Experiment Number 9

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Subject ::	Adv Programming Lab	CODE ::	CSP-347

1. Aim :

Design a quick sort with random pivoting using Lomuto partition scheme.

2. Task :

1. Design a quick sort with random pivoting using Lomuto partition scheme.

3. Algorithm :

```
partition(arr[], lo, hi)
    pivot = arr[hi]
    i = lo // place for swapping
    for j := lo to hi – 1 do
    if arr[j] ¡= pivot then
    swap arr[i] with arr[j]
    i = i + 1
    swap arr[i] with arr[hi]
    return i
```

4. Source Code :

```
#include <bits/stdc++.h>

using namespace std;

int partition(int arr[], int low, int high)
{
    int pivot = arr[high];
    int i = (low - 1);
    for (int j = low; j <= high - 1; j++)
    {
        if (arr[j] <= pivot)
        {
            i++;
            swap(arr[i], arr[j]);
        }
    }
    swap(arr[i + 1], arr[high]);
    return (i + 1);
}

void quickSort(int arr[], int low, int high)
{
    if (low < high)
    {
        int pi = partition(arr, low, high);
        quickSort(arr, low, pi - 1);
        quickSort(arr, pi + 1, high);
    }
}

void printArray(int arr[], int size)
{
    int i;
    for (i = 0; i < size; i++)
        printf("%d ", arr[i]);
    printf("\n");
}
```

```
int main()
{
    int arr[] = {10, 7, 8, 9, 1, 5};
    int n = sizeof(arr) / sizeof(arr[0]);
    quickSort(arr, 0, n - 1);
    printf("Sorted array: \n");
    printArray(arr, n);
    return 0;
}
```

5. Observations :

```
❯ g++ code.cpp -o code;./code
Sorted array:
1 5 7 8 9 10
 ~/w/S/Assignment/temp on  master !4 ?11 ❯
```

Learning Outcomes :

- Learnt about the Lomuto Partition.
- Learnt about the Quicksort.
- Learnt about the Quicksort using Lomuto Partition method.
- Learnt how to code for quicksort in c++.

S. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			