

UNIVERSITY OF ENGINEERING AND TECHNOLOGY,TAXILA



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*SOFTWARE ENGINEERING*

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**FINAL EXAM**

SUBMITTED TO : ENGR.SABA AWAN

SUBMITTED BY : MUHAMMAD ARSALAN

REG NO : 20-SE-56

**PF-LAB**

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# QUESTION

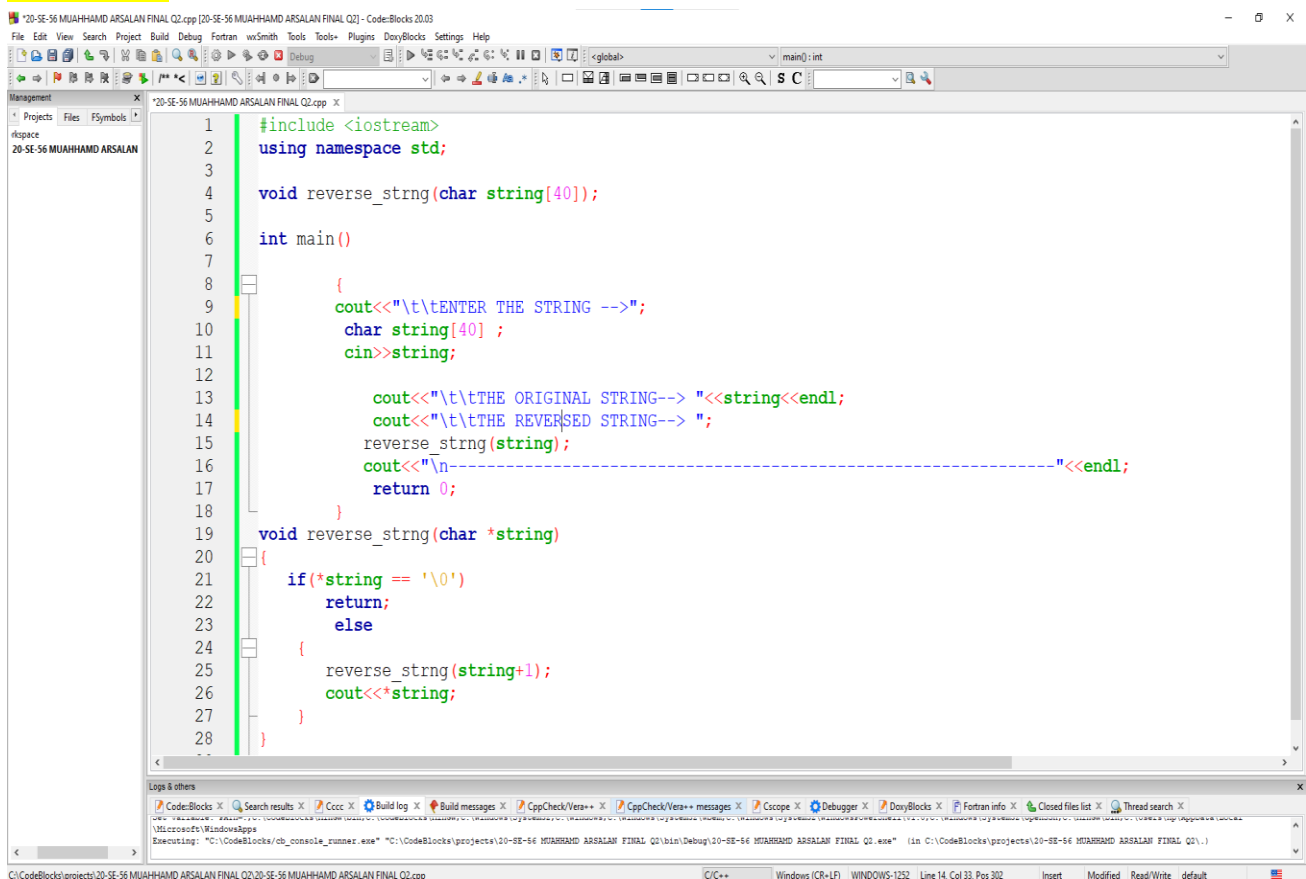
Write a C++ Program to Reverse a Sentence Using Recursion:

- Take a string and create a function to reverse it.
- If string not null then reverse function is called with string+1 value as argument.

Until the end of the string is reached this goes on and when null is encountered then our string is printed back to front. (CLO 1, 15 Marks)

# SOULUTION

## CODE-SS



```
1  #include <iostream>
2  using namespace std;
3
4  void reverse_strng(char string[40]);
5
6  int main()
7  {
8      cout<<"\t\tENTER THE STRING -->";
9      char string[40];
10     cin>>string;
11
12     cout<<"\t\tTHE ORIGINAL STRING--> "<<string<<endl;
13     cout<<"\t\tTHE REVERSED STRING--> ";
14     reverse_strng(string);
15     cout<<"\n-----"<<endl;
16     return 0;
17 }
18
19 void reverse_strng(char *string)
20 {
21     if(*string == '\0')
22         return;
23     else
24     {
25         reverse_strng(string+1);
26         cout<<*string;
27     }
28 }
```

The screenshot shows the Code::Blocks IDE with a C++ project named "20-SE-56 MUAHHAMAD ARSALAN FINAL Q2.cpp". The code implements a recursive function to reverse a string. The main function prompts the user to enter a string, prints the original string, calls the recursive function, and prints the reversed string. The recursive function, reverse\_strng, uses a base case to return when it reaches the null terminator and then prints the characters in reverse order as it returns.

## CODE HANDWRITTEN

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20-SE-56

Omega

PF-LAB

Final Exam

Question 2

Reverse the String-

Program Code:-

```
#include <iostream>
using namespace std;
```

```
void reverse_string(char string[40]);

int main()
{
    cout << "Enter the string --> ";
    char string[40];
    cin >> string;
```

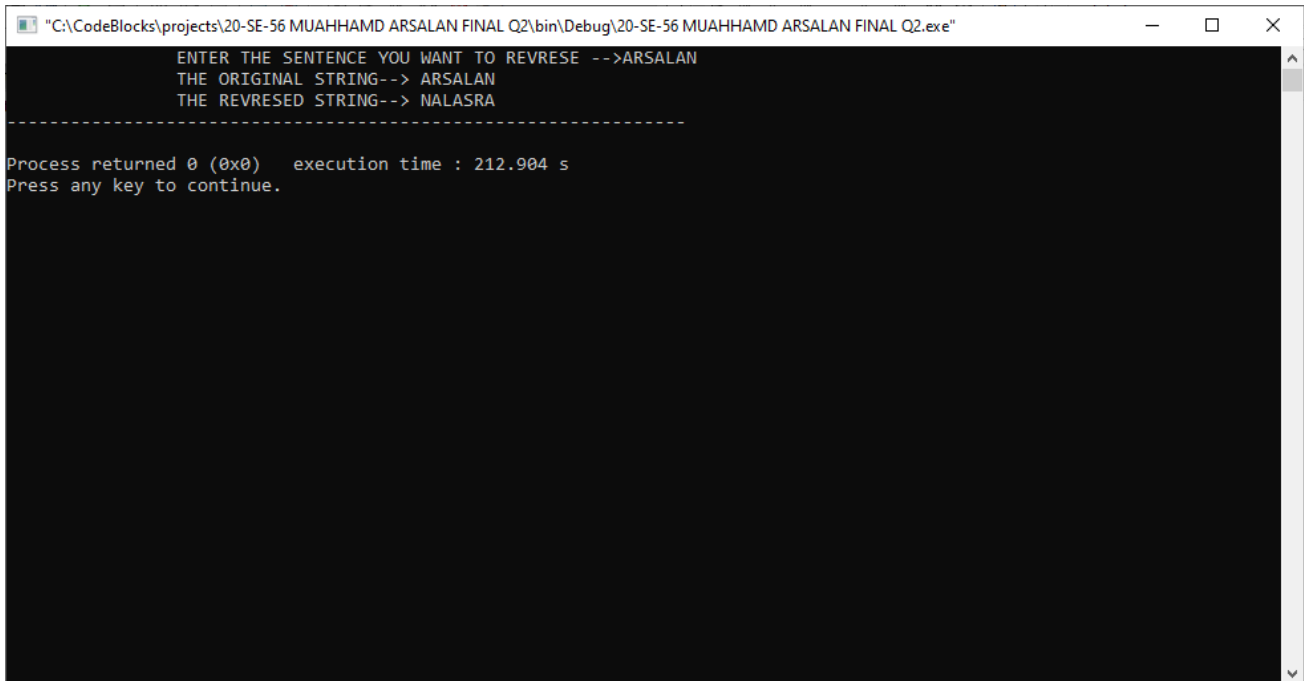
```
cout << "It's THE ORIGINAL STRING-->" << string << endl;  
cout << "It's THE REVERSED STRING-->" ;
```

```
reverse_string (string);  
cout << "In -----" << endl ;  
return 0;  
}
```

```
void reverse_string (char* string)  
{  
    if (*string == '\0')  
        return ;  
    else  
    {  
        reverse_string (string + 1);  
        cout << *string ;  
    }  
}
```



## OUTPUT



```
"C:\CodeBlocks\projects\20-SE-56 MUAHHAMD ARSALAN FINAL Q2\bin\Debug\20-SE-56 MUAHHAMD ARSALAN FINAL Q2.exe"
ENTER THE SENTENCE YOU WANT TO REVRESE -->ARSALAN
THE ORIGINAL STRING--> ARSALAN
THE REVRESED STRING--> NALASRA
-----
Process returned 0 (0x0)   execution time : 212.904 s
Press any key to continue.
```

## EXPLANATION

1. Firstly we started our main function.
2. In main function we firstly declared a function named "reverse\_strng".
3. This function pass arguments of char type and has an array of string whose size is 40
4. In main body program asks user to input the string that is stored in that array
5. Firstly program prints that original string on the screen
6. In next line in main function programm prints reverse string by arguments that are passed by function "reverse\_strng"
7. Now in function "reverse\_strng" we used pointers with array string in order to store its address
8. Then we applied condition using if-else statement that if our string is null than program will stop this function execution and return to the calling function
9. But if there is string present than it will start to reverse the characters and than this is displayed to the main function by passing arguments .

## QUESTION

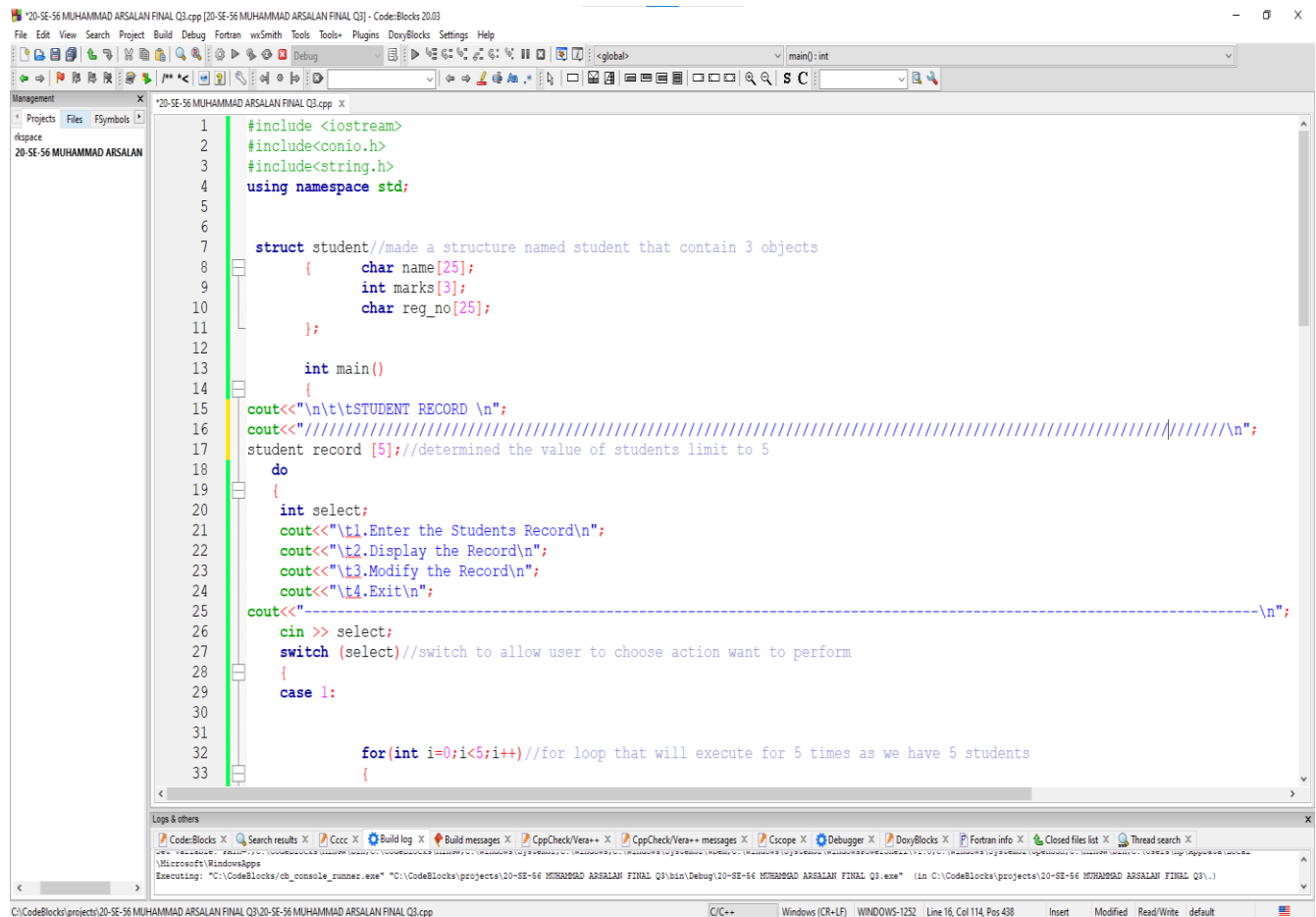
Create a C++ program that make use of both concepts i.e. Array of structure and array within structure by using following guidelines:

1. Create an Array of 5 Structures of Student Records
2. Each structure must contain:
  - a. An array of Full Name of Student
  - b. Registration Number in proper Format i.e 18-SE-24
  - c. Array of Marks of 3 subjects

- d. Display that information of all students in Ascending order using “Name”  
e. Search a particular student and update its Marks of any particular subject.  
(CLO 1, 15 Marks)

## SOLUTION

### CODE-SS



```
1  #include <iostream>
2  #include <conio.h>
3  #include <string.h>
4  using namespace std;
5
6
7  struct student//made a structure named student that contain 3 objects
8  {
9      char name[25];
10     int marks[3];
11     char reg_no[25];
12 }
13
14 int main()
15 {
16     cout<<"\n\t\tSTUDENT RECORD \n";
17     cout<<"////////////////////////////////////\n";
18     student record [5];//determined the value of students limit to 5
19     do
20     {
21         int select;
22         cout<<"\t1.Enter the Students Record\n";
23         cout<<"\t2.Display the Record\n";
24         cout<<"\t3.Modify the Record\n";
25         cout<<"\t4.Exit\n";
26         cout<<"-----\n";
27         cin >> select;
28         switch (select)//switch to allow user to choose action want to perform
29         {
30             case 1:
31
32                 for(int i=0;i<5;i++)//for loop that will execute for 5 times as we have 5 students
33                 {
```

Logs & others

CodeBlocks X Search results X Cccc X Build log X Build messages X CppCheck/Ver++ X CppCheck/Ver++ messages X Cscope X Debugger X DoryBlocks X Fortran info X Closed files list X Thread search X

Executing: "C:\CodeBlocks\ch\_console\_runner.exe" "C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe" (in C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\.)

C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp C/C++ Windows (CR-LF) WINDOWS-1252 Line 16, Col 114, Pos 438 Insert Modified Read/Write default

20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp [20-SE-56 MUHAMMAD ARSALAN FINAL Q3] - Code::Blocks 20.03

File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoryBlocks Settings Help

Management \*20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp X

```
34 cout << "\nEnter Details of Student No:" << i+1;
35
36 cout << "\n\tEnter the Student Name: ";
37 cin >> record[i].name;
38
39 cout << "\n\tEnter the Student Reg No: ";
40 cin >> record[i].reg_no;
41 for(int j=0; j<3; j++) //again a for loop for marks as we have to give marks of 3 subjects
42 {
43     cout << "\n\tEnter the Marks of Student in Subject" << j+1 << " :";
44     cin >> record[i].marks[j];
45 }
46
47 cout<<"-----\n";
48 break;
49 case 2://displaying the record
50 cout << "\nStudent Record " << endl;
51 cout<<endl<<endl;
52
53 for ( int i=4; i>=1; i--)//display the record in ascending order
54 {
55     for (int j=0; j<i; j++)
56     {
57         if (record[j].name[0] > record[j+1].name[0])
58         {
59             swap(record[j], record[j+1]);
60         }
61     }
62
63     for (int i=0; i<5; i++)//display the full record of all 5 students
64     {
65         cout<<i+1<<"\t";
66     }
```

Logs & others

Code::Blocks X Search results X Cccc X Build log X Build messages X CppCheck/Ver++ X CppCheck/Ver++ messages X Cscope X Debugger X DoryBlocks X Fortran info X Closed files list X Thread search X

Executing: "C:\CodeBlocks\cb\_console\_runner.exe" "C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe" (in C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\..)

C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp C/C++ Windows (CR+LF) WINDOWS-1252 Line 47, Col 119, Pos 1777 Insert Modified Read/Write default

20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp [20-SE-56 MUHAMMAD ARSALAN FINAL Q3] - Code::Blocks 20.03

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Management \*20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp X

```
66 cout<<i+1<<"\t";
67 cout << record[i].name << "\t";
68
69 cout << record[i].reg_no << "\t";
70 for(int j=0; j<3; j++)
71 {
72     cout << record[i].marks[j] << "\t";
73 }
74 cout<< endl;
75 }
76 cout<<"-----\n";
77 break;
78 case 3://modify the record
79 char name[25]; //a character data type for searching student by name
80 cout << "Enter Name of Student to Search Record:";
81 cin >> name;
82 for (int i = 0; i < 5; i++)
83 {
84     if (!strcmp(record[i].name, name) )//searching the name
85     {
86
87         for(int j=0; j<3; j++)
88         {
89
90
91
92
93             cout << "\n\tEnter the Marks " << j+1 << " :";//modify the marks of student
94             cin >> record[i].marks[j];
95         }
96     }
97 }
98 }
```

Logs & others

Code::Blocks X Search results X Cccc X Build log X Build messages X CppCheck/Ver++ X CppCheck/Ver++ messages X Cscope X Debugger X DoryBlocks X Fortran info X Closed files list X Thread search X

Executing: "C:\CodeBlocks\cb\_console\_runner.exe" "C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe" (in C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\..)

C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp C/C++ Windows (CR+LF) WINDOWS-1252 Line 76, Col 110, Pos 2704 Insert Modified Read/Write default

\*20-SE-56 MUHAMMAD ARSALAN FINAL Q3.cpp [20-SE-56 MUHAMMAD ARSALAN FINAL Q3] - CodeBlocks 20.03

File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoryBlocks Settings Help

Debug <global> main():int

Management

Projects Files FSymbols

rkspase

20-SE-56 MUHAMMAD ARSALAN

```
76 cout<<"-----\n";
77 break;
78 case 3://modify the record
79 char name[25];//a character data type for searching student by name
80 cout << "Enter Name of Student to Search Record:";
81 cin >> name;
82 for (int i = 0; i < 5; i++)
83 {
84     if (!strcmp(record[i].name, name ) )//searching the name
85     {
86
87         for(int j=0;j<3;j++)
88         {
89
90
91
92             cout << "\n\nEnter the Marks " << j+1 << " :";//modify the marks of student
93             cin >> record[i].marks[j];
94         }
95     }
96 }
97 }
98 }
99 cout<<"-----\n";
100 break;
101 case 4://if user press 4 it will exit the rogram
102     exit(0);
103 default:
104     break;
105 }
106 while (1);
107
108
```

Logs & others

CodeBlocks X Search results X Cccc X Build log X Build messages X CppCheck/Ver++ X CppCheck/Ver++ messages X Cscope X Debugger X DoryBlocks X Fortran info X Closed files list X Thread search X

Microsoft WindowsApps

Executing: "C:\CodeBlocks\cb\_console\_runner.exe" "C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe" (in C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\.)

C/C++ Windows (CR-LF) WINDOWS-1252 Line 76, Col 110, Pos 2784 Insert Modified Read/Write default



### Question: 3

Use Concepts of :

- Array of Structure
- Array within Structure

#### Program Code:-

```
#include <iostream>
```

```
#include <conio.h>
```

```
#include <string.h>
```

```
using namespace std;
```

```
struct student
```

```
{
```

```
    char name[25];
```

```
    int marks[3];
```

```
    char reg_no[25];
```

```
};
```

```
int main()
```

```
{
```

```
    cout << "\n\t\t STUDENT RECORD \n";
```

```
cout << "////////// \n";  
    student record [5];  
    do  
    {  
        int select;  
        cout << "\t 1. Enter the Students Record \n";  
        cout << "\t 2. Display the Record \n";  
        cout << "\t 3. Modify the Record \n";  
        cout << "\t 4. Exit \n";  
  
        cout << "----- \n";
```

```
        cin >> select;  
        switch (select)  
        {  
        case 1:  
            for (int i=0; i<5; i++)  
            {  
                cout << "\n\t Enter details of Student No: "<< i+1;  
                cout << "\n\t Enter the Student Name: ";  
                cin >> record[i].name;  
                cout << "\n\t Enter the Student Reg No: ";  
                cin >> record[i].reg_no;
```



```

for (int j=0; j<3; j++)
{
    cout << "\n\n Enter the Marks of Student in" << j+1 << ": ";
    cin >> record[i].marks[j];
}
}
cout << "-----\n";
break;

```

```

case 2:
cout << "\n Student Record" << endl;
cout << endl << endl;

```

```

for (int i=4; i>=1; i--)
{
    for (int j=0; j<i; j++)
    {
        if (record[j].name[0] > record[j+1].name[0])
        {
            swap(record[j], record[j+1]);
        }
    }
}
for (int i=0; i<5; i++)
{
    cout << i+1 << "\t";
}

```



```
cout << record[i].name << "\t";  
cout << record[i].reg_no << "\t";
```

```
for (int j=0 ; j<3 ; j++)
```

```
{
```

```
cout << record[i].marks[j] << "\t";
```

```
}
```

```
cout << endl;
```

```
}
```

```
cout << "-----\n";
```

```
break;
```

```
case 3:
```

```
char name[25];
```

```
cout << "Enter Name of Student to Search Record:";
```

```
cin >> name;
```

```
for (int i=0 ; i<5 ; i++)
```

```
{
```

```
if (!strcmp(record[i].name, name))
```

```
{
```

```
for (int j=0 ; j<3 ; j++)
```

```
{
```

```
cout << "\n\n Enter the Marks" << j+1 << " : " ;
```

```
cin >> record[i].marks[j];
```

```
}
```

```
}
```

```
}
```

## OUTPUT

```

C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe
STUDENT RECORD
////////////////////////////////////

1.Enter the Students Record
2.Display the Record
3.Modify the Record
4.Exit
-----
1
Enter Details of Student No:1
    Enter the Student Name: NABEELA

    Enter the Student Reg No: 20-SE-63

Enter the Marks of Student in Subject1 :24

Enter the Marks of Student in Subject2 :67

Enter the Marks of Student in Subject3 :43

Enter Details of Student No:2

```

```

C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe
Enter Details of Student No:2
    Enter the Student Name: AKRAM

    Enter the Student Reg No: 20-SE-11

Enter the Marks of Student in Subject1 :59

Enter the Marks of Student in Subject2 :75

Enter the Marks of Student in Subject3 :48

Enter Details of Student No:3
    Enter the Student Name: NIMRA

    Enter the Student Reg No: 20-SE-90

Enter the Marks of Student in Subject1 :88

Enter the Marks of Student in Subject2 :96

```

```
"C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe"
Enter the Marks of Student in Subject3 :70

Enter Details of Student No:4
    Enter the Student Name: BILAL

    Enter the Student Reg No: 20-SE-31

Enter the Marks of Student in Subject1 :48

Enter the Marks of Student in Subject2 :50

Enter the Marks of Student in Subject3 :47

Enter Details of Student No:5
    Enter the Student Name: IQRA

    Enter the Student Reg No: 20-SE-78

Enter the Marks of Student in Subject1 :39

Enter the Marks of Student in Subject2 :47
```

```
"C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe"
Enter the Marks of Student in Subject3 :83
-----
    1.Enter the Students Record
    2.Display the Record
    3.Modify the Record
    4.Exit
-----
2
Student Record

1      AKRAM   20-SE-11      59      75      48
2      BILAL   20-SE-31      48      50      47
3      IQRA    20-SE-78      39      47      83
4      NABEELA 20-SE-63      24      67      43
5      NIMRA   20-SE-90      88      96      70
-----
-
    1.Enter the Students Record
    2.Display the Record
    3.Modify the Record
    4.Exit
-----
3
Enter Name of Student to Search Record:NABEELA
```



```
"C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe"
3
Enter Name of Student to Search Record:NABEELA

Enter the Marks 1 :80

Enter the Marks 2 :56

Enter the Marks 3 :20
-----
1.Enter the Students Record
2.Display the Record
3.Modify the Record
4.Exit
-----
2

Student Record

1      AKRAM   20-SE-11      59      75      48
2      BILAL   20-SE-31      48      50      47
```

```
"C:\CodeBlocks\projects\20-SE-56 MUHAMMAD ARSALAN FINAL Q3\bin\Debug\20-SE-56 MUHAMMAD ARSALAN FINAL Q3.exe"
2

Student Record

1      AKRAM   20-SE-11      59      75      48
2      BILAL   20-SE-31      48      50      47
3      IQRA    20-SE-78      39      47      83
4      NABEELA 20-SE-63      80      56      20
5      NIMRA   20-SE-90      88      96      70
-----
1.Enter the Students Record
2.Display the Record
3.Modify the Record
4.Exit
-----
4

Process returned 0 (0x0)   execution time : 154.951 s
Press any key to continue.
```

## EXPLANATION

1. Firstly we declared a structure named "student" that contain three objects
2. These three objects are arrays first is character array with limit of 25 named "name", 2<sup>nd</sup> is integer array with limit of 3 named "marks" and third is character array with limit of 25 named "reg\_no"
3. Now in main function body we declared a array having limit of 5 which is student limits
4. Next we initialized a switch to select between four possible cases
5. If user pres 1 which means "enter student record" than there will a for loop that will execute a for loop for 5 times each time getting data of a student
6. When each time its get a dta of student there is inside for loop that will execute for three times to get marks of three subjects

7. After user complete the entry of 5 students than that case will break and again user will have choice .
8. If user press 2 that means "display students record"
9. There will be again a nested for loops in order to display all data entered and in descending order of their named alphabetically
10. Next this case will break and program again ask for user choice
11. If user press 3 than it means user "want to modify the data "
12. There would be a character type array to store the name given by user to search
13. User will search the student record by its name
14. Program will search for student and again ask to input the data
15. User can modify the student data and hence it is replaced
16. After putting marks of all three subjects that case will break and program will ask for user input
17. If user press 4 which means exit and program will exit .