**Assignment on C++ Structure**

**-------------------------------------------------------------------------------**

**1.**Give the output of the following program. Assuming all the desired header files are already included, which are required to run the code.

struct Pixel  
{  
            int C, R;  
};

void Display(Pixel P)  
{  
            cout << "Col "<< P.C << " Row " << P.R << endl;  
}

int main()  
{            Pixel X = {40,50}, Y, Z;  
            Z = X;  
            X.C += 10;  
            Y = Z;  
            Y.C += 10;  
            Y.R += 20;  
            Z.C -= 15;  
            Display(X);  
            Display(Y);  
            Display(Z);

            return 0;  
}

Give the answer.

The OutPut will be:

Col50Row50

Col50Row70

Col25Row50

**2.**Find the output of the following program. Assuming all the desired header files are already included, which are required to run the code.

struct Play  
{  
            int score, bonus;  
};

void calculate(Play &P, int N = 10)  
{  
            P.score++;  
            P.bonus += N;  
}

int main()  
{  
            Play PL = {10, 15};  
            calculate(PL, 5);  
            cout << PL.score << ":" << PL.bonus << endl;  
            calculate(PL);  
            cout << PL.score << ":" << PL.bonus << endl;  
            calculate(PL, 15);  
            cout << PL.score << ":" << PL.bonus << endl;

            return 0;  
}

Give the answer.

The OutPut will be

11:20

12:30

13:45

**3.**Find the output of the following program. Assuming all the desired header files are already included, which are required to run the code.

struct MyBox  
{  
            int length, breadth, height;  
};

void dimension (MyBox M)  
{  
            cout << M.length << "x" << M.breadth << "x";  
            cout << M.height << endl;  
}

int main ()  
{  
            MyBox B1 = {10, 15, 5}, B2, B3;  
            ++B1.height;  
            dimension(B1);  
            B3 = B1;  
            ++B3.length;  
            B3.breadth++;  
            dimension(B3);  
            B2 = B3;  
            B2.height += 5;  
            B2.length--;  
            dimension(B2);

           return 0;  
}

Give the answer.

The OutPut will be

10x15x6

11x16x6

10x16x11

**4.**Rewrite the following program after removing the syntactical errors (if any). Underline each correction.  
  
struct Pixels  
{  
            int color, style;  
}

void showPoint(Pixels P)  
{  
            cout << P.color, P.style << endl;  
}

int main()  
{  
            Pixels Point1 = (5, 3);  
            showPoint(Point1);  
            Pixels Point2 = Point1;  
            color.Point1 += 2;  
            showPoint(Point2);

            return 0;  
}

Give the answer.

It will give error

**5.**Declare a structure to represent a complex number (a number having a real part and imaginary part). Write C++ functions to add, subtract, multiply and divide two complex numbers.

#include<iostream>

using namespace std;

struct ComplexNumber{

private:

    float real;

    float img;

public:

    void acceptData();

    void addData();

    void subData();

    void mulData();

    void divData();

} s1,s2;

void ComplexNumber :: acceptData(){

    cout<<"Enter first real number : ";

    cin>>s1.real;

    cout<<"Enter first imaginary number : ";

    cin>>s1.img;

     cout<<"Enter second real number : ";

    cin>>s2.real;

    cout<<"Enter second imaginary number : ";

    cin>>s2.img;

}

void ComplexNumber :: addData(){

    float a,b;

    a = (s1.real) + (s2.real);

    b = (s1.img) + (s2.img);

    cout<<"Addition will be : "<<a<<" + "<<b<<"i"<<endl;

}

void ComplexNumber :: subData(){

    float a,b;

    a = (s1.real) - (s2.real);

    b = (s1.img) - (s2.img);

    cout<<"Subtraction will be : "<<a<<" + "<<b<<"i"<<endl;

}

void ComplexNumber :: mulData(){

    float a,b;

    a = ((s1.real)\*(s2.real))-((s1.img)\*(s2.img));

    b = ((s1.real)\*(s2.img))+((s2.real)\*(s1.img));

    cout<<"Multiplication will be : "<<a<<" + "<<b<<"i"<<endl;

}

void ComplexNumber :: divData(){

    float a,b;

    a = (((s1.real)\*(s2.real))+((s1.img)\*(s2.img)))/((s2.real,2)+(s2.img,2));

    b = (((s2.real)\*(s1.img))-((s1.real)\*(s2.img)))/((s2.real,2)+(s2.img,2));

    cout<<"Division will be : "<<a<<" + "<<b<<"i"<<endl;

}

int main(){

    ComplexNumber cn;

    cn.acceptData();

    cn.addData();

    cn.subData();

    cn.mulData();

    cn.divData();

    return 0;

}

OUTPUT:

PS D:\All\_Workspace\Assignments> ./assignmentsQ5

Enter first real number : 1

Enter first imaginary number : 2

Enter second real number : 3

Enter second imaginary number : 4

Addition will be : 4 + 6i

Subtraction will be : -2 + -2i

Multiplication will be : -5 + 10i

Division will be : 2.75 + 0.5i

**6.**An array stores details of 25 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.

#include<iostream>

#include<string>

using namespace std;

struct Student{

    int rollNo;

    string name;

    int m1, m2, m3;

};

typedef Student s;

int main(){

    s students[25];

    for(int i=0; i<25; i++){

        cout<<"Enter student roll number : ";

        cin>>students[i].rollNo;

        cout<<"Enter student's name : ";

        cin>>(students[i].name);

        cout<<"Enter the three subjects marks : ";

        cin>>students[i].m1>>students[i].m2>>students[i].m3;

    }

    cout<<"Students Failed In More Than 1 Subject : ";

    for(int i=0; i<25; i++){

        if((students[i].m1 < 40 && students[i].m2 < 40) || (students[i].m2 < 40 && students[i].m3 < 40) || (students[i].m1 < 40 && students[i].m3 < 40)){

            cout<<students[i].rollNo<<" "<<students[i].name;

        }

    }

    return 0;

}

7. What should be output of below program? program is compiled on g++ compiler.

#include<iostream>

using namespace std;

struct student{

char a; char b; int c;

};

int main()

{

cout<<sizeof(student);

return 0;

}

Options:

(A) 4  
(B) 6  
(C) 8  
(D) 12

Give the Answer: 6.

8. Which of the following statements assigns a value to the hourlyWage member of employee[2}?

Options:

(A) employee[2]->hourlyWage = 50.00;  
(B) employee2.hourlyWage = 7.50;  
(C) hourlyWage[2].employee = 29.75;  
(D) employee[2].hourlyWage = 75.00;

Give the answer: D

9. Which of the following statements outputs the value of the gpa member of element 1 of the student array?

Options:

(A) cout<<student1.gpa;  
(B) cout<<firstStudent.gpa;  
(C) cout<<student[1].gpa;  
(D) cout<<student1 ->gpa;

Give the answer: C

10. Which of the following statements outputs the value of the gpa member of element 1 of the student array?

Options:

(A) cout<<student1.gpa;  
(B) cout<<firstStudent.gpa;  
(C) cout<<student[1].gpa;  
(D) cout<<student1 ->gpa;

Give the answer: C