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FDS Lab Assignment 4

Problem statement

Write a C program to store first year percentage of students in array. Write function for sorting array of floating-point numbers in ascending order using bucket sort and display top five scores.

Objective:

1. To implement and analyze bucket sort.

Theory.

Bucket Sorting: A sorting algorithm that divides the unsorted array elements into several groups called buckets. Each bucket is then sort. Finally, the sorted buckets are combined to form a final sorted array

Ex.

Consider a array: [10, 21, 29, 48, 52]

The difference in each element term is almost equal to 10.

So, hence this array has uniformly distributed data and can be sorted using bucket sort algorithm

Platform:

OS → Linux

Text editor → Eclipse, VS code

Compilers → gcc on linux for C.

PSEUDO CODE :-

```
Void bucketsort (int A[], int n)
{
  int i,j;
  int bucket[max];
    // for // counters // buckets can store max Numbers
    20 for (i=0; i<max; i++)
        bucket[i] = 0;
    for (j=0; j<n; j++)
      {
        ++ bucket [A[j]];
        // counting number for each bucket
      }
    for (i=0; j=0; i<max ; i++)
      for (; bucket[i] > 0 ; -- bucket[i])
          { A[j] = i ; j++ ; }
```

Time complexity

Bucket sort :- $O(n+k)$

n = no. of elements

k = no. of buckets

Avg case time complexity = $O(n)$

Conclusion.

Thus, implemented bucket sort algorithm.

FAQ's.

Ans 1] Input is uniformly distributed over a range. There are floating point values

Ans 2] a) Bucket sort is different from other algorithms that we use.

b) Advantage of bucket sort is that once the elements are distributed also buckets, each bucket can be processed independently of the others.

c) Another advantage of bucket sort is that you can use it as an external sorting algorithm.

d) Worst case time complexity is same as that of bubble, selection, insertion and quick sort

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