

Computer Engineering Department, S.V.N.I.T. Surat.
B Tech (CO) –IInd Year semester-III
Course: Data Structures CO203
Assignment-IV

1.) Create an array to store the student information (ex. Student code, Name, Address, Mobile, Total mark, CGPA)

Perform following operations:

(1) Insert

(2) Delete

(3) Search

(4) Traverse

(5) Update the element at particular position given by the user.

Code:

```
// Create an array to store the student information (ex. Student code, Name, Address, Mobile,
// Total mark, CGPA)
// Perform following operations:
// (1) Insert
// (2) Delete
// (3) Search
// (4) Traverse
// (5) Update the element at particular position given by the user.
#include <stdio.h>
#include <string.h>

// Declaring a structure class
struct student
{
    int s_code;
    char s_name[100];
    char s_address[10000];
    int s_mark;
    float s_cgpa;
};

struct student stud[101]; // Array of Student Structure
int i, j;
int idx = 0; // Takes Care of Number of Element Inserted

// Common Function for Printing Data
void print_data(int id)
```

```

{
    printf("\nStudent Data\n");

    printf("Student Code    : %d\n", stud[id].s_code);
    printf("Student Name     : %s", stud[id].s_name);
    printf("Student Address  : %s", stud[id].s_address);
    printf("Student Mark      : %d\n", stud[id].s_mark);
    printf("Student CGPA       : %f\n", stud[id].s_cgpa);
}

// 1. Insertation of Student Data
void fx1()
{
    int cnt = 0;
    printf("Enter the Number of Students whose Data is to be Inserted :\n");
    scanf("%d", &cnt);
    for (int i = 1; i <= cnt; i++)
    {
        if (idx == 100)
        {
            printf("No More Student Data can be Entered!\n");
        }
        else
        {
            printf("Enter Student %d Details :\n", i);
            printf("Student Code :\n");
            scanf("%d", &stud[idx].s_code);
            fflush(stdin);
            printf("Student Name :\n");
            fgets(stud[idx].s_name, sizeof(stud[idx].s_name), stdin);
            printf("Student Address :\n");
            fflush(stdin);
            fgets(stud[idx].s_address, sizeof(stud[idx].s_address), stdin);
            fflush(stdin);
            printf("Student Mark [1-100] :\n");
            scanf("%d", &stud[idx].s_mark);
            printf("Student CGPA [1-10] :\n");
            scanf("%f", &stud[idx].s_cgpa);
            idx += 1;
        }
    }
    return;
}

// 2. Deletion of Student Data
void fx2()
{
    int cnt = 0;
    printf("Enter the Number of Students whose Data is to be Deleted :\n");
    scanf("%d", &cnt);

```

```

for (int i = 0; i < cnt; i++)
{
    int rno;
    printf("Enter the Roll Number of Student :\n");
    scanf("%d", &rno);
    int found = 0;
    for (j = 0; j < idx; j++)
    {
        if (stud[j].s_code == rno)
        {
            stud[j].s_code = -1;
            // SHIFTING LOGIC ADDED
            for (int k = idx - 2; k >= j; k--)
            {
                stud[k].s_code = stud[k + 1].s_code;
                strcpy(stud[k].s_name, stud[k + 1].s_name);
                strcpy(stud[k].s_address, stud[k + 1].s_address);
                stud[k].s_mark = stud[k + 1].s_mark;
                stud[k].s_cgpa = stud[k + 1].s_cgpa;
            }
            stud[idx - 1].s_code = -1;
            idx -= 1; // Decrease Size by 1 Element
            printf("Student Data Deleted Successfully!\n");
            found = 1;
            break;
        }
    }
    if (found == 0)
    {
        printf("Student Data Does not Exist!\n");
        printf("Either Data not Inserted by Admin or Deleted!\n");
    }
}
return;
}

//3. Search of Student Data
void fx3()
{
    int cnt = 0;
    printf("Enter the Number of Students whose Data is to be Searched :\n");
    scanf("%d", &cnt);

    for (int i = 0; i < cnt; i++)
    {
        int rno;
        printf("Enter the Roll Number of Student :\n");
        scanf("%d", &rno);
        int found = 0;

```

```

    for (int j = 0; j < idx; j++)
    {
        if (stud[j].s_code == rno)
        {
            printf("Student Found!\n");
            print_data(j);
            found = 1;
            break;
        }
    }
    if (found == 0)
    {
        printf("Student Data Does not Exist!\n");
        printf("Either Data not Inserted by Admin or Deleted!\n");
    }
}
return;
}

```

//4.Traverse of Student Data

```

void fx4()
{
    for (int k = 0; k < idx; k++)
    {
        if (stud[k].s_code != -1)
        {
            print_data(k);
        }
    }
    return;
}

```

//5. Update the element at particular Roll Number given by the user.

```

void fx5()
{
    int cnt = 0;
    printf("Enter the Number of Students whose Data is to be Updated :\n");
    scanf("%d", &cnt);

    for (int i = 0; i < cnt; i++)
    {
        int rno;
        printf("Enter the Roll Number of Student :\n");
        scanf("%d", &rno);
        int found = 0;
        for (int j = 0; j < idx; j++)
        {
            if (stud[j].s_code == rno)
            {
                printf("Enter Student Details :\n", i);
            }
        }
    }
}

```

```

        printf("Student Code :\n");
        scanf("%d", &stud[j].s_code);
        fflush(stdin);
        printf("Student Name :\n");
        fgets(stud[j].s_name, sizeof(stud[j].s_name), stdin);
        printf("Student Address :\n");
        fflush(stdin);
        fgets(stud[j].s_address, sizeof(stud[j].s_address), stdin);
        fflush(stdin);
        printf("Student Mark [1-100] :\n");
        scanf("%d", &stud[j].s_mark);
        printf("Student CGPA [1-10] :\n");
        scanf("%f", &stud[j].s_cgpa);
        found = 1;
        break;
    }
}
if (found == 0)
{
    printf("Student Data Does not Exist in DataBase!\n");
    printf("Enter Student Details Again :\n");
    printf("Student Code :\n");
    scanf("%d", &stud[idx].s_code);
    fflush(stdin);
    printf("Student Name :\n");
    fgets(stud[idx].s_name, sizeof(stud[idx].s_name), stdin);
    printf("Student Address :\n");
    fflush(stdin);
    fgets(stud[idx].s_address, sizeof(stud[idx].s_address), stdin);
    fflush(stdin);
    printf("Student Mark [1-100] :\n");
    scanf("%d", &stud[idx].s_mark);
    printf("Student CGPA [1-10] :\n");
    scanf("%f", &stud[idx].s_cgpa);
    idx += 1;
}
}
return;

return;
}

int main()
{
    // Marks of Student Not Initialized = -1
    for (int i = 0; i <= 100; i++)
    {
        stud[i].s_code = -1;
    }
}

```

```
int choice = 0;
printf("Perform following operations:\n");
printf("1 -> Insert\n");
printf("2 -> Delete\n");
printf("3 -> Search\n");
printf("4 -> Traverse\n");
printf("5 -> Update the element at particular Roll Number\n");
```

```
char ch = 'Y';
while (ch == 'Y' || ch == 'y')
{
    int choice = 0;

    printf("Enter your Choice : ");
    scanf("%d", &choice);

    switch (choice)
    {

        case 1:
            fx1();
            break;
        case 2:
            fx2();
            break;
        case 3:
            fx3();
            break;
        case 4:
            fx4();
            break;
        case 5:
            fx5();
            break;
        default:
            printf("Enter Valid Choice [1-5] Only!");
            break;
    }
    fflush(stdin); // for character input

    printf("Want to Do Another Operation?(Y/N)\n");
    scanf("%c", &ch);
}

return 0;
```

```
}
```

Test Case:

1.) Inserting Data of 5 Students

Sr No	Code	Name	Address	Mark	CGPA
1	10	Ram	Ayodhya, UttarPradesh	100	9.89
2	12	Bhagya Rana	Surat, Gujarat	100	10
3	14	Nobita	Mount Fiji	45	7.5
4	16	Sizuka	California, USA	91	9.25
5	18	Kitretsu	New York, USA	85	8.94

Perform following operations:

1 -> Insert

2 -> Delete

3 -> Search

4 -> Traverse

5 -> Update the element at particular Roll Number

Enter your Choice : 1

Enter the Number of Students whose Data is to be Inserted :

5

Enter Student 1 Details :

Student Code :

10

Student Name :

Ram

Student Address :

Ayodhya, UttarPradesh

Student Mark [1-100] :

100

Student CGPA [1-10] :

9.89

Enter Student 2 Details :

Student Code :

12

Student Name :

Bhagya Rana

Student Address :

Surat, Gujarat

Student Mark [1-100] :

100

Student CGPA [1-10] :

10

Enter Student 3 Details :

Student Code :

14

Student Name :

Nobita

Student Address :

Mount Fiji

Student Mark [1-100] :

45

Student CGPA [1-10] :

7.5

Enter Student 4 Details :

Student Code :

16

Student Name :

Sizuka

Student Address :

California, USA

Student Mark [1-100] :

91

Student CGPA [1-10] :

9.25

Enter Student 5 Details :

Student Code :

18

Student Name :

Kitretsu

Student Address :

New York, USA

Student Mark [1-100] :

85

Student CGPA [1-10] :

8.94

Want to Do Another Operation?(Y/N)

2.) Traversal of all Students Data: [To Confirm Data Has been Entered Correctly!]

Y

Enter your Choice : 4

Student Data

Student Code : 10

Student Name : Ram

Student Address : Ayodhya, UttarPradesh

Student Mark : 100

Student CGPA : 9.890000

Student Data

Student Code : 12

Student Name : Bhagya Rana

Student Address : Surat, Gujarat

Student Mark : 100

Student CGPA : 10.000000

Student Data

Student Code : 14

Student Name : Nobita

Student Address : Mount Fiji

Student Mark : 45

Student CGPA : 7.500000

Student Data

Student Code : 16

Student Name : Sizuka

Student Address : California, USA

Student Mark : 91

Student CGPA : 9.250000

Student Data

Student Code : 18

Student Name : Kitretsu

Student Address : New York, USA

Student Mark : 85

Student CGPA : 8.940000

3.) Deleting Nobita [Roll Number: 14] from Student Data.

Sr No	Code	Name	Address	Mark	CGPA
1	10	Ram	Ayodhya, UttarPradesh	100	9.89
2	12	Bhagya Rana	Surat, Gujarat	100	10
3	16	Sizuka	California, USA	91	9.25
4	18	Kitretsu	New York, USA	85	8.94

```
Y
Enter your Choice : 2
Enter the Number of Students whose Data is to be Deleted :
1
Enter the Roll Number of Student :
14
Student Data Deleted Succesfully!
Want to Do Another Operation?(Y/N)
Y
Enter your Choice : 4

Student Data
Student Code      : 10
Student Name      : Ram
Student Address   : Ayodhya, UttarPradesh
Student Mark      : 100
Student CGPA      : 9.890000

Student Data
Student Code      : 12
Student Name      : Bhagya Rana
Student Address   : Surat, Gujarat
Student Mark      : 100
Student CGPA      : 10.000000

Student Data
Student Code      : 16
Student Name      : Sizuka
Student Address   : California, USA
Student Mark      : 91
Student CGPA      : 9.250000

Student Data
Student Code      : 18
Student Name      : Kitretsu
Student Address   : New York, USA
Student Mark      : 85
```

4.) Search for Roll Number 12 [Me!] & Roll Number 14 [Nobita] {We deleted Him Recently}

```
Want to Do Another Operation?(Y/N)
Y
Enter your Choice : 3
Enter the Number of Students whose Data is to be Searched :
2
Enter the Roll Number of Student :
12
Student Found!

Student Data
Student Code      : 12
Student Name      : Bhagya Rana
Student Address   : Surat, Gujarat
Student Mark      : 100
Student CGPA      : 10.000000
Enter the Roll Number of Student :
14
Student Data Does not Exist!
Either Data not Inserted by Admin or Deleted!
```

5.) Updating of Table Data

Updated Shizuka Data and Inserted Nobita Data [In Case Data Not Found, Then New Data Inserted!]

Sr No	Code	Name	Address	Mark	CGPA
1	10	Ram	Ayodhya, UttarPradesh	100	9.89
2	12	Bhagya Rana	Surat, Gujarat	100	10
3	16	Sizuka Gupta	New Jersey, USA	93	9.41
4	18	Kitretsu	New York, USA	85	8.94
5	14	Nobita Singh	Mount Fiji 2	78	8.12

```
Want to Do Another Operation?(Y/N)
Y
Enter your Choice : 5
Enter the Number of Students whose Data is to be Updated :
2
Enter the Roll Number of Student :
14
Student Data Does not Exist in DataBase!
Enter Student Details Again :
Student Code :
14
Student Name :
Nobita Singh
Student Address :
Mount Fiji 2
Student Mark [1-100] :
78
Student CGPA [1-10] :
8.12
Enter the Roll Number of Student :
16
Enter Student Details :
Student Code :
16
Student Name :
Sizuka Gupta
Student Address :
New Jersey, USA
Student Mark [1-100] :
93
Student CGPA [1-10] :
9.41
Want to Do Another Operation?(Y/N)
```

Enter your Choice : 4

Student Data

Student Code : 10
Student Name : Ram
Student Address : Ayodya, UttarPradesh
Student Mark : 100
Student CGPA : 9.890000

Student Data

Student Code : 12
Student Name : Bhagya Rana
Student Address : Surat, Gujarat
Student Mark : 100
Student CGPA : 10.000000

Student Data

Student Code : 16
Student Name : Sizuka Gupta
Student Address : New Jersey, USA
Student Mark : 93
Student CGPA : 9.410000

Student Data

Student Code : 18
Student Name : Kitretsu
Student Address : New York, USA
Student Mark : 85
Student CGPA : 8.940000

Student Data

Student Code : 14
Student Name : Nobita Singh
Student Address : Mount Fiji 2
Student Mark : 78
Student CGPA : 8.120000

Want to Do Another Operation?(Y/N)

Submitted By:
Roll Number: **U19CS012** (D-12)
Name: *Bhagya Rana*