PROGRAM TITLE: Using structures, create a record for each student. The record should contain student name, marks scored in Science, Mathematics, English, Bengali and their average. Enter data of 5 students and sort the records based on the average marks.

PROGRAM ALGORITHM:

```
algo structsort()
{
     initialize an array of five structures
     for(i=1 to 5)
     {
          input name
          set sum to zero
          for(j=1 to 4)
          {
               input mark of jth subject of ith student
               add mark to sum
          }
          calculate and store average in ith structure
     }
     sort the array of structures
     print the sorted array
}
```

PROGRAM CODE:

```c
/*C Program to Sort through structures*/
#include <stdio.h>
#include <string.h>
#define N 5

/*Create Structure*/
struct student
{
     char name[50];
     int mark[4];
     double avg;
};
int main()
{
     int i,j,flag=1,tmpa[4];
     char tmpn[50];
     double tmp,sum=0;
     struct student e[N];

     /*Read the Individual Inputs*/
     printf("Enter the details of the students\n");
     for(i=0;i<N;i++)
     {
          printf("----------------------------------
%d----------------------------------\n",i+1);
```

```c
            printf("Name:");
            scanf("%[^\n]s",&e[i].name);
            printf("Enter Marks for %s",e[i].name);
            sum=0;
            for(j=0;j<4;j++)
            {
                 switch(j)
                 {
                      case 0:printf("\nScience:");break;
                      case 1:printf("Mathematics:");break;
                      case 2:printf("English:");break;
                      case 3:printf("Bengali:");break;
                 }
                 scanf("%d",&e[i].mark[j]);
                 sum=sum+e[i].mark[j];
            }
            getchar();
            e[i].avg=sum/N;
      }

      /*Sort the structures*/
      while(flag)
      {
            flag=0;
            for(i=0;i<N-1;i++)
            {
                 if(e[i].avg<e[i+1].avg)
                 {

                      /*Swapping all the elements of the structures*/
                      tmp=e[i].avg;
                      e[i].avg=e[i+1].avg;
                      e[i+1].avg=tmp;
                      strcpy(tmpn,e[i].name);
                      strcpy(e[i].name,e[i+1].name);
                      strcpy(e[i+1].name,tmpn);
                      for(j=0;j<4;j++)
                      {
                           tmpa[j]=e[i].mark[j];
                           e[i].mark[j]=e[i+1].mark[j];
                           e[i+1].mark[j]=tmpa[j];
                      }
                      flag=1;
                 }
            }
      }

      /*Print Sorted Structures*/

printf("---------------------------------------------------------------
------\n");
      printf("----------------------The Sorted Structure
is----------------------\n");
      for(i=0;i<N;i++)
      {
```

```c
printf("--------------------------------------------------------------------
------\n");
        printf("Name:%s\n",e[i].name);
        for(j=0;j<4;j++)
        {
                switch(j)
                {
                        case 0:printf("Science:%6d\t",e[i].mark[j]);break;
                        case 1:printf("Mathematics:
%6d\t",e[i].mark[j]);break;
                        case 2:printf("English:%6d\t",e[i].mark[j]);break;
                        case 3:printf("Bengali:%6d\n",e[i].mark[j]);break;
                }
        }
        printf("Average:%6.2lf\n",e[i].avg);
    }

printf("--------------------------------------------------------------------
------\n");
    return 0;
}
```

OUTPUT:

```
Enter the details of the students
--------------------------------1--------------------------------
Name:Anthony
Enter Marks for Anthony
Science:98
Mathematics:100
English:83
Bengali:66
--------------------------------2--------------------------------
Name:Akbar
Enter Marks for Akbar
Science:95
Mathematics:91
English:92
Bengali:88
--------------------------------3--------------------------------
Name:Amar
Enter Marks for Amar
Science:87
Mathematics:85
English:96
Bengali:90
--------------------------------4--------------------------------
Name:Gonsalves
Enter Marks for Gonsalves
Science:75
Mathematics:66
English:73
Bengali:78
```

```
--------------------------------5--------------------------------
Name:Omar
Enter Marks for Omar
Science:89
Mathematics:85
English:91
Bengali:88
-----------------------------------------------------------------
----------------------The Sorted Structure is--------------------
-----------------------------------------------------------------
Name:Akbar
Science:    95  Mathematics:    91   English:    92  Bengali:    88
Average: 73.20
-----------------------------------------------------------------
Name:Amar
Science:    87  Mathematics:    85   English:    96  Bengali:    90
Average: 71.60
-----------------------------------------------------------------
Name:Omar
Science:    89  Mathematics:    85   English:    91  Bengali:    88
Average: 70.60
-----------------------------------------------------------------
Name:Anthony
Science:    98  Mathematics:   100   English:    83  Bengali:    66
Average: 69.40
-----------------------------------------------------------------
Name:Gonsalves
Science:    75  Mathematics:    66   English:    73  Bengali:    78
Average: 58.40
-----------------------------------------------------------------
```

DISCUSSION:

While swapping the structures, care should be taken that each of the elements should also be swapped. The Program assumes that the marks are given as integers.