S.No: 12	Exp. Name: ***Write a C program to sort given elements using Radix sort***	Date:2023-04-30

ID: 224G1A0591

Aim:

Write a program to `sort` (`ascending order`) the given elements using `radix sort` technique.

At the time of execution, the program should print the message on the console as:

```
Enter array size :
```

For example, if the user gives the **input** as:

```
Enter array size : 5
```

Next, the program should print the following message on the console as:

```
Enter 5 elements :
```

if the user gives the **input** as:

```
Enter 5 elements : 34 67 12 45 22
```

then the program should **print** the result as:

```
Before sorting the elements are : 34 67 12 45 22
After sorting the elements are : 12 22 34 45 67
```

Note: Do use the **printf()** function with a **newline** character (`\n`).

Source Code:

RadixSortMain2.c

```
#include<stdio.h>
#include<conio.h>
int largest(int[],int);
void printArray(int[],int);
void RadixSort(int[],int);
int main() {
   int size;
   int *arr,i;
   printf("Enter array size : ");
   scanf("%d",&size);
   arr = (int *) malloc(size * sizeof(int));
   printf("Enter %d elements : ",size);
   for(i=0;i<size;i++) {
      scanf("%d",&arr[i]);
   }
   printf("Before sorting the elements are : ");
   printArray(arr,size);
   RadixSort(arr,size);
   printf("After sorting the elements are : ");
   printArray(arr,size);
   return 0;
}
int largest(int a[], int n) {
   int i,k=a[0];
   for(i=0;i<n;i++) {
```

```
      if(a[i]>k) {
        k=a[i];
      }
    }
    return k;
}
void printArray(int a[], int n) {
    int i;
    for(i=0;i<n;i++) {
       printf("%d ",a[i]);
    }
    printf("\n");
}
void RadixSort(int a[],int n) {
    int bucket[10][10],bucket_count[19],i,j,k,rem,NOP=0,divi=1,large,pass;
    large=largest(a,n);
    while(large>0) {
    NOP++;
    large/=10;
    }
    for(pass=0;pass<NOP;pass++) {
       for(i=0;i<10;i++) {
          bucket_count[i]=0;
       }
       for(i=0;i<n;i++) {
          rem=(a[i]/divi)%10;
          bucket[rem][bucket_count[rem]]=a[i];
          bucket_count[rem]++;
       }
       i=0;
       for(k=0;k<10;k++) {
          for(j=0;j<bucket_count[k];j++) {
             a[i]=bucket[k][j];
             i++;
          }
       }
       divi*=10;
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter array size : 5
Enter 5 elements : 23
43
54
12
65
Before sorting the elements are : 23 43 54 12 65
After sorting the elements are : 12 23 43 54 65

ID: 224G1A0591
2022-2026-CSE-B
Srinivasa Ramanujan Institute of Technology

Test Case - 2
User Output
Enter array size : 7
Enter 7 elements : 23
54
136
85
24
65
76
Before sorting the elements are : 23 54 136 85 24 65 76
After sorting the elements are : 23 24 54 65 76 85 136

ID: 224G1A0591

2022-2026-CSE-B

Srinivasa Ramanujan Institute of Technology