
void quick_sort(int A[], int low, int high)
{
    int part;
```

```
    if (low < high)
    {
        part = partition(A, low, high);
        quick_sort(A, low, part - 1);
        quick_sort(A, part + 1, high);
    }
}
int partition(int A[], int low, int high)
{
    int i, j, temp;
    int pivot = A[low];
    i = low + 1;
    j = high;

    do
    {
        while (A[i] <= pivot)
        {
            i++;
        }
        while (A[j] > pivot)
        {
            j--;
        }
        if (i < j)
        {
            temp = A[i];
            A[i] = A[j];
            A[j] = temp;
        }
    } while (i < j);

    temp = A[low];
    A[low] = A[j];
    A[j] = temp;
    return j;
}
```

OUTPUT:

```
Enter the number of employees:7

Enter the salary of 7 employees
12456
13452
11265
2145
35689
14211
13546

The array before sorting,
12456 13452 11265 2145 35689 14211 13546

Top 5 performers are,
35689 14211 13546 13452 12456
```