

ADVANCED DATA STRUCTURE ASSIGNMENT DAY 3

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Pre -Assignment: (All programs to be committed via git only)

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

Program :~

```
#include <iostream>
using namespace std;
int main ()
{
    int min,max;
    const int Numb = 5;
    int a[Numb];
    for(int i=0;i<5;i++)
    {
        cout<< "\nEnter the Values : ";
        cin>> a[i];
    }
    min=a[0];
    max=a[0];
    for(int i=1;i<5;i++)
    {
        if(min>a[i])
        {
            min=a[i];
        }
        else if(max<a[i])
        {
            max = a[i];
        }
    }
    cout<<"Largest Number is : "<< max << endl;
    cout<<"Smallest Number is : "<< min << endl;
    return 0;
}
```

Output :~**Result...**

compiled and executed in 14.242 sec(s)

```
Enter the Values : 10
Enter the Values : 20
Enter the Values : 15
Enter the Values : 35
Enter the Values : 09

Largest Number is : 35
Smallest Number is : 9
```

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.

PROGRAM :~

```
#include<stdio.h>
#include<iostream>
#include<string.h>
#include<cstdlib>
using namespace std;
int main()
{
    char str[100],temp,ch,a,z;
    char str1[100], str2[100],s[50];
    int length,i=0,j=0;
    cout<<"Enter any string : ";
    gets(str);
    length = strlen(str);
    cout<<"***** String Length ***** ";
    cout<<"\nString Length: "<<length;

    j=strlen(str)-1;
    while(i<j)
    {
        temp=str[i];
        str[i]=str[j];
        str[j]=temp;
        i++;
        j--;
    }
}
```

```
cout<<"\n***** Reverse String ***** ";
cout<<"\nReverse String is: "<<str;

    cout<<"\nEnter First String : ";
    gets(str1);
    cout<<"\nEnter Second String : ";
    gets(str2);

    if(strcmp(str1, str2)==0)
    {
        cout<<"\nBoth the Strings Are Equal";
    }
    else
    {
        cout<<"\nBoth the Strings Are Not Equal";
    }

    strcat(str1, str2);
    cout<<"\n***** Concatenation of String ***** ";
    cout<<"\nString After Concatenation is : "<<str1;

    cout<<"\nEnter the String : ";
    cin>>str;
    for(i=0;i<=strlen(str);i++)
    {
        if(str[i]>=97 && str[i]<=122)
        {
            str[i]=str[i]-32;
        }
    }
    cout<<"\n***** Lowercase to Uppercase String ***** ";
    cout<<"\nThe String in Uppercase = "<<str;

    return 0;
}
```

/* OUTPUT :~

```
Enter any string : ASHISH
***** String Length *****
String Length: 6
```

```
***** Reverse String *****
Reverse String is: HSIHSA
Enter First String : ashish
Enter Second String : DUSANE
Both the Strings Are Not Equal
```

```
***** Concatenation of String *****
String After Concatenation is : ashishDUSANE

***** Lowercase to Uppercase String *****
Enter the String : ashish
The String in Uppercase = ASHISH
*/
```

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

```
PROGRAM :~
#include<iostream>
using namespace std;
void read_matrix(int a[10][10],int r,int c)
{
    int i,j;
    for(i=1;i<=r;i++)
    {
        for(j=1;j<=c;j++)
        {
            cout<<"\n Enter matrix elements :\t";
            cin>>a[i][j];
        }
    }
}
void display_data(int a[10][10],int r,int c)
{
    int i,j;
    for(i=1;i<=r;i++)
    {
        for(j=1;j<=c;j++)
        {
            cout<< a[i][j];
        }
        cout<<"\n";
    }
}
int main()
{
    int a[10][10],r,c,ch;
```

```

    cout<<"\n Enter the Number of Rows : \t";
    cin>>r;
    cout<<"\n Enter the Number of Columns : \t";
    cin>>c;
    do
    {
        cout<<"\n 1. INPUT MATRIX";
        cout<<"\n 2. DISPLAY MATRIX ";
        cout<<"\n 3. EXIT";
        cout<<"\n ENTER YOUR CHOICE : \t";
        cin>>ch;
        switch(ch)
        {
            case 1:  read_matrix(a,r,c);
                     break;
            case 2:  display_data(a,r,c);
                     break;
        }
    }while(ch<3);
    return 0;
}

```

OUTPUT :~

Result...

compiled and executed in 26.552 sec(s)

```

Enter the Number of Rows :    3

Enter the Number of Columns : 3

1. INPUT MATRIX
2. DISPLAY MATRIX
3. EXIT
ENTER YOUR CHOICE :    1

Enter matrix elements :    9
Enter matrix elements :    6
Enter matrix elements :    3
Enter matrix elements :    8
Enter matrix elements :    5
Enter matrix elements :    2
Enter matrix elements :    7
Enter matrix elements :    4
Enter matrix elements :    1

1. INPUT MATRIX
2. DISPLAY MATRIX
3. EXIT
ENTER YOUR CHOICE :    2
9 6 3
8 5 2
7 4 1

1. INPUT MATRIX
2. DISPLAY MATRIX
3. EXIT
ENTER YOUR CHOICE :    3|

```

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.

PROGRAM : ~

```
#include<iostream>
using namespace std;
struct stud
{
    int roll;
    char nm[50];
    float m1, m2, m3;
};
```

```
typedef stud S;
```

```
int main()
```

```
{
    S student[10];

    for(int i=0 ; i < 10 ; i++)
    {
        cout << "\n Enter Roll no : \t";
        cin >> student[i].roll;

        cout << "\n Enter Name : \t";
        cin>>student[i].nm;

        cout << "\n Enter marks of three subjects : \t";
        cin >> student[i].m1 >> student[i].m2 >> student[i].m3 ;

    }
    cout<< "\n STUDENTS FAILED IN MORE THAN 1 SUBJECT \n ";
    for(int i=0 ; i < 10 ; i++)
    {
        if(( student[i].m1< 40 && student[i].m2 < 40) || (student[i].m2 < 40
&& student[i].m3 < 40) ||
        ( student[i].m1 < 40 && student[i].m3 < 40))
            cout << student[i].roll << "\t" << student[i].nm << "\n";
    }
}
```

/*OUTPUT :-

Enter Roll no : 01

Enter Name : Ashish

Enter marks of three subjects : 65

75

65

Enter Roll no : 02

Enter Name : Shyam

Enter marks of three subjects : 39

38

65

Enter Roll no : 03

Enter Name : Rashid

Enter marks of three subjects : 38

35

69

Enter Roll no : 04

Enter Name : Bhushan

Enter marks of three subjects : 65

41

39

STUDENTS FAILED IN MORE THAN 1 SUBJECT

2 Shyam

3 Rashid