S.No: 12	Exp. Name: ***Write a C program to sort given elements using Radix sort***	Date:2023-05-08

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>
void 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);
}
int largest(int a[], int n)
{
   int i,k=a[0];
   for(i=1;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[10],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;
   }
}
```


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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

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