

C++ PROGRAM

MANUAL

BY,
MANJUNATH.R
USN: 1KS20CS054
BRANCH: CSE
VI SEM SEC 'A'

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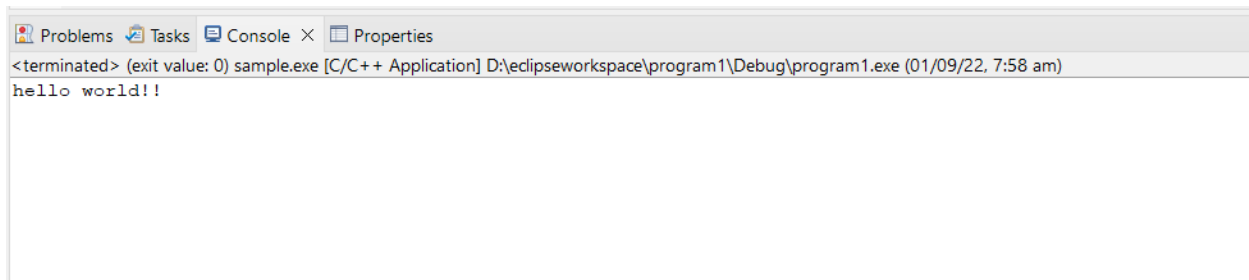
Module 1

1. Write a C++ program to print “Hello World” on Console window.

Sol:

```
#include<iostream>
using namespace std;
int main()
{
    cout<<"hello world!! \n";
}
```

Output:

A screenshot of a C++ IDE's console window. The window has tabs for 'Problems', 'Tasks', 'Console', and 'Properties'. The 'Console' tab is active, showing the output of a program. The text in the console is '<terminated> (exit value: 0) sample.exe [C/C++ Application] D:\eclipseworkspace\program1\Debug\program1.exe (01/09/22, 7:58 am)' followed by 'hello world!!' on the next line.

2. Write a C++ program to implement Simple Calculator.

Sol:

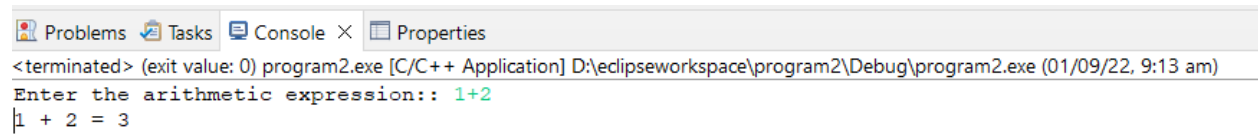
```
#include <iostream>
using namespace std;
int main()
{
    char op;
    float num1, num2;
    cout<<"Enter the arithmetic expression:: ";
    cin>>num1>>op>>num2;
    switch(op)
    {
        case '+':
            cout<<num1<<" + "<<num2<<" = " <<num1+num2;
            break;
        case '-':
            cout<<num1<<" - "<<num2<<" = " <<num1-num2;
            break;
        case '*':
            cout<<num1<<" * "<<num2<<" = " <<num1*num2;
            break;
        case '/':
            if(num2==0)
                cout<<"Divide by zero error!!";
            else
                cout<<num1<<" / "<<num2<<" = " <<num1/num2;
```

```

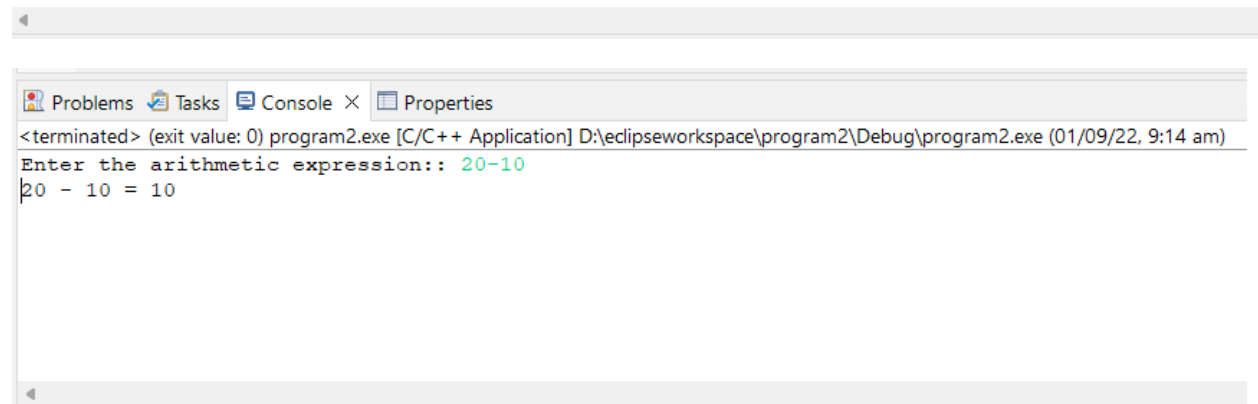
        break;
    default:
        cout<<"Invalid Operator!!";
        break;
    }
    return 0;
}

```

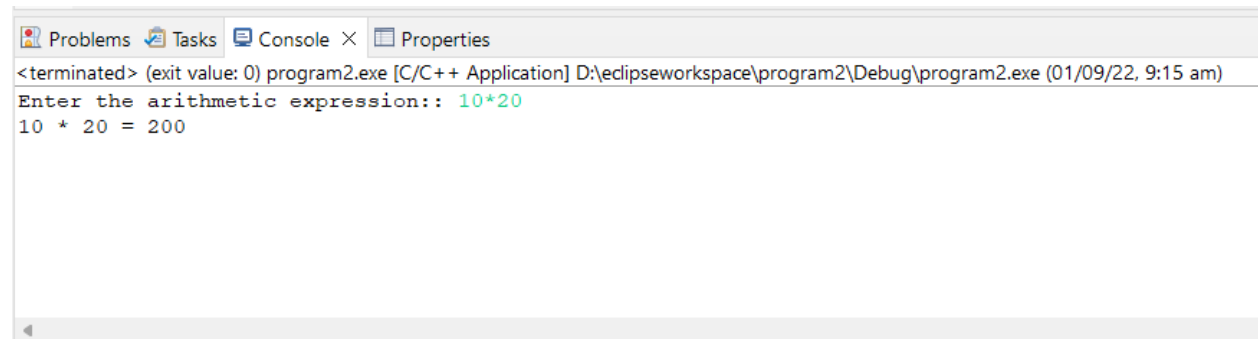
Output:



The screenshot shows the Eclipse IDE's console window. The title bar includes 'Problems', 'Tasks', 'Console', and 'Properties'. The console text reads: '<terminated> (exit value: 0) program2.exe [C/C++ Application] D:\eclipseworkspace\program2\Debug\program2.exe (01/09/22, 9:13 am)' followed by 'Enter the arithmetic expression:: 1+2' and '1 + 2 = 3'.



The screenshot shows the Eclipse IDE's console window. The title bar includes 'Problems', 'Tasks', 'Console', and 'Properties'. The console text reads: '<terminated> (exit value: 0) program2.exe [C/C++ Application] D:\eclipseworkspace\program2\Debug\program2.exe (01/09/22, 9:14 am)' followed by 'Enter the arithmetic expression:: 20-10' and '20 - 10 = 10'.



The screenshot shows the Eclipse IDE's console window. The title bar includes 'Problems', 'Tasks', 'Console', and 'Properties'. The console text reads: '<terminated> (exit value: 0) program2.exe [C/C++ Application] D:\eclipseworkspace\program2\Debug\program2.exe (01/09/22, 9:15 am)' followed by 'Enter the arithmetic expression:: 10*20' and '10 * 20 = 200'.

```
Problems Tasks Console X Properties
<terminated> (exit value: 0) program2.exe [C/C++ Application] D:\eclipseworkspace\program2\Debug\program2.exe (01/09/22, 9:15 am)
Enter the arithmetic expression:: 2/0
Divide by zero error!!
```

```
Problems Tasks Console X Properties
<terminated> (exit value: 0) program2.exe [C/C++ Application] D:\eclipseworkspace\program2\Debug\program2.exe (01/09/22, 9:15 am)
Enter the arithmetic expression:: 10/2
10 / 2 = 5
```

```
Problems Tasks Console X Properties
<terminated> (exit value: 0) program2.exe [C/C++ Application] D:\eclipseworkspace\program2\Debug\program2.exe (01/09/22, 9:16 am)
Enter the arithmetic expression:: 2@5
Invalid Operator!!
```

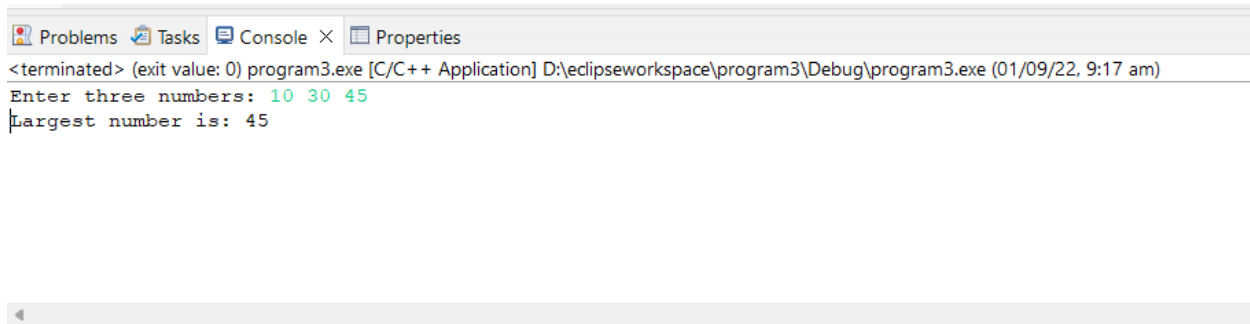
3. Write a C++ program to find biggest of three numbers.

Sol:

```
#include<iostream>
using namespace std;

int main()
{
    float a,b,c;
    cout<<"Enter three numbers: ";
    cin>>a>> b>>c;
    if((a >= b) && (a >= c))
        cout<<"Largest number is: "<<a;
    else if ((b>=a) && (b>=c))
        cout<<"Largest number is: "<<b;
    else
        cout<<"Largest number is: "<<c;
    return 0;
}
```

Output:



```
<terminated> (exit value: 0) program3.exe [C/C++ Application] D:\eclipseworkspace\program3\Debug\program3.exe (01/09/22, 9:17 am)
Enter three numbers: 10 30 45
Largest number is: 45
```

4. Write a C++ program to find sum of 'n' natural numbers using following looping statements.

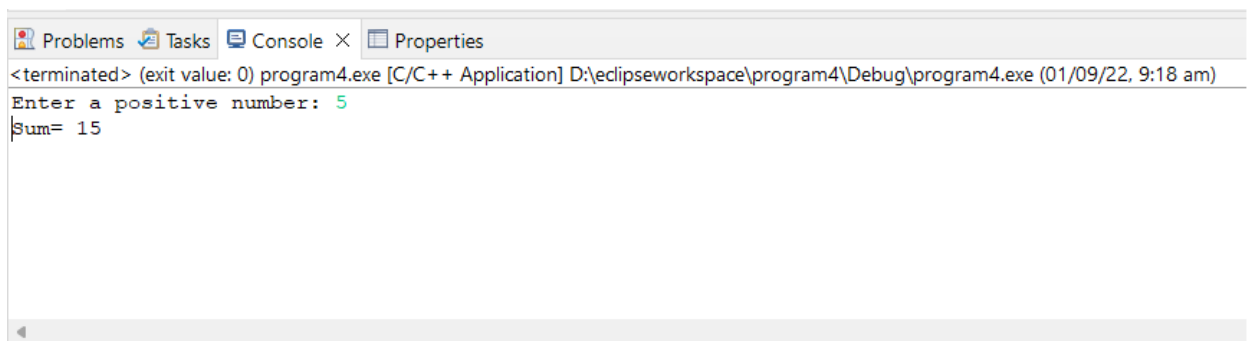
Sol:

➤ while loop:

```
#include <iostream>
using namespace std;

int main()
{
    int n,i,sum=0;
    cout<<"Enter a positive number: ";
    cin>>n;
    while(i<=n)
    {
        sum=sum+i;
        i++;
    }
    cout<<"Sum= "<<sum;
    return 0;
}
```

Output:



```
<terminated> (exit value: 0) program4.exe [C/C++ Application] D:\eclipseworkspace\program4\Debug\program4.exe (01/09/22, 9:18 am)
Enter a positive number: 5
Sum= 15
```

➤ do while loop:

```
#include <iostream>
using namespace std;

int main()
{
```

```

    int n,i,sum=0;
    cout<<"Enter a positive number: ";
    cin>>n;
    do{
        sum=sum+i;
        i++;
    }while(i<=n);
    cout<<"Sum= "<<sum;
    return 0;
}

```

Output:

```

<terminated> (exit value: 0) program4.exe [C/C++ Application] D:\eclipseworkspace\program4\Debug\program4.exe (01/09/22, 9:18 am)
Enter a positive number: 5
Sum= 15

```

➤ for loop:

```

#include <iostream>
using namespace std;

int main()
{
    int n,i,sum=0;
    cout<<"Enter a positive number: ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        sum=sum+i;
    }
    cout<<"Sum= "<<sum;
    return 0;
}

```

Output:

```

<terminated> (exit value: 0) program4.exe [C/C++ Application] D:\eclipseworkspace\program4\Debug\program4.exe (01/09/22, 9:18 am)
Enter a positive number: 5
Sum= 15

```

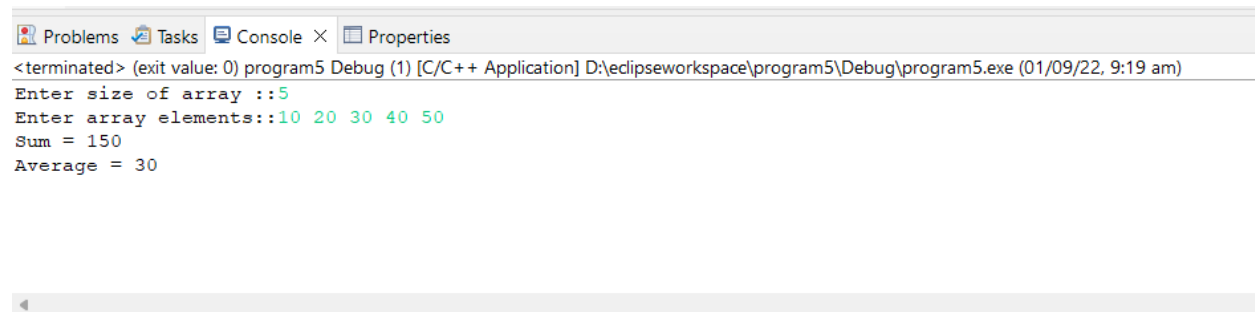
5. Write a C++ program to find sum and mean of 'n' array elements.

Sol:

```
#include <iostream>
using namespace std;

int main()
{
    int a[100], n, sum=0;
    float avg;
    cout << "Enter size of array ::";
    cin >> n;
    cout << "Enter array elements ::";
    for(int i = 0; i < n; ++i)
    {
        cin >> a[i];
        sum = sum + a[i];
    }
    cout << "Sum = " << sum << endl;
    avg = sum / n;
    cout << "Average = " << avg;
    return 0;
}
```

Output:



```
Problems Tasks Console X Properties
<terminated> (exit value: 0) program5 Debug (1) [C/C++ Application] D:\eclipseworkspace\program5\Debug\program5.exe (01/09/22, 9:19 am)
Enter size of array ::5
Enter array elements ::10 20 30 40 50
Sum = 150
Average = 30
```

6. Write a C++ program to find biggest element in two dimensional arrays.

Sol:

```
#include <iostream>
using namespace std;

int main()
{
    int m, n, a[10][10], i, j, high;
    cout << "Enter no. of rows and columns:\n";
    cin >> m >> n;
    cout << "Enter matrix:\n";
    for(i=0; i<m; ++i)
    {
        for(j=0; j<n; ++j)
            cin >> a[i][j];
    }
    for(i=0; i<m; ++i)
    {
        for(j=0; j<n; ++j)
```



```

        {
            if(a[i][j]>high)
                high=a[i][j];
        }
    }
    cout<<"biggest Element is: "<<high;
    return 0;
}

```

Output:

```

Problems Tasks Console × Properties
<terminated> (exit value: 0) program6 Debug (1) [C/C++ Application] D:\eclipseworkspace\program6\Debug\program6.exe (01/09/22, 9:20 am)
Enter no. of rows and columns:
2 2
Enter matrix:
10 20
30 40
biggest Element is: 40

```

7. Write a C++ program to find the areas (Ex: Circle, Triangle, Rectangle etc)

Sol:

```

#include<iostream>
using namespace std;

int main()
{
    float a,b;
    int ch;
    cout<<" ::AREA OF PLANES:: \n"<<endl;
    while(1)
    {
        cout<<"calculate Area of: \n";
        cout<<"1.CIRCLE \n2:TRIANGLE \n3:RECTANGLE \n ";
        cout<<"\n Enter your choice:: ";
        cin>>ch;
        switch(ch)
        {
            case 1: cout<< "Enter radius of CIRCLE::";
                    cin>>a;
                    cout<<"Area of the CIRCLE = "<<3.14*a*a<<endl;
                    break;
            case 2: cout<<"Enter base and height of TRIANGLE::"<<endl;
                    cin>>a>>b;
                    cout<<"Area of the TRIANGLE = "<<0.5*a*b<<endl;
                    break;
            case 3: cout<<"Enter length and breadth of RECTANLE::"<<endl;
                    cin>>a>>b;
                    cout<<"Area of the RECTANGLE = "<<a*b;
                    break;
            default:exit(0);
                    cout<<"Invalid choice";
        }
    }
    return 0;
}

```

Output:

```
Problems Tasks Console × Properties
<terminated> (exit value: 0) program7 Debug [C/C++ Application] D:\edipseworkspace\program7\Debug\program7.exe (01/09/22, 9:23 am)
::AREA OF PLANES::

calculate Area of:
1.CIRCLE
2.TRIANGLE
3.RECTANGLE

Enter your choice:: 1
Enter radius of CIRCLE::10
Area of the CIRCLE = 314
calculate Area of:
1.CIRCLE
2.TRIANGLE
3.RECTANGLE

Enter your choice:: 2
Enter base and height of TRIANGLE::
10 20
Area of the TRIANGLE = 100
calculate Area of:
1.CIRCLE
2.TRIANGLE
3.RECTANGLE

Enter your choice:: 3
Enter length and breadth of RECTANLE::
10 20
Area of the RECTANGLE = 200
calculate Area of:
1.CIRCLE
2.TRIANGLE
3.RECTANGLE
```

8. Write a C++ program to implement reference variable (Refer Listing 1.16 in ppt)

Sol:

```
#include <iostream>
using namespace std;
int main()
{
    int a=10; // variable initialization
    int &b=a;
    int &c=a;
    cout<<"Value of a is :"<<a<<endl;
    cout<<"Value of b is :"<<b<<endl;
    cout<<"Value of c is :"<<c<<endl;
    return 0;
}
```

Output:

```
Problems Tasks Console X Properties
<terminated> (exit value: 0) program8 Debug (1) [C/C++ Application] D:\eclipseworkspace\program8\Debug\program8.exe (01/09/22, 9:24 am)
Value of a is :10
Value of b is :10
Value of c is :10
```

9. Write a C++ program to implement Function prototyping (Refer Listing 1.22 in ppt)

Sol:

```
#include<iostream>
using namespace std;
void mul(int,int);

int main()
{
    int a=10,b=20;
    mul(a,b);
    return 0;
}
void mul(int x,int y)
{
    cout<<(x*y);
}
```

Output:

```
Problems Tasks Console X Properties
<terminated> (exit value: 0) program9 Debug (1) [C/C++ Application] D:\eclipseworkspace\program9\Debug\program9.exe (01/09/22, 9:24 am)
200
```

10. Write a C++ program to implement Function overloading (Refer Listing 1.24 in ppt)

(In Examination you may get formula oriented programs to implement function overloading – Refer solution to previous year question papers.)

Sol:

Example 1:

```
#include<iostream>
using namespace std;
int add(int, int);
int add(int, int, int);

int add(int a, int b)
```

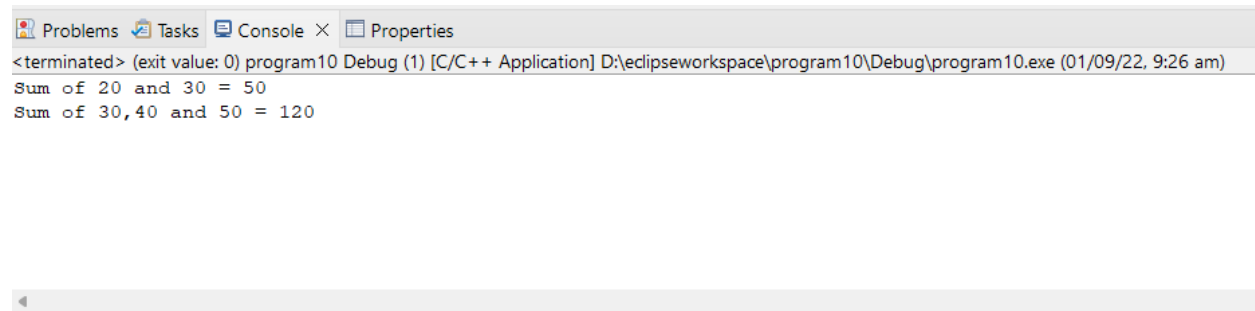
```

{
    return (a+b);
}
int add(int a, int b, int c)
{
    return (a+b+c);
}

int main()
{
    int sum,sum1;
    sum = add(20,30);
    sum1 = add(30,40,50);
    cout<<"Sum of 20 and 30 = "<<sum<<endl;
    cout<<"Sum of 30,40 and 50 = "<<sum1<<endl;
    return 0;
}

```

Output:



```

<terminated> (exit value: 0) program10 Debug (1) [C/C++ Application] D:\eclipseworkspace\program10\Debug\program10.exe (01/09/22, 9:26 am)
Sum of 20 and 30 = 50
Sum of 30,40 and 50 = 120

```

Example 2:

```

#include<iostream>
using namespace std;
void area(float r);
void area(float b, float h);
void area(int l, int b);

int main()
{
    int length,breadth;
    float base, height, radius;

    cout<<"Enter the radius of circle:: ";
    cin>>radius;
    area(radius);

    cout<<"\nEnter length of base and height of triangle:: ";
    cin>>base>>height;
    area(base, height);

    cout<<"\nEnter length and breadth of rectangle:: ";
    cin>>length>>breadth;
    area(length,breadth);
    return 0;
}

void area(float r)

```

```

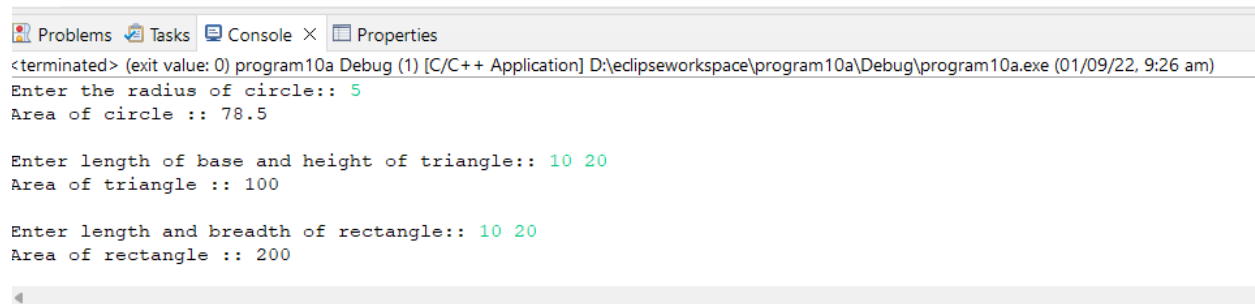
{
    cout<<"Area of circle :: "<<(3.14*r*r)<<endl;
}

void area(float b, float h)
{
    cout<<"Area of triangle :: "<<(0.5*b*h)<<endl;
}

void area(int l, int b)
{
    cout<<"Area of rectangle :: "<<(l*b)<<endl;
}

```

Output:



```

Problems Tasks Console × Properties
<terminated> (exit value: 0) program10a Debug (1) [C/C++ Application] D:\eclipseworkspace\program10a\Debug\program10a.exe (01/09/22, 9:26 am)
Enter the radius of circle:: 5
Area of circle :: 78.5

Enter length of base and height of triangle:: 10 20
Area of triangle :: 100

Enter length and breadth of rectangle:: 10 20
Area of rectangle :: 200

```

11. Write a C++ program to implement scope resolution operator (Refer Listing 2.7 in ppt)

Sol:

```

#include<iostream>
using namespace std;

class Distance
{
    int iFeet;
    float fInches;
public:
    void setFeet(int);
    int getFeet();
    void setInches(float);
    float getInches();
};

void Distance::setFeet(int x)
{
    iFeet=x;
}

int Distance::getFeet()
{
    return iFeet;
}

void Distance::setInches(float y)
{

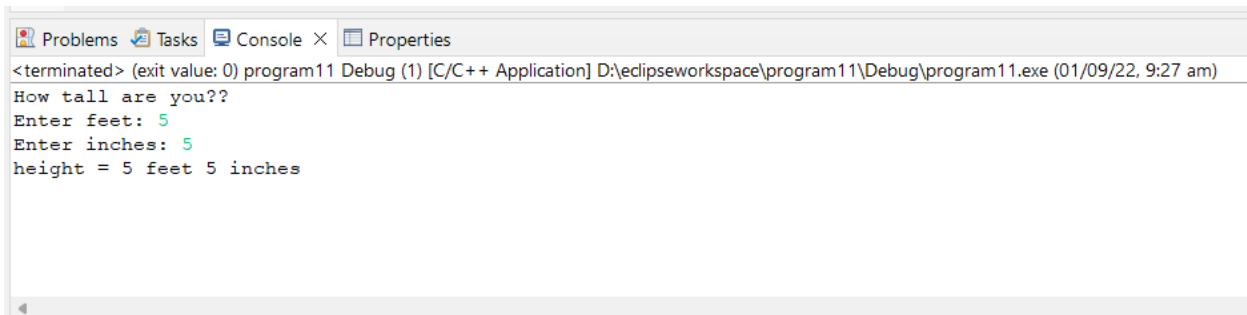
```

```

    fInches=y;
}
float Distance::getInches()
{
    return fInches;
}
int main()
{
    int feet;
    float inches;
    Distance d;
    cout<<"How tall are you?? "<<endl;
    cout<<"Enter feet: ";
    cin>>feet;
    cout<<"Enter inches: ";
    cin>>inches;
    d.setFeet(feet);
    d.setInches(inches);
    cout<<"height = "<<d.getFeet()<<" feet "<<d.getInches()<<" inches "<<endl;
    return 0;
}

```

Output:



The screenshot shows a C++ IDE with a console window. The console output is as follows:

```

<terminated> (exit value: 0) program11 Debug (1) [C/C++ Application] D:\eclipseworkspace\program11\Debug\program11.exe (01/09/22, 9:27 am)
How tall are you??
Enter feet: 5
Enter inches: 5
height = 5 feet 5 inches

```

12. Write a C++ program to implement this pointer (Refer Listing 2.9 in ppt)

Sol:

```

#include<iostream>
using namespace std;
class Distance
{
    int iFeet;
    float fInches;
public:
    void setFeet(int);
    int getFeet();
    void setInches(float);
    float getInches();
    Distance add(Distance); // returns object of class Distance
};
void Distance::setFeet(int x)
{
    iFeet=x;
}

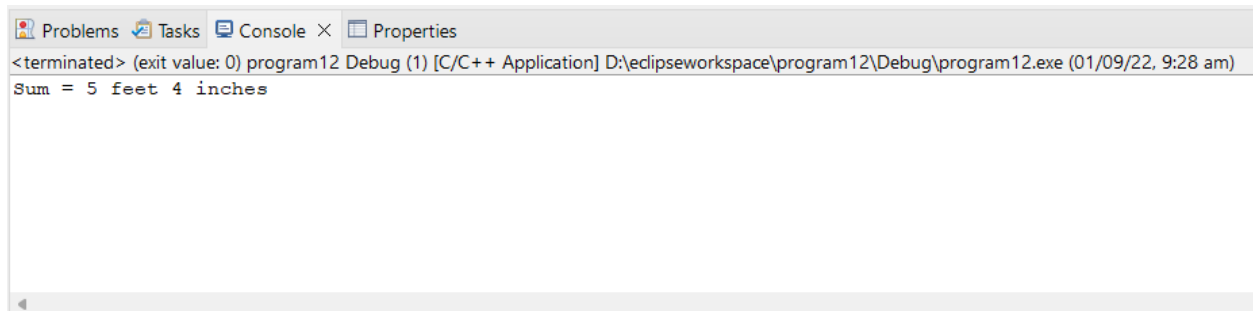
```

```

int Distance::getFeet()
{
return iFeet;
}
void Distance::setInches(float y)
{
fInches=y;
}
float Distance::getInches()
{
return fInches;
}
Distance Distance::add(Distance d)
{
Distance sum;
sum.iFeet = this->iFeet + d.iFeet;
sum.fInches = this->fInches + d.fInches;
return sum;
}
int main()
{
Distance d1, d2, d3;
d1.setFeet(2);
d1.setInches(2.5);
d2.setFeet(3);
d2.setInches(1.5);
d3=d1.add(d2);
cout<<"Sum = "<<d3.getFeet()<<" feet "<<d3.getInches()<<" inches ";
return 0;
}

```

Output:



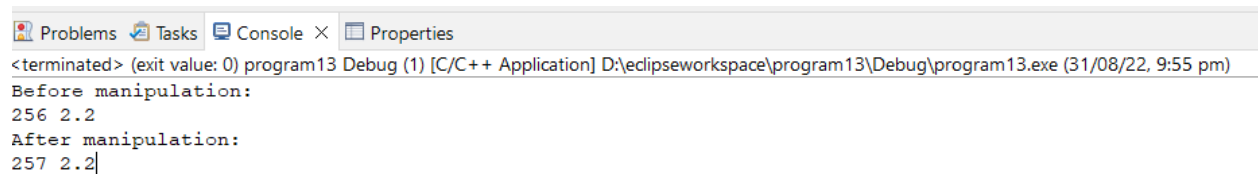
The screenshot shows a console window with a tab labeled 'Console'. The text in the console is:
 <terminated> (exit value: 0) program12 Debug (1) [C/C++ Application] D:\eclipseworkspace\program12\Debug\program12.exe (01/09/22, 9:28 am)
 Sum = 5 feet 4 inches
 The console window has a scrollbar on the right side.

13. Write a C++ program to implement Explicit Address Manipulation (Refer Listing 2.12 in ppt)

Sol:

```
#include<iostream>
using namespace std;
class Distance
{
    int iFeet;
    float fInches;
public:
    void setFeet(int);
    int getFeet();
    void setInches(float);
    float getInches();
};
void Distance::setFeet(int x)
{
    iFeet=x;
}
int Distance::getFeet()
{
    return iFeet;
}
void Distance::setInches(float y)
{
    fInches=y;
}
float Distance::getInches()
{
    return fInches;
}
int main()
{
    Distance d;
    d.setFeet(256);
    d.setInches(2.2);
    cout<<"Before manipulation:"<<endl;
    cout<<d.getFeet()<<" "<<d.getInches()<<endl;
    char * p = (char *)&d;
    *p=1; // the MSB of the value stored in iFeet is forcibly set to 1. Hence
    256 is now 257
    cout<<"After manipulation:"<<endl;
    cout<<d.getFeet()<<" "<<d.getInches()<<endl;
    return 0;
}
```

Output:



```
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program13\Debug\program13.exe (31/08/22, 9:55 pm)
Before manipulation:
256 2.2
After manipulation:
257 2.2
```


14. Write a C++ program to implement Arrow operator (Refer Listing 2.13 in ppt)

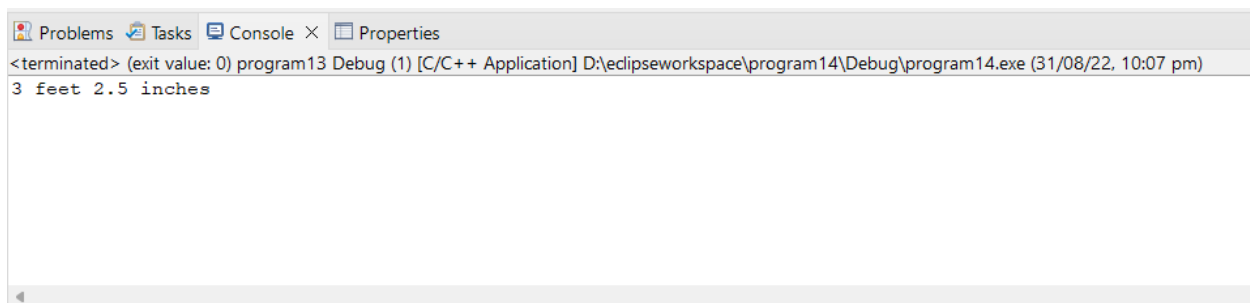
Sol:

```
#include<iostream>
using namespace std;
class Distance
{
    int iFeet;
    float fInches;
public:
    void setFeet(int);
    int getFeet();
    void setInches(float);
    float getInches();
};

void Distance::setFeet(int x)
{
    iFeet=x;
}
int Distance::getFeet()
{
    return iFeet;
}
void Distance::setInches(float y)
{
    fInches=y;
}
float Distance::getInches()
{
    return fInches;
}

int main()
{
    Distance d;
    Distance * dPtr;
    dPtr=&d;
    dPtr->setFeet(3);
    dPtr->setInches(2.5);
    cout<<dPtr->getFeet()<<" feet "<<dPtr->getInches()<<" inches ";
    return 0;
}
```

Output:



The screenshot shows a C++ IDE with a console window. The console output is: 3 feet 2.5 inches. The IDE interface includes tabs for Problems, Tasks, Console, and Properties. The console window title is: <terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program14\Debug\program14.exe (31/08/22, 10:07 pm).

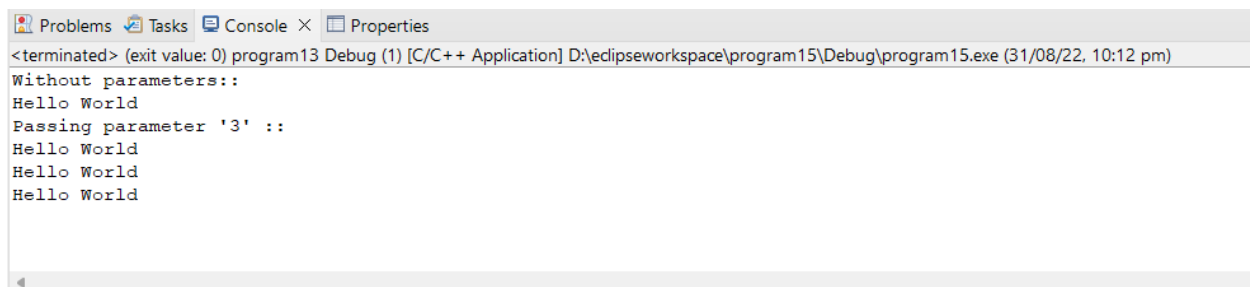
15. Write a C++ program to implement Default values for formal arguments of member functions (Refer Listing 2.17 in ppt)

Sol:

```
#include<iostream>
using namespace std;
class HelloWorld
{
public:
    void show(int=1); // default values of parameter is set to 1
};

void HelloWorld::show(int p)
{
    for(int i=1; i<=p; i++)
        cout<<"Hello World"<<endl;
}
int main()
{
    HelloWorld obj1;
    cout<<"Without parameters::"<<endl;
    obj1.show(); // no parameter is passed. Hence default value of 1 is
considered
    cout<<"Passing parameter '3' ::"<<endl;
    obj1.show(3); // the value passed overrides the default value. Hence p=3
    return 0;
}
```

Output:



```
Problems Tasks Console Properties
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program15\Debug\program15.exe (31/08/22, 10:12 pm)
Without parameters::
Hello World
Passing parameter '3' ::
Hello World
Hello World
Hello World
```

16. Write a C++ program to implement constant member functions (Refer Listing 2.20 in ppt)

Sol:

```
#include<iostream>
using namespace std;
class Demo
{
    int val;
public:
    Demo(int x)
    {
        val = x;
    }
    int getValue() const
```

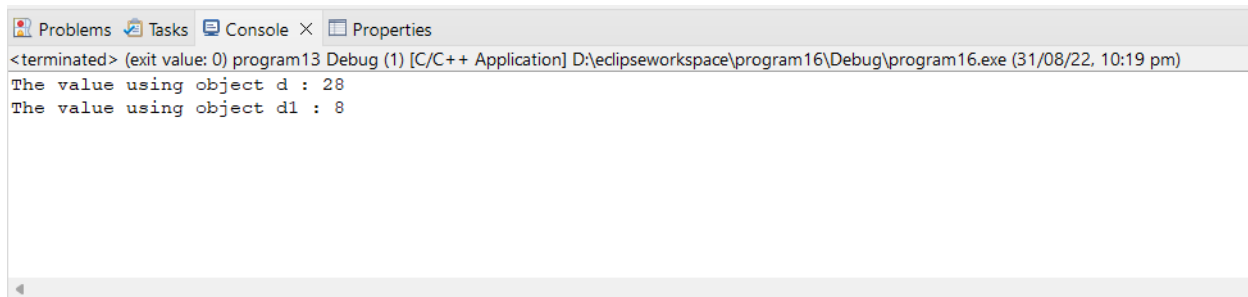
```

    {
        return val;
    }
};

int main()
{
    const Demo d(28);
    Demo d1(8);
    cout << "The value using object d : " << d.getValue();
    cout << "\nThe value using object d1 : " << d1.getValue();
    return 0;
}

```

Output:



The screenshot shows a C++ IDE with a console window. The console output is as follows:

```

<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program16\Debug\program16.exe (31/08/22, 10:19 pm)
The value using object d : 28
The value using object d1 : 8

```

17. Write a C++ program to implement mutable data members (Refer Listing 2.21 in ppt)

Sol:

```

#include <iostream>
using namespace std;
class Test
{
public:
    int a;
    mutable int b;
    Test(int x, int y)
    {
        a=x;
        b=y;
    }
    void seta(int x)
    {
        a = x;
    }
    void setb(int y)
    {
        b = y;
    }
    void disp()
    {
        cout<<endl<<"a: "<<a<<" b: "<<b<<endl;
    }
};

int main()
{

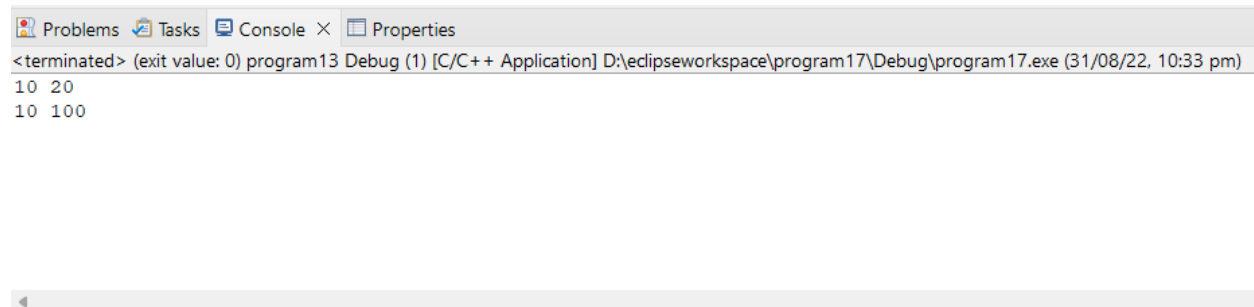
```

```

    const Test t(10,20);
    cout<<t.a<<" "<<t.b<<"\n";
    // t.a=30; //Error occurs because a can not be changed, because object is
    constant.
    //b still can be changed, because b is mutable.
    t.b=100;
    cout<<t.a<<" "<<t.b<<"\n";
    return 0;
}

```

Output:



The screenshot shows a C++ IDE with a console window. The console output is as follows:

```

10 20
10 100

```

The IDE interface includes tabs for Problems, Tasks, Console, and Properties. The console window title bar indicates the program is running in Debug mode.

18. Write a C++ program to implement Friend non-member functions (Refer Listing 2.22 in ppt)

Sol:

```

#include<iostream>
using namespace std;

class Square
{
    int length;
public:
    void getLength(float len)
    {
        length=len;
    }
    void perimeter()
    {
        cout<<"Perimeter = "<<(length*4)<<endl;
    }
    friend void no_of_tiles(Square&); // object of class Square has to be passed
    to this function
};

void no_of_tiles(Square& obj)
{
    int area;
    cout<<"Enter the area of the floor:: ";
    cin>>area;
    cout<<"Number of tiles required = "<<area/(obj.length*obj.length)<<endl;
}

int main()
{

```

```

Square s;
s.getLength(12);
s.perimeter();
no_of_tiles(s);
return 0;
}

```

Output:

```

Problems Tasks Console × Properties
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program18\Debug\program18.exe (31/08/22, 10:42 pm)
Perimeter = 48
Enter the area of the floor:: 2304
Number of tiles required = 16

```

19. Write a C++ program to implement Static Data member (Refer Listing 2.31)

Sol:

```

#include <iostream>
using namespace std;
class Demo
{
    public:
        static int A;
};

int Demo :: A =10;

int main()
{
    cout<<"\nValue of A: "<<Demo::A;
    return 0;
}

```

Output:

```

Problems Tasks Console × Properties
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program19\Debug\program19.exe (31/08/22, 11:10 pm)
Value of A: 10

```

20. Write a C++ program to implement Static member function (Refer Listing 2.38)

Sol:

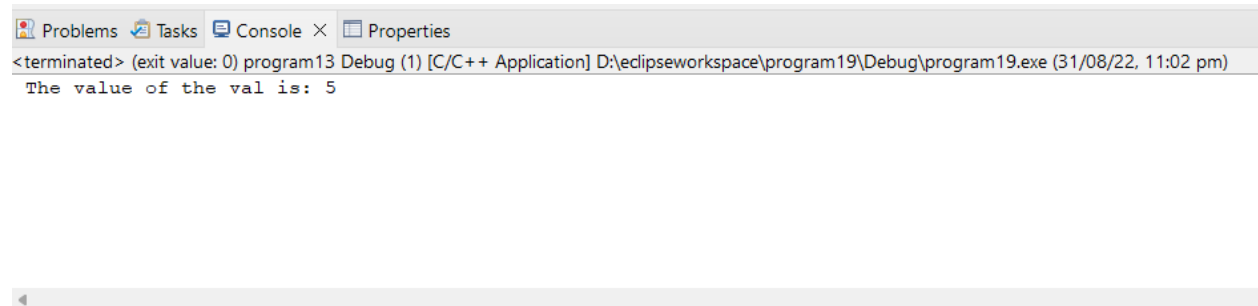
```
#include <iostream>
using namespace std;

class A
{
    static int val; // declare a static data member
public:
    static int func () // create static member function
    {
        return val;
    }
};

int A :: val = 5;

int main ()
{
    cout << " The value of the val is: " << A::func() << endl;
    return 0;
}
```

Output:

A screenshot of a C++ IDE's console window. The window has a title bar with 'Problems', 'Tasks', 'Console', and 'Properties' tabs. The 'Console' tab is active, showing the output of a program. The text in the console is: '<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program19\Debug\program19.exe (31/08/22, 11:02 pm)' followed by a new line and the output 'The value of the val is: 5'. There is a scrollbar on the right side of the console window.

```
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program19\Debug\program19.exe (31/08/22, 11:02 pm)
The value of the val is: 5
```

Module 2

1. Write a C++ program to read and print student, employee details using array of object (Refer Previous year solution)

Sol:

Example 1: Student details:

```
#include <iostream>
using namespace std;
class Student
{
    char name[20], usn[10];
    float marks, perc;
public:
    void readDetails();
    void printDetails();
    void calcPercentage();
};

void Student::readDetails()
{
    cout<<"\nEnter name of student: " ;
    cin>>name;
    cout<<"Enter USN: ";
    cin>>usn;
    cout<<"Enter total marks out of 600: ";
    cin>>marks;
}

void Student::calcPercentage()
{
    perc=(marks/600)*100;
}

void Student::printDetails()
{
    cout << "Student details:\n";
    cout << "Name: " << name << "\nUSN: " << usn << "\nMarks: " << marks <<
"\nPercentage: " << perc<<endl;;
}

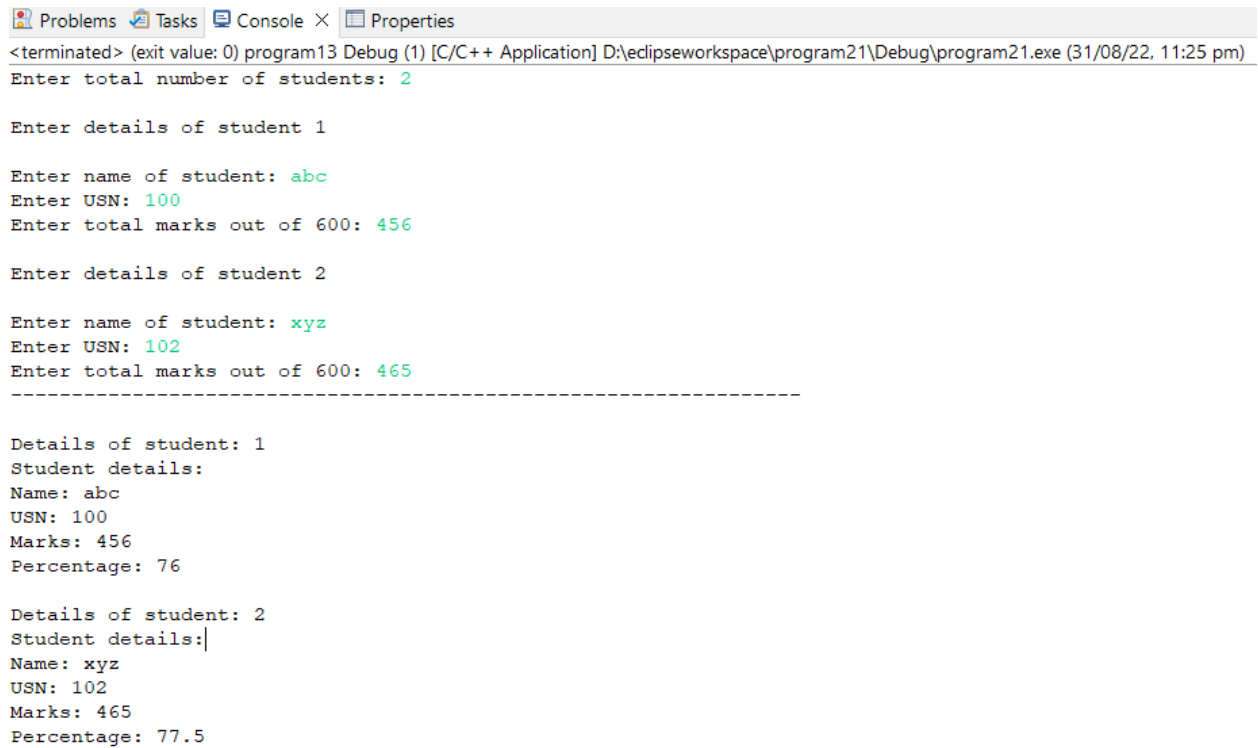
int main()
{
    Student s[30];
    int n;
    cout << "Enter total number of students: ";
    cin >> n;
    for(int i=0; i< n; i++)
    {
        cout << "\nEnter details of student " << i+1 <<endl;
        s[i].readDetails();
        s[i].calcPercentage();
    }
}
```

```

        cout<<"-----
- "<<endl;
    for(int i=0; i< n; i++)
    {
        cout<<"\nDetails of student: "<<i+1<<endl;
        s[i].printDetails();
    }
    return 0;
}

```

Output:



```

Problems Tasks Console × Properties
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program21\Debug\program21.exe (31/08/22, 11:25 pm)
Enter total number of students: 2

Enter details of student 1

Enter name of student: abc
Enter USN: 100
Enter total marks out of 600: 456

Enter details of student 2

Enter name of student: xyz
Enter USN: 102
Enter total marks out of 600: 465
-----

Details of student: 1
Student details:
Name: abc
USN: 100
Marks: 456
Percentage: 76

Details of student: 2
Student details:
Name: xyz
USN: 102
Marks: 465
Percentage: 77.5

```


Example 2: Employee details:

```
#include <iostream>
using namespace std;
class Employee
{
    char name[20], empID[10];
    float salary, netSal;
public:
    void readDetails();
    void netSalary();
    void printDetails();
};

void Employee::readDetails()
{
    cout<<"\nEnter name of the Employee: " ;
    cin>>name;
    cout<<"Enter Employee ID: ";
    cin>>empID;
    cout<<"Enter basic salary per month: ";
    cin>>salary;
}

void Employee::netSalary()
{
    float tax=0.0;
    if(salary<=25000)
        tax=0.05*salary;
    else if(salary<=80000)
        tax=0.07*salary;
    else
        tax=0.09*salary;
    netSal=(salary-tax);
}

void Employee::printDetails()
{
    cout << "\nEmployee details:\n";
    cout << "\nName: "<< name << "\nEmployee ID: " << empID << "\nBasic
Salary " << salary << "\nNet Salary: " << netSal<<endl;;
}

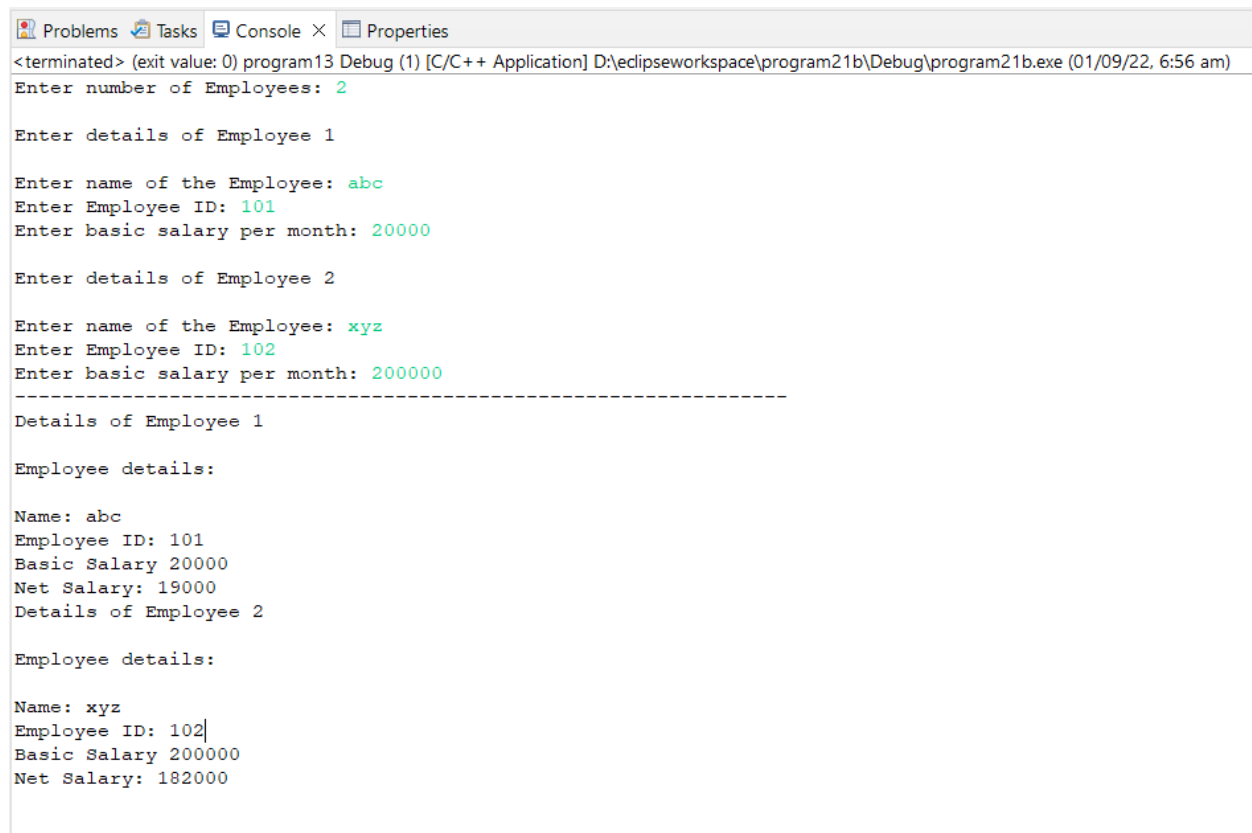
int main()
{
    Employee emp[30];
    int n;
    cout << "Enter number of Employees: ";
    cin >> n;
    for(int i=0; i< n; i++)
    {
        cout << "\nEnter details of Employee " << i+1 << endl;
        emp[i].readDetails();
        emp[i].netSalary();
    }
}
```

```

        cout<<"-----
- "<<endl;
    for(int i=0; i< n; i++)
    {
        cout << "Details of Employee " << i+1 << endl;
        emp[i].printDetails();
    }
    return 0;
}

```

Output:



```

Problems Tasks Console × Properties
<terminated> (exit value: 0) program13 Debug (1) [C/C++ Application] D:\eclipseworkspace\program21b\Debug\program21b.exe (01/09/22, 6:56 am)
Enter number of Employees: 2

Enter details of Employee 1

Enter name of the Employee: abc
Enter Employee ID: 101
Enter basic salary per month: 20000

Enter details of Employee 2

Enter name of the Employee: xyz
Enter Employee ID: 102
Enter basic salary per month: 200000
-----
Details of Employee 1

Employee details:

Name: abc
Employee ID: 101
Basic Salary 20000
Net Salary: 19000
Details of Employee 2

Employee details:

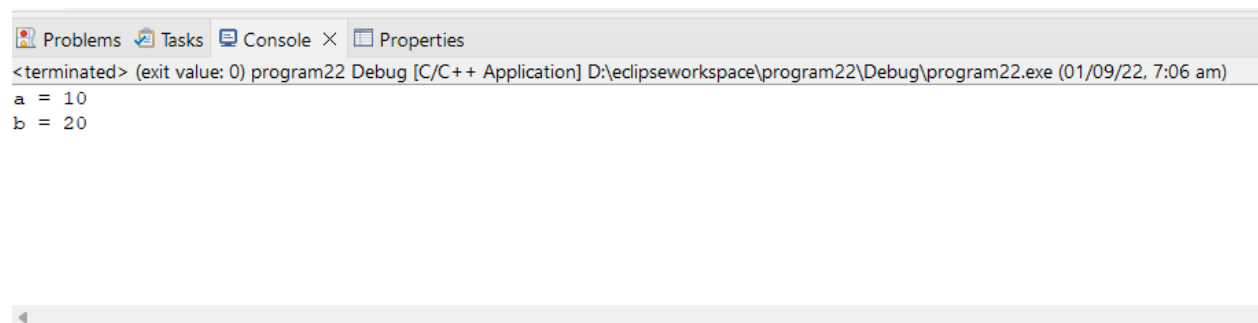
Name: xyz
Employee ID: 102|
Basic Salary 200000
Net Salary: 182000

```

2. Write a C++ program to implement zero argument or default constructor
Sol:

```
#include <iostream>
using namespace std;
class demo
{
    private:
        int a, b ;
    public:
        demo ()
        {
            a = 10;
            b = 20;
        }
        void display ()
        {
            cout<<"a = "<< a <<endl;
            cout<<"b = "<< b <<endl;
        }
};
int main ()
{
    demo obj;
    obj.display();
    return 0;
}
```

Output:



The screenshot shows an IDE window with tabs for Problems, Tasks, Console, and Properties. The Console tab is active, displaying the output of the program. The text in the console is as follows:

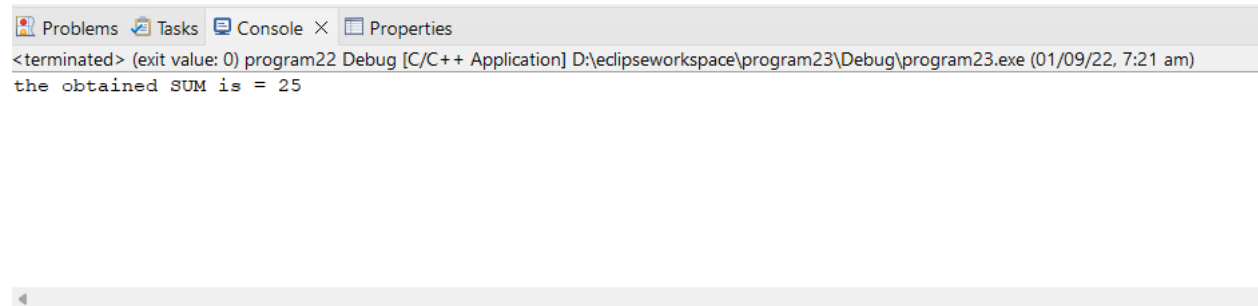
```
<terminated> (exit value: 0) program22 Debug [C/C++ Application] D:\eclipseworkspace\program22\Debug\program22.exe (01/09/22, 7:06 am)
a = 10
b = 20
```

3. Write a C++ program to implement parameterized constructor
Sol:

```
#include <iostream>
using namespace std;
class Sum
{
    private:
        int a,b;
    public:
        Sum(int a1, int b1)
        {
            a = a1;
            b = b1;
        }
        int add()
        {
            return a+b;
        }
};

int main()
{
    Sum S1(10,15); //S1 is the object of class Sum
    cout<< "the obtained SUM is = "<<S1.add();
    return 0;
}
```

Output:

A screenshot of a C++ IDE's console window. The window has a title bar with icons for Problems, Tasks, Console, and Properties. The console text shows the program's execution: it starts with "<terminated> (exit value: 0) program22 Debug [C/C++ Application] D:\eclipseworkspace\program23\Debug\program23.exe (01/09/22, 7:21 am)" and then displays the output "the obtained SUM is = 25".

```
Problems Tasks Console × Properties
<terminated> (exit value: 0) program22 Debug [C/C++ Application] D:\eclipseworkspace\program23\Debug\program23.exe (01/09/22, 7:21 am)
the obtained SUM is = 25
```

4. Write a C++ program to implement Explicit Constructor (Refer following Code snippet)

```
#include<iostream>
using namespace std;

class String
{
    char * cstr;

public:
    explicit String(char * p = NULL);
    char * getString();
};

String :: String(char * p)
{
    cstr = p;
}

char * String :: getString()
{
    return cstr;
}

int main()
{
    String s1=(String) "abc";

    cout<<s1.getString();
}
```

Sol:

Example 1: (using code snippet):

```
#include<iostream>
using namespace std;
class String
{
    char *str; //declare a string i.e an array of characters
public:
    explicit String(char *p = 0);
    /* only values that match the class type can be assigned.*/
    char *getString(); // implicit conversion of values to type String does
not take place //
};

String::String(char *p)
{
    str = p;
}

char *String::getString()
{
    return str;
}

int main()
{
    String S("Hello");
    String S1=(String)"World";
}
```

```

        cout<<S.getString()<<endl;
        cout<<S1.getString();
        /*if the statement was:: String s1="World", the value "World" would not
        be converted to class type String." this form of assigning values is
        illegal.*/
        return 0;
    }

```

Output:

```

<terminated> (exit value: 0) program24 Debug [C/C++ Application] D:\eclipseworkspace\program24\Debug\program24.exe (01/09/22, 7:57 am)
Hello
World

```

Example 2:

```

#include<iostream>
using namespace std;

class A
{
    int data1;
    int data2;
    char* name;

public:
    A(int a, int b=10, char* c = "manju"):data1(a), data2(b), name(c)
    {
        cout<<"A::Constructor...\n";
    };

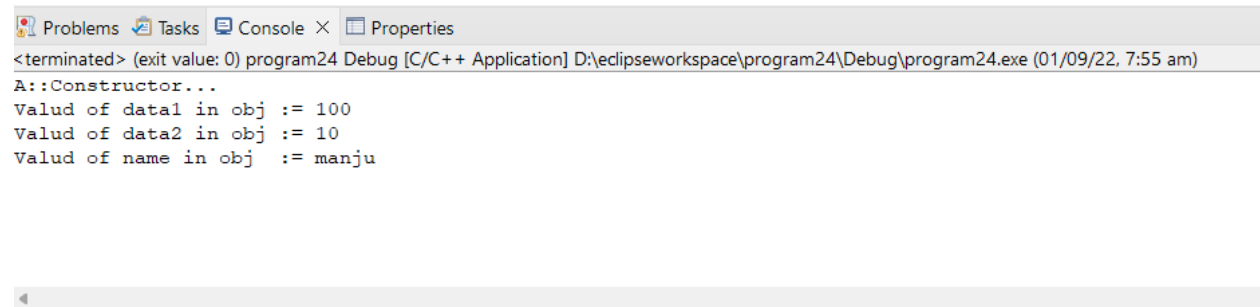
    friend void display(A obj);
};

void display(A obj)
{
    cout<<"Valud of data1 in obj := "<< obj.data1<<endl;
    cout<<"Valud of data2 in obj := "<< obj.data2<<endl;
    cout<<"Valud of name in obj := "<< obj.name<<endl;
}

int main()
{
    display(100);
    return (0);
}

```

Output:



The screenshot shows a debugger's console window with a tab labeled 'Console'. The output text is as follows:

```
<terminated> (exit value: 0) program24 Debug [C/C++ Application] D:\eclipseworkspace\program24\Debug\program24.exe (01/09/22, 7:55 am)
A::Constructor...
Valud of data1 in obj := 100
Valud of data2 in obj := 10
Valud of name in obj := manju
```