S.No: 12	Exp. Name: ***Write a C program to sort given elements using Radix sort***	Date:2023-05-14

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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 a[],int n)
{
   int large=a[0],i;
   for(i=1;i<n;i++)
   {
      if(large<a[i])
      large=a[i];
   }
      return large;
   }
   void printArray(int arr[],int n)
   {
      for(int i=0;i<n;i++)
      printf("%d ",arr[i]);
      printf("\n");
   }
   int main()
   {
      int size;
      int*arr,i;
      printf("Enter array size : ");
      scanf("%d",&size);
      arr=(int*)malloc(size*sizeof(int));
```

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```
      printf("Enter %d elements : ",size);
      for(i=0;i<size;i++)
      {
         scanf("%d",&arr[i]);
      }
      printf("Before sorting the elements are : ");
      printAray(arr,size);
      RadixSort(arr,size);
      printf("After sorting the elements are : ");
      printArray(arr,size);
      return 0;
   }
      void RadixSort(int a[],int n)
      {
         int bucket[10][10],bucket_count[10];
         int i,j,k,remainder,NOP=0,divisor=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++)
            {
               remainder=(a[i]/divisor)%10;
               bucket[remainder][bucket_count[remainder]]=a[i];
               bucket_count[remainder]+=1;
            }
            i=0;
            for(k=0;k<10;k++)
            {
               for(j=0;j<bucket_count[k];j++)
               {
                  a[i]=bucket[k][j];
                  i++;
               }
            }
            divisor*=10;

      }

}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter array size : 5

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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

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