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Domain Winter Camp

Q1 Print Multiplication Table of a Number

```
#include <iostream>

using namespace std;

void printTable(int num) {

    for(int i = 1; i <= 10; ++i) {

        cout << num << " * " << i << " = " << num * i << endl;

    }

}

int main() {

    int number;

    cout << "Enter an integer: ";

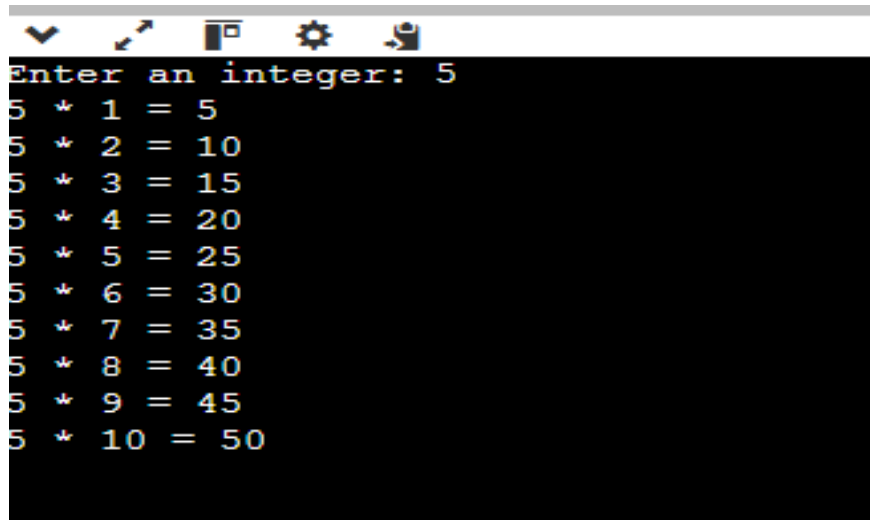
    cin >> number;

    printTable(number);

    return 0;

}
```

Output

A screenshot of a terminal window with a black background and yellow text. The prompt 'Enter an integer: 5' is shown at the top. Below it, a multiplication table for the number 5 is displayed, with each row showing the number 5 multiplied by integers from 1 to 10, followed by the result. The table is as follows:

5	*	1	=	5
5	*	2	=	10
5	*	3	=	15
5	*	4	=	20
5	*	5	=	25
5	*	6	=	30
5	*	7	=	35
5	*	8	=	40
5	*	9	=	45
5	*	10	=	50

Q2. SUM OF ALL NATURAL Number

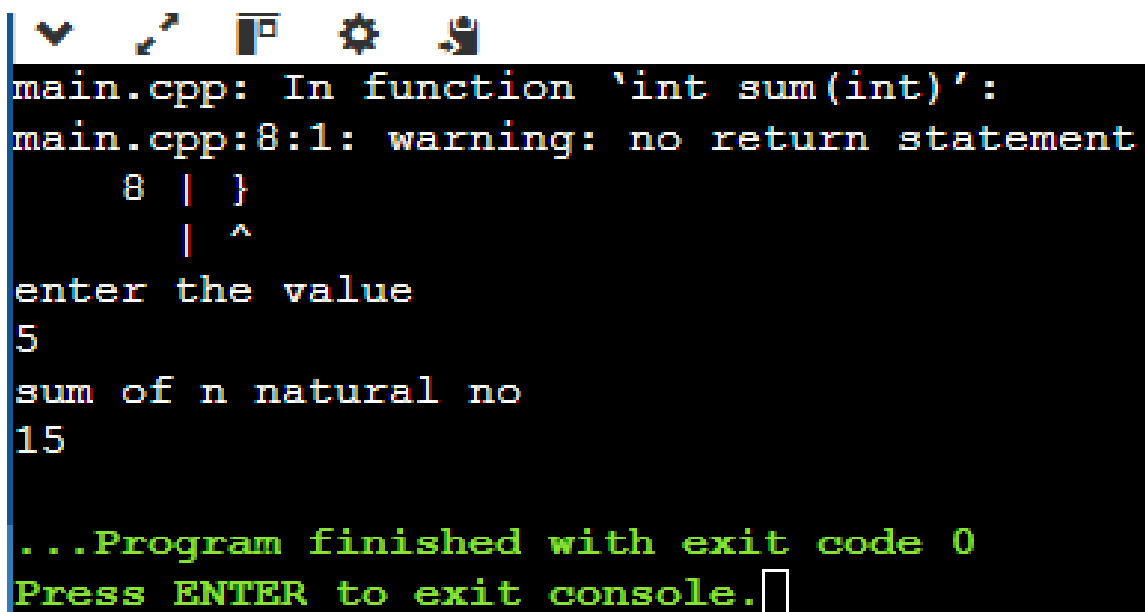
```
#include <iostream>

using namespace std;

int sum(int n)
{
    int s;
    s=n*(n+1)/2;
    cout<<s;
}

int main()
{
    int n;
    cout<<"enter the value"<<endl;
    cin>>n;
    cout<<"sum of n natural no"<<endl;
    sum(n);
}
```

OUTPUT:



The screenshot shows a terminal window with a dark background and light-colored text. At the top, there is a toolbar with icons for a dropdown menu, a pencil, a square, a gear, and a magnifying glass. The main text area displays the output of the program. It starts with a warning message: 'main.cpp: In function 'int sum(int)': main.cpp:8:1: warning: no return statement'. Below this, there is a line of code '8 | }' with a caret '^' pointing to the closing brace. The program then prompts 'enter the value' and the user enters '5'. The program then outputs 'sum of n natural no' followed by '15'. At the bottom, it says '...Program finished with exit code 0' and 'Press ENTER to exit console.' followed by a white cursor box.

```
main.cpp: In function 'int sum(int)':
main.cpp:8:1: warning: no return statement
      8 | }
        | ^
enter the value
5
sum of n natural no
15

...Program finished with exit code 0
Press ENTER to exit console. □
```

Q3 NUMBER IS PRIME OR NOT

```
#include <iostream>

using namespace std;

int main()
{
    int n,s;

    cout<<"Enter the number : "<<endl;

    cin>>n;

    s=0;

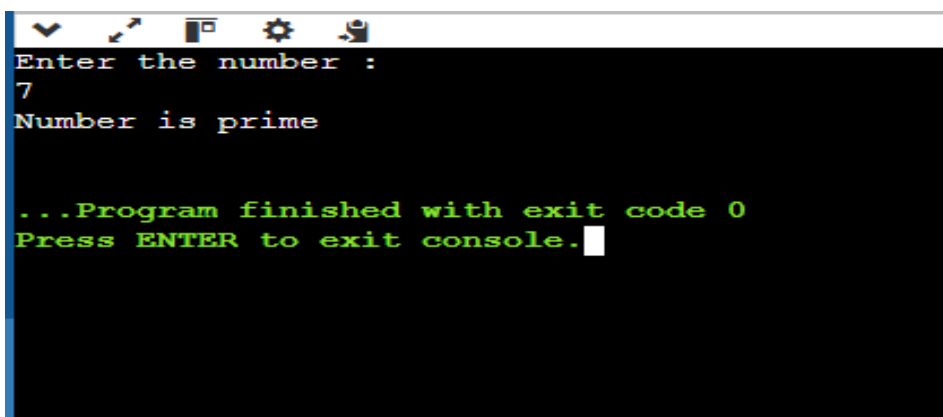
    for(int i=2;i<n;i++)
    {
        if(n%i==0)
        {
            s++;
        }
    }

    if(s>0)
    {
        cout<<"Number is not prime"<<endl;
    }

    else

    {
        cout<<"Number is prime"<<endl;
    }
}
```

OUTPUT

A screenshot of a console window with a black background and white text. The window has a standard OS title bar with minimize, maximize, and close buttons. The text in the console shows the program's execution: it prompts 'Enter the number :', the user enters '7', and the program outputs 'Number is prime'. At the bottom, it shows '...Program finished with exit code 0' and 'Press ENTER to exit console.' with a white cursor character.

```
Enter the number :
7
Number is prime

...Program finished with exit code 0
Press ENTER to exit console.
```

Q4. Count the total no. of digit in given number n

```
#include <iostream>

using namespace std;

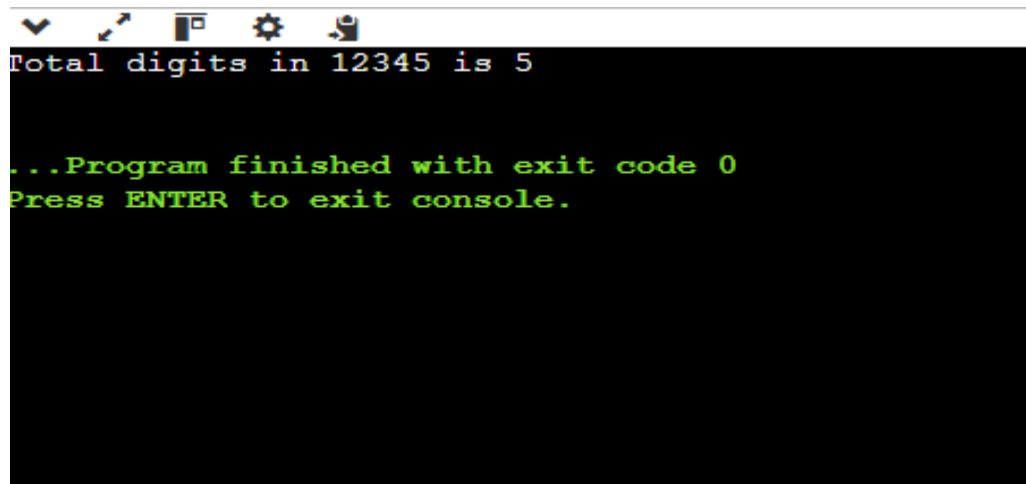
int countDigits(int n) {
    int count = 0;
    while (n > 0) {
        n /= 10;
        count++;
    }
    return count;
}

int main() {
    int n = 12345;

    cout << "Total digits in " << n << " is " << countDigits(n) << endl;

    return 0;
}
```

OUTPUT:

A screenshot of a console window with a black background and white and green text. The window has a title bar with standard icons. The output text is: "Total digits in 12345 is 5" in white, followed by "...Program finished with exit code 0" and "Press ENTER to exit console." in green.

Q5 Number is odd or even

```
#include <iostream>

using namespace std;

int main()
{
    int n;

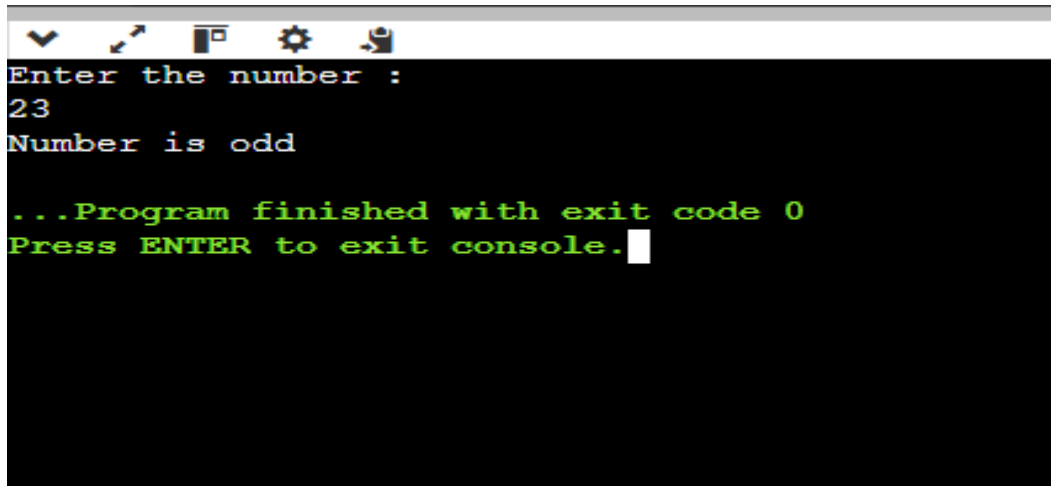
    cout << "Enter the number : " << endl;
```

```

cin>>n;
if(n%2==0)
{
    cout<<"Number is even";
}
else
{
    cout<<"Number is odd";
}
}

```

OUTPUT:



```

Enter the number :
23
Number is odd

...Program finished with exit code 0
Press ENTER to exit console.

```

Q6 Find the largest number in two numbers

```

#include <iostream>
using namespace std;
int main()
{
    int a,b;
    cout<<"enter the no"<<endl;
    cin>>a>>b;
    if(a>b)
    {
        cout<<"the largest no:"<<a<<endl;
    }
    else
    {

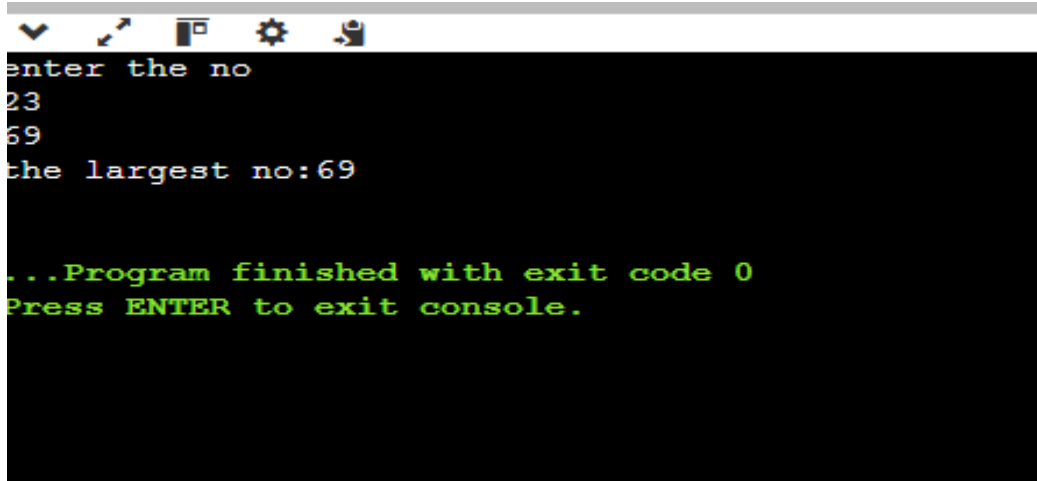
```

```

        cout<<"the largest no:"<<b<<endl;
    }
}

```

OUTPUT:



```

enter the no
23
69
the largest no:69

...Program finished with exit code 0
Press ENTER to exit console.

```

Q7 Sum of odd number upto n

```

#include <iostream>

using namespace std;

int main() {

    int n, sum = 0;
    cout << "Enter the value of N: ";

    cin >> n;

    for (int i = 1; i <= n; i += 2) {

        sum += i;

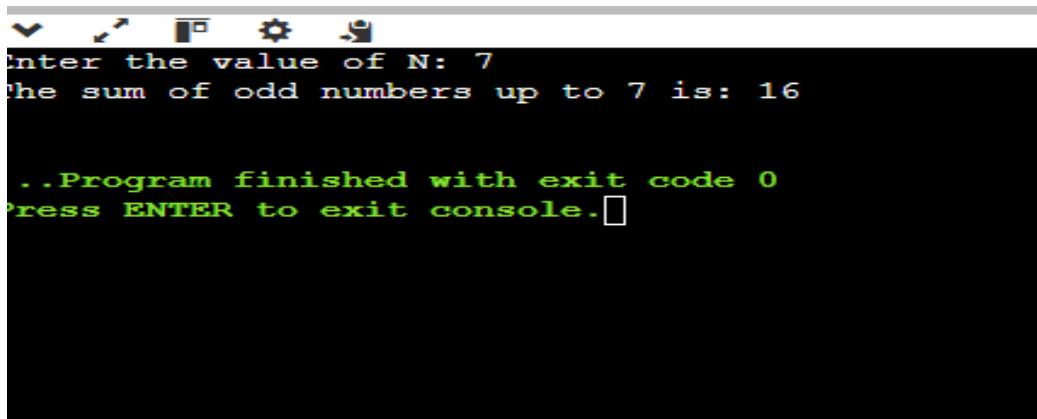
    }
    cout << "The sum of odd numbers up to " << n << " is: " << sum << endl;

    return 0;

}

```

Output:



```

Enter the value of N: 7
The sum of odd numbers up to 7 is: 16

...Program finished with exit code 0
Press ENTER to exit console.

```

Q8. Write a program to calculate the area of different shapes using function overloading. Implement overloaded functions to compute the area of a circle, a rectangle, and a triangle.

```
#include <iostream>

#include <cmath>

using namespace std;

double area(double radius) {
    return M_PI * radius * radius;
}

double area(double length, double width){
    return length * width;
}

double area1(double base, double height){
    return 0.5 * base * height;
}

int main() {
    double radius, length, width, base, height;
    cout << "Enter the radius of the circle: ";

    cin >> radius;

    cout << "Area of the circle: " << area(radius) << endl;

    cout << "Enter the length:";

    cin >> length;

    cout << "Enter the width:";

    cin >> width;

    cout << "Area of rectangle:" << area(length,width) << endl;

    cout << "Enter the base:";

    cin >> base;

    cout << "Enter the height:";

    cin >> height;

    cout << "Area of triangle:" << area(base,height) << endl;

    return 0;
}
```

Output:

```
Enter the radius of the circle: 5
Area of the circle: 78.5398
Enter the length:4
Enter the width:6
Area of rectangle:24
Enter the base:3
Enter the height:7
Area of triangle:21

...Program finished with exit code 0
Press ENTER to exit console. □
```

Q9. Write a program that demonstrates function overloading to calculate the salary of employees at different levels in a company hierarchy. Implement overloaded functions to compute salary for:

- Intern (basic stipend).
- Regular employee (base salary + bonuses).
- Manager (base salary + bonuses + performance incentives).

```
#include <iostream>
using namespace std;
int calculateSalary(int stipend) {
    return stipend;
}
int calculateSalary(int baseSalary, int bonuses) {
    return baseSalary + bonuses;
}
int calculateSalary(int baseSalary, int bonuses, int incentives) {
    return baseSalary + bonuses + incentives;
}
int main() {
    int stipend, baseSalary, bonuses, incentives;
    cout << "Enter stipend for intern: ";
    cin >> stipend;
    cout << "Intern Salary: " << calculateSalary(stipend) << endl;
    cout << "Enter base salary and bonuses for a regular employee: ";
    cin >> baseSalary >> bonuses;
    cout << "Employee Salary: " << calculateSalary(baseSalary, bonuses) << endl;
    cout << "Enter base salary, bonuses, and incentives for a manager: ";
    cin >> baseSalary >> bonuses >> incentives;
    cout << "Manager Salary: " << calculateSalary(baseSalary, bonuses, incentives) << endl;
    return 0;}
```


Output:

```
Enter stipend for intern: 10000
Intern Salary: 10000
Enter base salary and bonuses for a regular employee: 50000
20000
Employee Salary: 70000
Enter base salary, bonuses, and incentives for a manager: 80000
30000
20000
Manager Salary: 130000

...Program finished with exit code 0
Press ENTER to exit console.
```

Q10 Create a C++ program that uses polymorphism to calculate the area of various shapes. Define a base class Shape with a virtual method calculateArea(). Extend this base class into the following derived classes:

Rectangle: Calculates the area based on length and width.

Circle: Calculates the area based on the radius.

Triangle: Calculates the area using base and height.

The program should use dynamic polymorphism to handle these shapes and display the area of each.

Ans

```
#include <iostream>

#include <cmath>

using namespace std;
class Shape {
public:
    virtual void calculateArea() = 0;
};
class Rectangle : public Shape {
private:
    float length, width;
public:
    Rectangle(float l, float w) : length(l), width(w) {}
    void calculateArea() override {
        cout << "Shape: Rectangle" << endl;
        cout << "Area: " << length * width << endl;
    }
}
```

```

};

class Circle : public Shape {
private:
    float radius;
public:
    Circle(float r) : radius(r) {}
    void calculateArea() override {
        cout << "Shape: Circle" << endl;
        cout << "Area: " << M_PI * radius * radius << endl;
    }
};

class Triangle : public Shape {
private:
    float base, height;
public:
    Triangle(float b, float h) : base(b), height(h) {}
    void calculateArea() override {
        cout << "Shape: Triangle" << endl;
        cout << "Area: " << 0.5 * base * height << endl;
    }
}; int main() {
    int shapeType;

    cout << "Enter shape type (1 for Rectangle, 2 for Circle, 3 for Triangle): ";
    cin >> shapeType;

    Shape* shape = nullptr;

    switch(shapeType) {
        case 1: {
            float length, width;

            cout << "Enter length and width of the rectangle: ";
            cin >> length >> width;

            shape = new Rectangle(length, width);

            break;

```

```

}

case 2: {
    float radius;

    cout << "Enter radius of the circle: ";

    cin >> radius;

    shape = new Circle(radius);

    break;
}

case 3: {
    float base, height;

    cout << "Enter base and height of the triangle: ";

    cin >> base >> height;

    shape = new Triangle(base, height);

    break;
}

default:

    cout << "Invalid shape type." << endl;

    return 1;
}

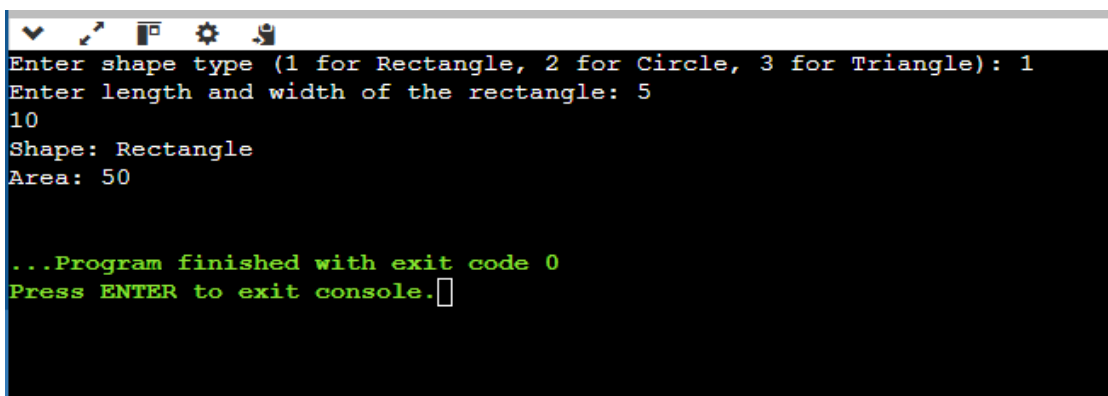
if(shape) {
    shape->calculateArea();

    delete shape;
}

return 0;
}

```

Output



```

Enter shape type (1 for Rectangle, 2 for Circle, 3 for Triangle): 1
Enter length and width of the rectangle: 5
10
Shape: Rectangle
Area: 50

...Program finished with exit code 0
Press ENTER to exit console.

```

Q11.Number is Positive or negative

```
#include <iostream>

using namespace std;

int main()
{
    int n;

    cout<<"enter the value"<<endl;

    cin>>n;

    if(n>0){

        cout<<"no is positive"<<endl;

    }

    else

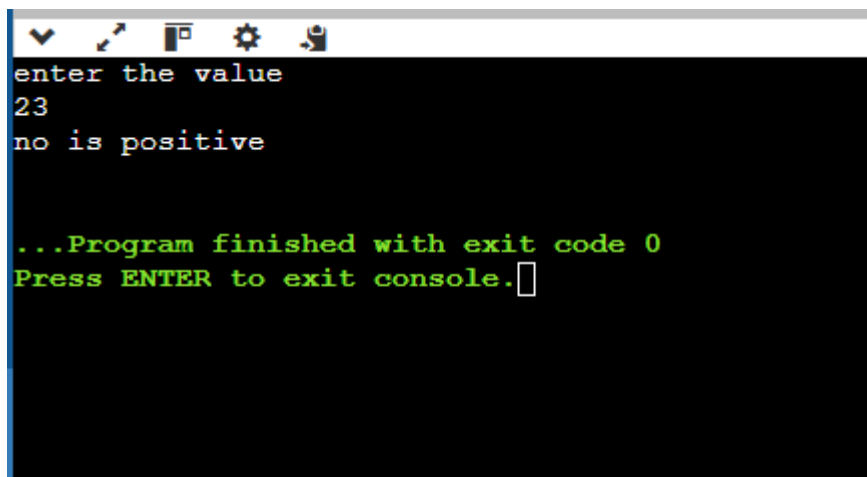
    {

        cout<<"no is negative"<<endl;

    }

}
```

Output:

A screenshot of a console window with a black background and white text. The window has a title bar with standard icons. The output shows the program prompting for a value, receiving '23', and printing 'no is positive'. It then displays a green message: '...Program finished with exit code 0' and 'Press ENTER to exit console.' followed by a cursor.

```
enter the value
23
no is positive

...Program finished with exit code 0
Press ENTER to exit console.
```