

Pre-Assignment (Day 3): Advanced Data Structures

1. Declare a 1 – Dimensional array in C++ and find the smallest and largest value in the array.

Sol:

```
#include<iostream.h>
#include<conio.h>
void main()
{
    int i,smallest,largest,arr[10];
    clrscr();
    cout<<"\nEnter Any 10 Array Elements: \n\t";
    for(i=0;i<10;i++)
        cin>>arr[i];
    cout<<"\nEntered Array Elements Are: \n\t";
    for(i=0;i<10;i++)
        cout<<arr[i]<<" ";
    smallest = arr[0];
    largest = arr[0];
    for(i=0;i<10;i++)
    {
        if(smallest > arr[i])
            smallest = arr[i];
        else if(largest < arr[i])
            largest = arr[i];
    }
    cout<<"\n\nLargest Element: "<<largest;
    cout<<"\n\nSmallest Element: "<<smallest;
    getch();
}
```

O/p:

```
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Enter Any 10 Array Elements:
    11 28 3 7 94 96 13 9 16 0

Entered Array Elements Are:
    11 28 3 7 94 96 13 9 16 0

Largest Element: 96

Smallest Element: 0_
```

2. Write a program in C++ finds the length of the string and also displays the string reverse, compare two strings to check whether they are equal or not and concatenate two strings, convert string to lower case/upper case.

Sol:

```
#include<iostream.h>
#include<conio.h>
#include<string.h>
void main()
{
    char str1[10];
    char str2[10];
    char str3[10];
    int len,ch;
    char ch2;
    clrscr();
    do
    {
        cout<<"\n1. Find Length and Reverse of String";
        cout<<"\n2. Compare Two Strings";
        cout<<"\n3. Concatenate Two Strings";
        cout<<"\n4. Find Lower/Upper Case of String";
        cout<<"\nEnter Choice: ";
        cin>>ch;
        switch(ch)
        {
            case 1:
                cout<<"\n---Find Length and Reverse of String---";
                cout<<"\nEnter String: ";
                cin>>str1;
                cout<<"\nEntered String Is: "<<str1;
                len = strlen(str1);
                cout<<"\nLength of Entered String Is: "<<len;
                cout<<"\nReverse of Entered String Is: "<<strrev(str1);
                break;
            case 2:
                cout<<"\n---Compare Two Strings---";
                cout<<"\nEnter String1: ";
                cin>>str1;
                cout<<"\nEnter String2: ";
```

```
        cin>>str2;
        if(strcmp(str1,str2) == 0)
            cout<<"\n\tBoth Strings Are Equal...";
        else
            cout<<"\n\tBoth Strings Are Not Equal...";
        break;

    case 3:
        cout<<"\n---Concatinate Two Strings---";
        cout<<"\nEnter String1: ";
        cin>>str1;
        cout<<"\nEnter String2: ";
        cin>>str2;
        cout<<"\nString 1: "<<str1<<"\nString 2: "<<str2;
        cout<<"\nConcatination: "<<strcat(str1,str2);
        break;

    case 4:
        cout<<"\n---Find Lower/Upper Case of String---";
        cout<<"\nEnter String: ";
        cin>>str1;
        cout<<"\nLower Case: "<<strlwr(str1);
        cout<<"\nLower Case: "<<strupr(str1);
        break;

    default:
        cout<<"\nPlease Enter Valid Choice...";
        break;
    }
    cout<<"\nTry Again??? (Press y/Y - YES | n/N - NO): ";
    cin>>ch2;
}while(ch2 == 'y' || ch2 == 'Y');
}
```

O/p:

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```
1. Find Length and Reverse of String
2. Compare Two Strings
3. Concatenate Two Strings
4. Find Lower/Upper Case of String
Enter Choice: 1

---Find Length and Reverse of String---
Enter String: suacds

Entered String Is: suacds
Length of Entered String Is: 6
Reverse of Entered String Is: sdcaus
Try Again??? (Press y/Y - YES ; n/N - NO): y
```

```
1. Find Length and Reverse of String
2. Compare Two Strings
3. Concatenate Two Strings
4. Find Lower/Upper Case of String
Enter Choice: 2

---Compare Two Strings---
Enter String1: ACDS

Enter String2: ACDS

Both Strings Are Equal...
Try Again??? (Press y/Y - YES ; n/N - NO): y
```

```
1. Find Length and Reverse of String
2. Compare Two Strings
3. Concatenate Two Strings
4. Find Lower/Upper Case of String
Enter Choice: 3
```

```
---Concatenate Two Strings---
```

```
Enter String1: SU_
```

```
Enter String2: CDAC
```

```
String 1: SU_
```

```
String 2: CDAC
```

```
Concatination: SU_CDAC
```

```
Try Again??? (Press y/Y - YES ; n/N - NO): y_
```

```
1. Find Length and Reverse of String
2. Compare Two Strings
3. Concatenate Two Strings
4. Find Lower/Upper Case of String
Enter Choice: 4
```

```
---Find Lower/Upper Case of String---
```

```
Enter String: su_CDAC
```

```
Lower Case: su_cdac
```

```
Lower Case: SU_CDAC
```

```
Try Again??? (Press y/Y - YES ; n/N - NO): n_
```

3. Write a menu driven C++ program to do following operation on two dimensional array B of size a x b. You should use user-defined functions which accept 2-D array A and its size a and b as arguments. The options are:

To input elements into matrix of size a x b

To display elements of matrix of size a x b

Sol:

```
#include<iostream.h>
#include<conio.h>
int i,j;
void input(int a, int b, int arr[100][100])
{
    for(i=0;i<a;i++)
    {
        for(j=0;j<b;j++)
        {
            cout<<"Enter Element at arr["<<i<<"]["<<j<<"]: ";
            cin>>arr[i][j];
        }
    }
}

void display(int a, int b, int arr[100][100])
{
    if(a == 0 && b == 0)
        cout<<"\nMatrix is Empty...";
    else
    {
        cout<<"\nMatrix Elements Are:\n";
        for(i=0;i<a;i++)
        {
            for(j=0;j<b;j++)
                cout<<"\t"<<arr[i][j]<<" ";
            cout<<endl;
        }
    }
}

void main()
{
```

```
int a,b,i,j,arr[100][100];
int ch;
a = b = 0;
char ch2;
clrscr();
do
{
    cout<<"\n1. Input Elements In Matrix";
    cout<<"\n2. Display Elements Of Matrix";
    cout<<"\nEnter Choice: ";
    cin>>ch;
    switch(ch)
    {
        case 1:
            cout<<"\nEnter Number of Rows: ";
            cin>>a;
            cout<<"\nEnter Number of Columns: ";
            cin>>b;
            input(a,b,arr);
            cout<<"\nMatrix Elements Inserted Successfully...";
            break;
        case 2:
            display(a,b,arr);
            break;
        default:
            cout<<"\nInvalid Choice...";
            break;
    }
    cout<<"\nTry Again ??? (Press y/Y - YES | n/N - NO): ";
    cin>>ch2;
}while(ch2 == 'y' || ch2 == 'Y');
}
```


O/p:

```
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1. Input Elements In Matrix
2. Display Elements Of Matrix
Enter Choice: 2

Matrix is Empty...
Try Again ??? (Press y/Y - YES ; n/N - NO): y

1. Input Elements In Matrix
2. Display Elements Of Matrix
Enter Choice: 1

Enter Number of Rows: 2

Enter Number of Columns: 3
Enter Element at arr[0][0]: 11
Enter Element at arr[0][1]: 28
Enter Element at arr[0][2]: 1
Enter Element at arr[1][0]: 2
Enter Element at arr[1][1]: 45
Enter Element at arr[1][2]: 24

Matrix Elements Inserted Successfully...
Try Again ??? (Press y/Y - YES ; n/N - NO): y_

Try Again ??? (Press y/Y - YES ; n/N - NO): y

1. Input Elements In Matrix
2. Display Elements Of Matrix
Enter Choice: 2

Matrix Elements Are:
    11    28    1
    2    45    24

Try Again ??? (Press y/Y - YES ; n/N - NO): n
```

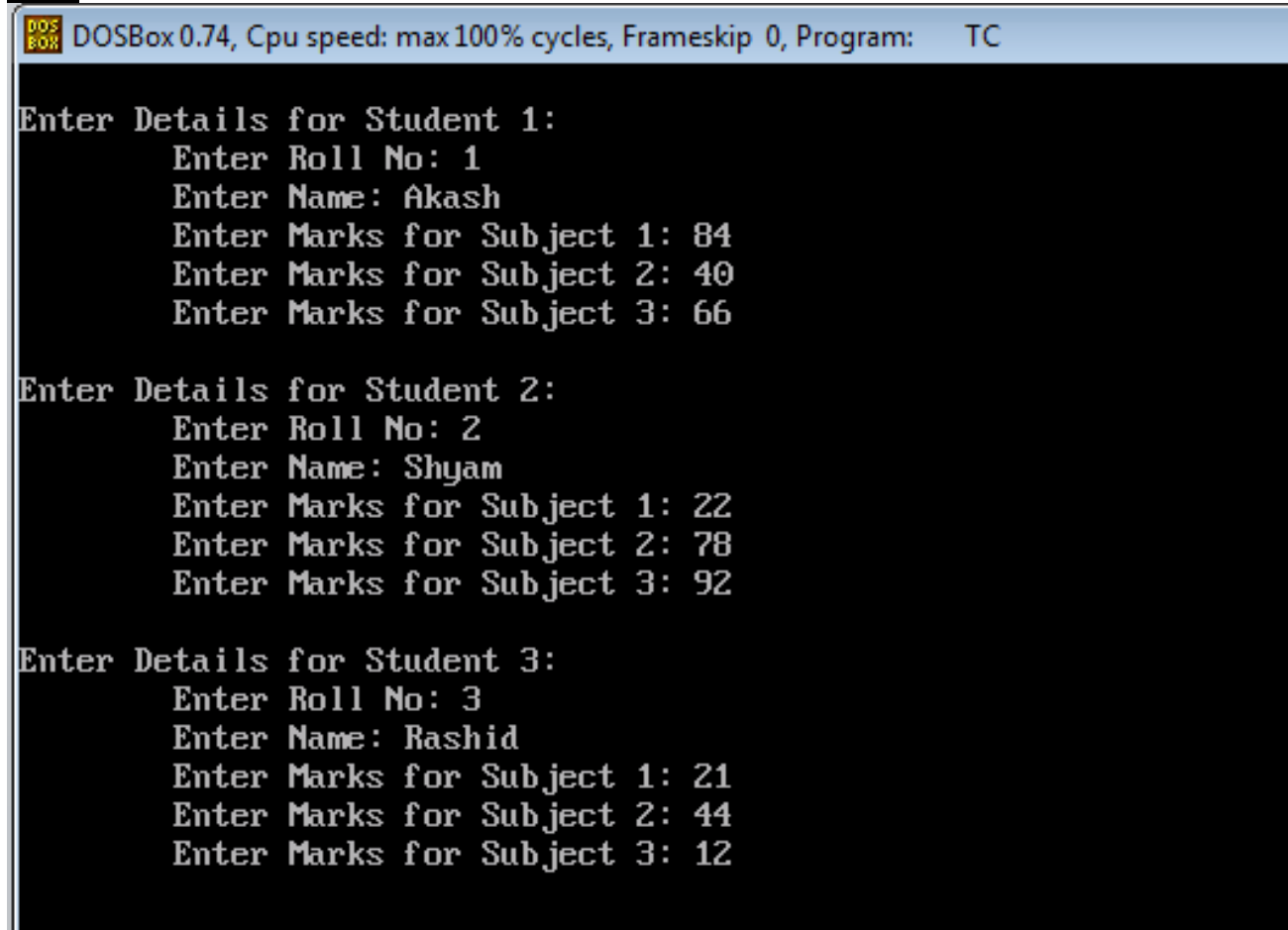
4. An array stores details of 10 students (rollno, name, marks in three subject). Write a program to create such an array and print out a list of students who have failed in more than one subject.

Sol:

```
#include<iostream.h>
#include<conio.h>
struct student
{
    int roll_no;
    char name[10];
    int marks[3];
}s[10];
void main()
{
    int i,j;
    clrscr();
    for(i=0;i<10;i++)
    {
        cout<<"\nEnter Details for Student "<<i+1<<": \n";
        cout<<"\tEnter Roll No: ";
        cin>>s[i].roll_no;
        cout<<"\tEnter Name: ";
        cin>>s[i].name;
        for(j=0;j<3;j++)
        {
            cout<<"\tEnter Marks for Subject "<<j+1<<": ";
            cin>>s[i].marks[j];
        }
    }
    cout<<"\n\nCalculating Results...";
    cout<<"\nStudents Who Have Failed In More Than One Subject Are:\n";
    cout<<"\n\tROLL NO\tNAME";
    for(i=0;i<10;i++)
    {
        if((s[i].marks[0] < 40 && s[i].marks[1] < 40) || (s[i].marks[0] < 40
        && s[i].marks[2] < 40) || (s[i].marks[1] < 40 && s[i].marks[2] < 40))
            cout<<"\n\t"<<s[i].roll_no<<"\t"<<s[i].name;
```

```
}  
    getch();  
}
```

O/p:



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```
Enter Details for Student 1:  
    Enter Roll No: 1  
    Enter Name: Akash  
    Enter Marks for Subject 1: 84  
    Enter Marks for Subject 2: 40  
    Enter Marks for Subject 3: 66  
  
Enter Details for Student 2:  
    Enter Roll No: 2  
    Enter Name: Shyam  
    Enter Marks for Subject 1: 22  
    Enter Marks for Subject 2: 78  
    Enter Marks for Subject 3: 92  
  
Enter Details for Student 3:  
    Enter Roll No: 3  
    Enter Name: Rashid  
    Enter Marks for Subject 1: 21  
    Enter Marks for Subject 2: 44  
    Enter Marks for Subject 3: 12
```

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Enter Marks for Subject 3: 12

Enter Details for Student 4:

Enter Roll No: 4

Enter Name: Ashish

Enter Marks for Subject 1: 11

Enter Marks for Subject 2: 22

Enter Marks for Subject 3: 56

Enter Details for Student 5:

Enter Roll No: 5

Enter Name: Bhushan

Enter Marks for Subject 1: 10

Enter Marks for Subject 2: 12

Enter Marks for Subject 3: 39

Enter Details for Student 6:

Enter Roll No: 6

Enter Name: Jayesh

Enter Marks for Subject 1: 55

Enter Marks for Subject 2: 65

Enter Marks for Subject 3: 78

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Enter Marks for Subject 3: 78

Enter Details for Student 7:

Enter Roll No: 7

Enter Name: Aishwarya

Enter Marks for Subject 1: 77

Enter Marks for Subject 2: 78

Enter Marks for Subject 3: 82

Enter Details for Student 8:

Enter Roll No: 8

Enter Name: Snehal

Enter Marks for Subject 1: 32

Enter Marks for Subject 2: 66

Enter Marks for Subject 3: 31

Enter Details for Student 9:

Enter Roll No: 9

Enter Name: Bhagyashri

Enter Marks for Subject 1: 77

Enter Marks for Subject 2: 78

Enter Marks for Subject 3: 90

Enter Details for Student 10:

Enter Roll No: 10

Enter Name: Prajakta

Enter Marks for Subject 1: 21

Enter Marks for Subject 2: 22

Enter Marks for Subject 3: 34

Calculating Results...

Students Who Have Failed In More Than One Subject Are:

ROLL NO	NAME
3	Rashid
4	Ashish
5	Bhushan
8	Snehal
10	Prajakta