**Assignment on C++ Structure**

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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.

ANSWER:

Col 50 Row 50

Col 50 Row 70

Col 25 Row 50

DRY RUN:

|  |  |
| --- | --- |
| 40,50 | 50,50 |

X = {40, 50}

|  |  |  |
| --- | --- | --- |
| 40,50 | 50,50 | 50,70 |

Y

|  |  |
| --- | --- |
| 40,50 | 25,50 |

Z

Z = X; //x will return its value to z

X.C += 10; //X.C=X.C+10;

Y = Z; //Z will return value to Y

Y.C += 10; //Y.C=Y.C+10

Y.R += 20; //Y.R=Y.R+20

Z.C -= 15; //Z.C=Z.C-15

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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.

ANSWER:

11:20

12:30

13:45

DRY RUN:

|  |
| --- |
| 10,15 |

//Initial value of PL  
  
Play PL = {10, 15};

calculate(PL, 5); 🡺 P.Score++; = 11

P.Bonus += N; = 20

|  |
| --- |
| 11,20 |

//Value of calculate{PL, 5}

calculate(PL); 🡺 P.Score++; = 12

P.Bonus += N; = 30

|  |
| --- |
| 12, 30 |

//Value of calculate{PL}

calculate(PL, 15); 🡺 P.Score++; = 13

P.Bonus += N; = 45

|  |
| --- |
| 13, 45 |

//Value of calculate{PL, 15}

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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.

ANSWER: DRY RUN:

MyBox B1 = {10, 15, 5}, B2, B3;

10x15x6 ++B1.height; //height of B1 will increment by 1 🡺 {10, 15, 6}

11x16x6 B3 = B1; // B1 return value to B3

++B3.length; // length of B3 will increment by 1

B3.breadth++; // breadth of B3 will increment by 1 🡺 {11, 16, 6}

10x16x11 B2 = B3; //B3 returns value to B2

B2.height += 5; // height of B2 will increment by 5

B2.length--; // length of B2 will decrement by 1 🡺 {10, 16, 11}

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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.

#include<iostream>

using namespace std;

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;

Point1.color += 2;

showPoint(Point2);

return 0;

}

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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>

#include<cmath>

using namespace std;

struct Complex{

    private:

    int real;

    int imag;

    public:

    void Accept();

    void addComplex();

    void subComplex();

    void mulComplex();

    void divComplex();

}C1,C2;

void Complex::Accept(){

    cout<<"Enter first Complex Number: "<<endl;

    cin>>C1.real>>C1.imag;

    cout<<"Enter second Complex Number: "<<endl;

    cin>>C1.real>>C1.imag;

    }

void Complex::addComplex(){

    int a, b;

    a=(C1.real)+(C1.real);

    b=(C1.imag)+(C1.imag);

    cout<<"The Addition of Two Complex Number: "<<a<<"+"<<b<<"i"<<endl;

}

void Complex::subComplex(){

    int a, b;

    a=(C1.real)-(C1.real);

    b=(C1.imag)-(C1.imag);

    cout<<"The Subtraction of Two Complex Number: "<<a<<"+"<<b<<"i"<<endl;

}

void Complex::mulComplex(){

    int a, b;

    a=(C1.real)\*(C1.real);

    b=(C1.imag)\*(C1.imag);

    cout<<"The Multiplication of Two Complex Number: "<<a<<"+"<<b<<"i"<<endl;

}

void Complex::divComplex(){

    int a, b;

    a=(C1.real)/(C1.real);

    b=(C1.imag)/(C1.imag);

    cout<<"The Division of Two Complex Number: "<<a<<"+"<<b<<"i"<<endl;

}

int main(){

    Complex C3;

    C3.Accept();

    C3.addComplex();

    C3.subComplex();

    C3.mulComplex();

    C3.divComplex();

    return 0;

}

OUTPUT:

PS D:\All\_Workspace\CPP\_Workspace\chapter04> g++ assign.cpp -o assign.exe

PS D:\All\_Workspace\CPP\_Workspace\chapter04> ./assign

Enter first Complex Number:

10+20

Enter second Complex Number:

10+30

The Addition of Two Complex Number: 20+60i

The Subtraction of Two Complex Number: 0+0i

The Multiplication of Two Complex Number: 100+900i

The Division of Two Complex Number: 1+1i

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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.

/\*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 stdName;

    float Sci\_marks, Maths\_marks, English\_marks;

}S[25];

int main(){

    Student S[25];

    cout << "Enter student\'s Detail: "<<endl;

    for(int i=0; i<25; i++){

        cout<<"For roll number"<<endl;

        cin>>S[i].rollNo;

        cout<<"Enter name: ";

        cin>>S[i].stdName;

        cout<<"Enter marks: ";

        cin >>S[i].Sci\_marks>>S[i].Maths\_marks>>S[i].English\_marks;

    }

    cout<<"Displaying Information: "<<endl;

    for(int i=0; i<25; i++){

        cout<<"Roll number: "<<S[i].rollNo<<endl;

        cout<<"Name: "<< S[i].stdName <<endl;

        cout<<"Marks: "<<S[i].Sci\_marks<<"\t"<<S[i].Maths\_marks<<"\t"<<S[i].English\_marks<<endl;

        if((S[i].Sci\_marks<35)&&(S[i].Maths\_marks<35)||(S[i].English\_marks<35)&&(S[i].Maths\_marks<35)||(S[i].Sci\_marks<35)&&(S[i].English\_marks<35)){

            cout<<S[i].rollNo<<"\t"<<S[i].stdName<<"  is Failed in More than One Subject";

        }

        else{

            cout<<"you are pass"<<endl;

        }

    }

    return 0;

}

PS D:\All\_Workspace\CPP\_Workspace\chapter04> g++ assign2.cpp -o assig.exe

PS D:\All\_Workspace\CPP\_Workspace\chapter04> ./assig

Enter student's Detail:

For roll number

1

Enter name: Anushka

Enter marks: 89 98 100

For roll number

12

Enter name: Anwesha

Enter marks: 22 32 56

Displaying Information:

Roll number: 1

Name: Anushka

Marks: 89 98 100

you are pass

Roll number: 12

Name: Anwesha

Marks: 22 32 56

12 Anwesha is Failed in More than One Subject

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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: (C) 8

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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) employee[2].hourlyWage=75.00;

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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) cout<<student[1].gpa;

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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) cout<<student[1].gpa;

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