Experiment 8: Without comparing the integer values in an array, sort the array of integers in ascending order.

CO ATTAINED: CO2, CO4

**Objective:**

Objective is to be able to learn Counting sort in which unlike other sorts the elements are not compared with each other.

**Apparatus Used:**C/C++, Dev C++

**Program Logic:**

Counting sort is effective when range is not greater than number of objects to be sorted. It can be used to sort the negative input values.

**Algorithm**

countingSort(array, n) // 'n' is the size of array

1max = find maximum element in the given array

2create count array with size maximum + 1

3Initialize count array with all 0's

4for i = 0 to n

5find the count of every unique element and

6store that count at ith position in the count array

7for j = 1 to max

8Now, find the cumulative sum and store it in count array

9for i = n to 1

10Restore the array elements

11Decrease the count of every restored element by 1

12end countingSort

#include <bits/stdc++.h>

using namespace std;

voidcount\_sort(vector<int>&v){

map<int,int>um;

for(auto &x : v){

um[x]++;

}

intitr = 0;

for(auto &x : um){

intnum = x.first;

int times = x.second;

while(times--){

v[itr++] = num;

}

}

}

void print1d(vector<int>&v){

for(auto &x : v){

cout<<x<<"";

}

cout<<"\n";

}

int main()

{

vector<int>v = {2,5,3,4,1,6,7,3,5,9};

print1d(v);

count\_sort(v);

print1d(v);

return 0;

}

Outcome:

1,2,3,4,5,6,7,8,9