



# **C PROGRAMMING LAB FILE**

**(1<sup>st</sup> Semester)**

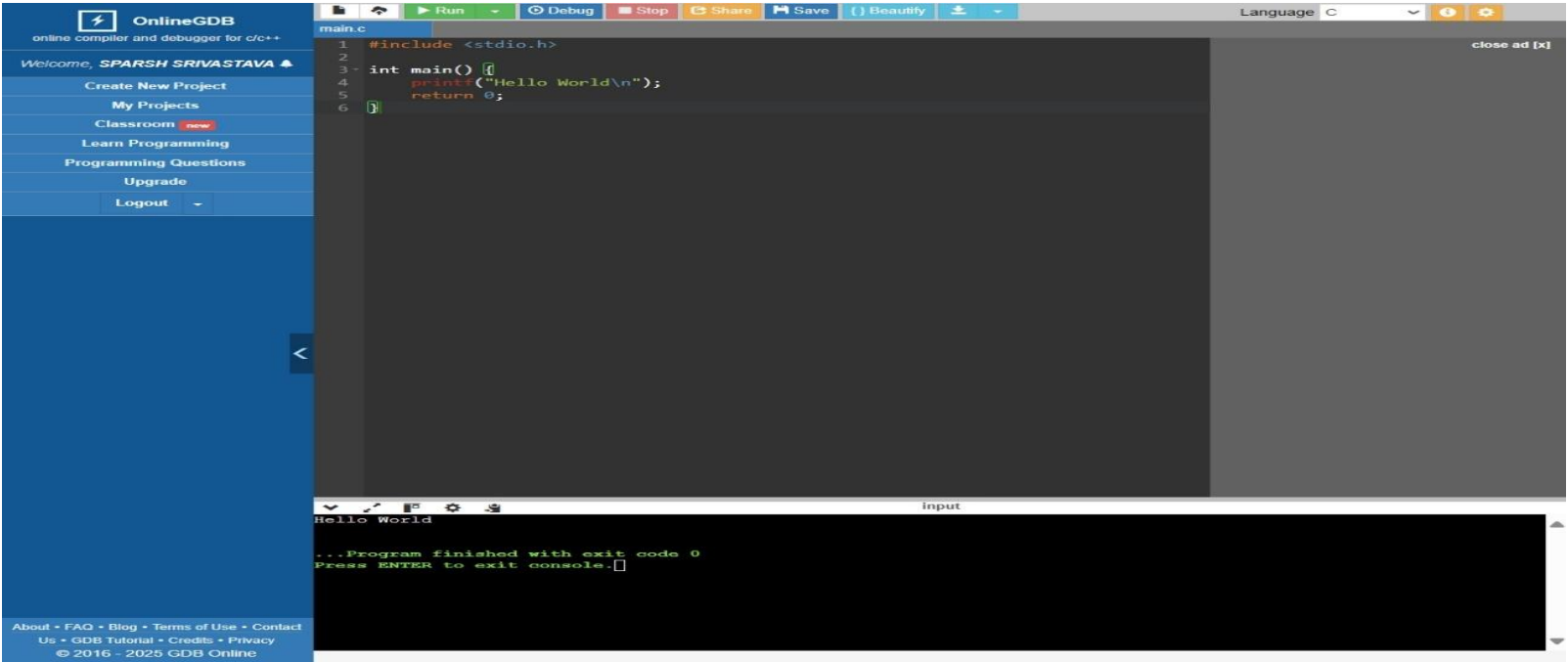
**Name:- Sparsh Srivastava**

**SAP ID :- 590022251**

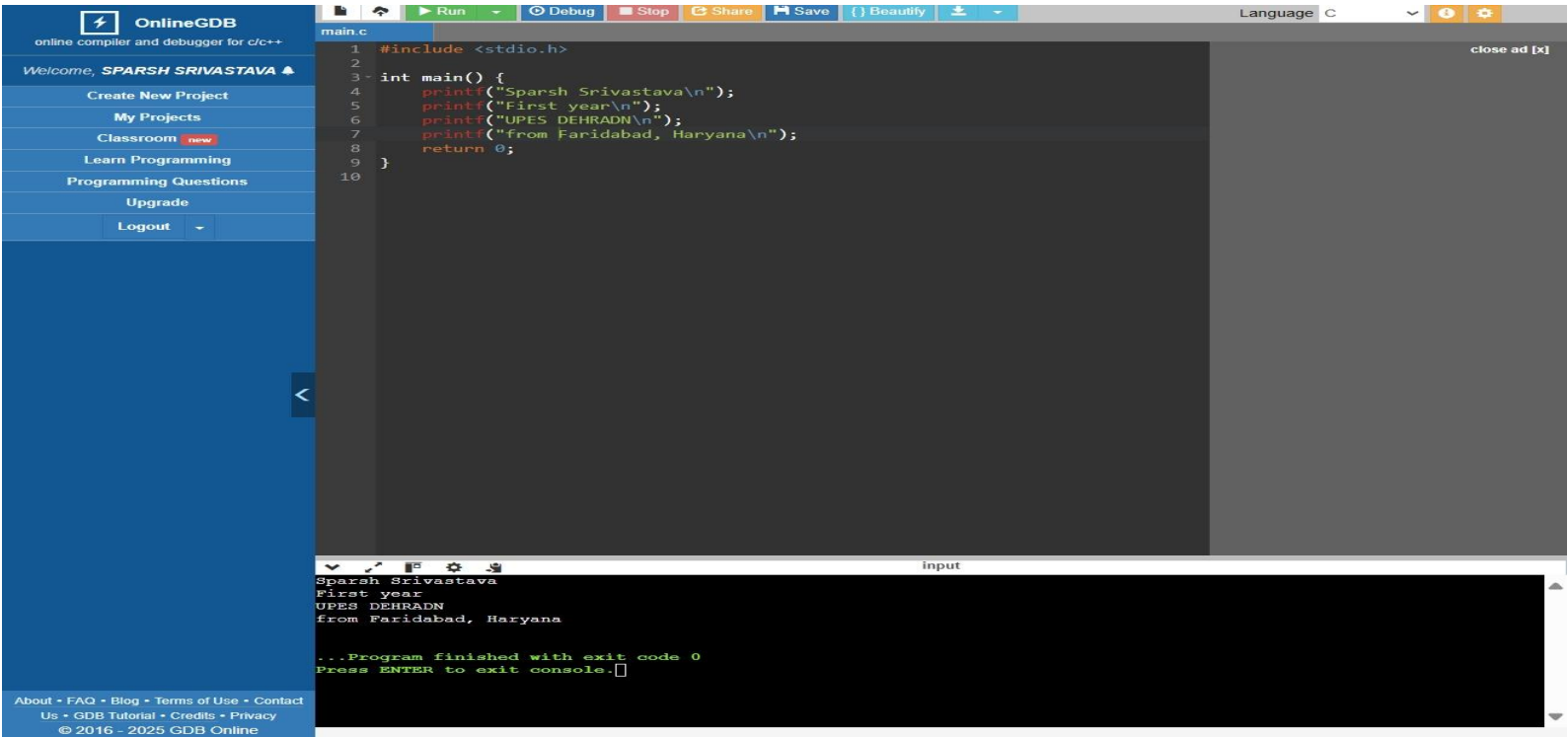
**Batch 33**

# Experiment 1: Installation, Environment Setup and starting with C language

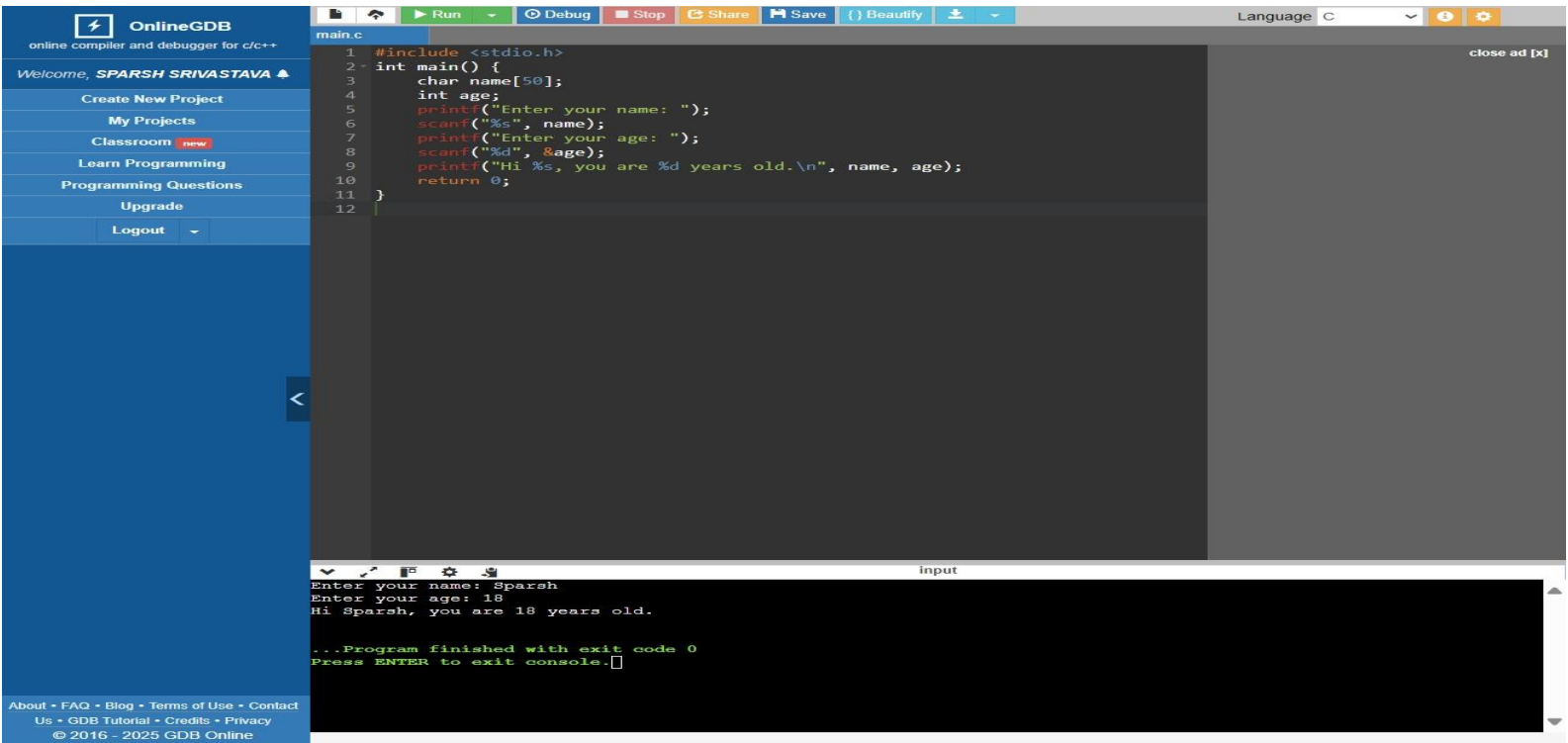
1. Write a C program to print “ Hello World”



2. Write a C Program to print the address in multiple lines (new line)



3. Write a program that prompts the user to enter their name and age.



4. Write a C program to add two numbers, take number from user.

The screenshot shows the OnlineGDB interface. On the left is a blue sidebar with navigation links: 'Create New Project', 'My Projects', 'Classroom' (marked 'new'), 'Learn Programming', 'Programming Questions', 'Upgrade', and 'Logout'. The main area displays a C program in 'main.c' with line numbers 1 to 12. The code includes `<stdio.h>`, defines `int num1, num2, sum;`, and prompts the user to enter two numbers. It calculates the sum and prints it. The console output shows the user entering '13' for both numbers, resulting in a sum of '26'. The program finishes with exit code 0.

```
1 #include <stdio.h>
2 int main() {
3     int num1, num2, sum;
4     printf("Enter first number: ");
5     scanf("%d", &num1);
6     printf("Enter second number: ");
7     scanf("%d", &num2);
8     sum = num1 + num2;
9     printf("Sum = %d\n", sum);
10 }
11 return 0;
12
```

Input: Enter first number: 13, Enter second number: 13, Sum = 26

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

## Experiment 2: Operators:

1. WAP a C program to calculate the area and perimeter of a rectangle based on its length and width.

The screenshot shows the OnlineGDB interface with a C program for calculating the area and perimeter of a rectangle. The code includes `<stdio.h>`, declares `float length, width, area, perimeter;`, and prompts the user for length and width. It calculates the area (`length * width`) and perimeter (`2 * (length + width)`), then prints both. The console output shows inputs of 4 for length and 2 for width, resulting in an area of 8.00 and a perimeter of 12.00.

```
1 #include <stdio.h>
2
3 int main() {
4     float length, width, area, perimeter;
5     printf("Enter length of the rectangle: ");
6     scanf("%f", &length);
7     printf("Enter width of the rectangle: ");
8     scanf("%f", &width);
9     area = length * width;
10    perimeter = 2 * (length + width);
11    printf("Area = %.2f\n", area);
12    printf("Perimeter = %.2f\n", perimeter);
13    return 0;
14 }
15
```

Input: Enter length of the rectangle: 4, Enter width of the rectangle: 2, Area = 8.00, Perimeter = 12.00

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

2. WAP a C program to Convert temperature from Celsius to Fahrenheit using the formula:  $F = (C * 9/5) + 32$ .

The screenshot shows the OnlineGDB interface with a C program for converting Celsius to Fahrenheit. The code includes `<stdio.h>`, declares `float celsius, fahrenheit;`, and prompts the user for temperature in Celsius. It uses the formula `fahrenheit = (celsius * 9 / 5) + 32;` to calculate the Fahrenheit value and prints it. The console output shows an input of 35 for Celsius, resulting in 95.00 for Fahrenheit.

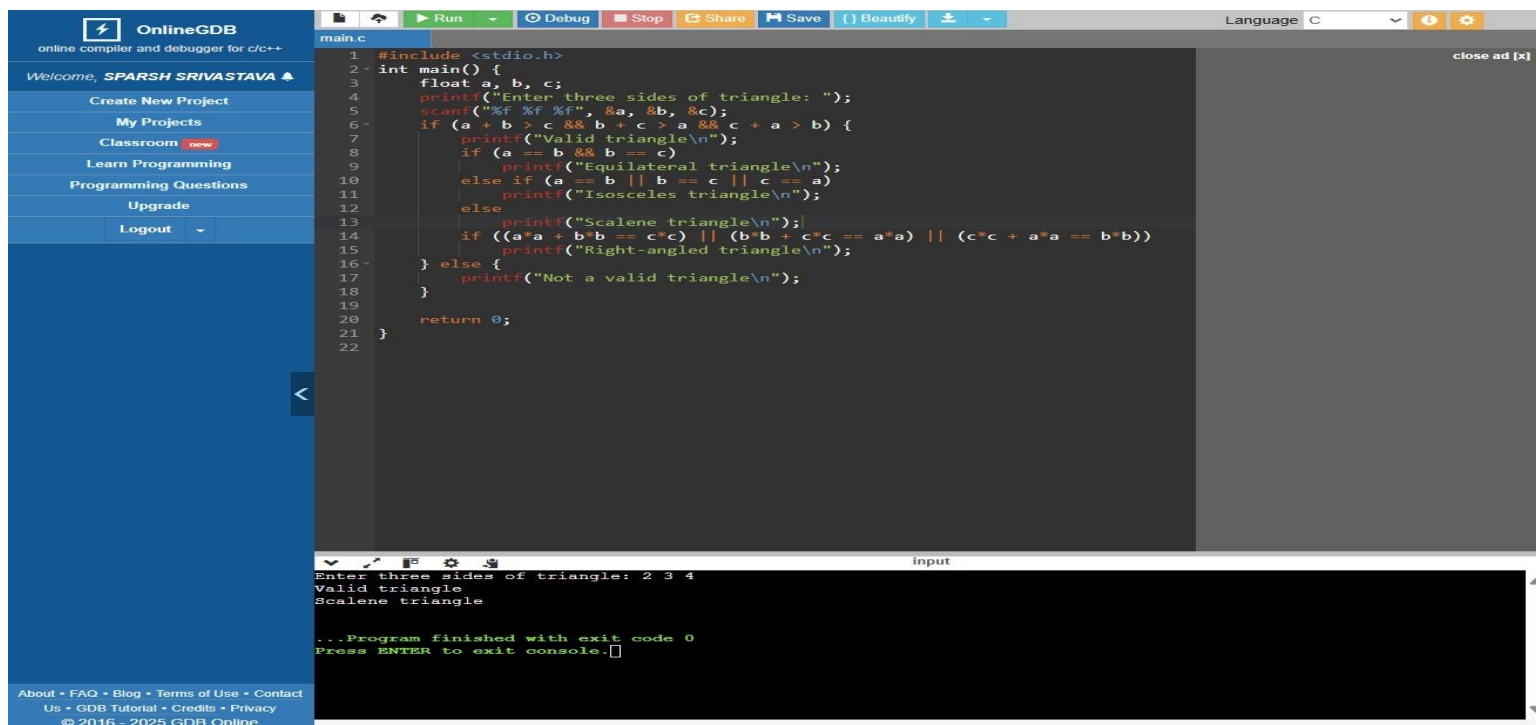
```
1 #include <stdio.h>
2 int main() {
3     float celsius, fahrenheit;
4     printf("Enter temperature in Celsius: ");
5     scanf("%f", &celsius);
6     fahrenheit = (celsius * 9 / 5) + 32;
7     printf("Temperature in Fahrenheit = %.2f\n", fahrenheit);
8     return 0;
9 }
10
```

Input: Enter temperature in Celsius: 35, Temperature in Fahrenheit = 95.00

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

## Experiment 3.1: Conditional Statements

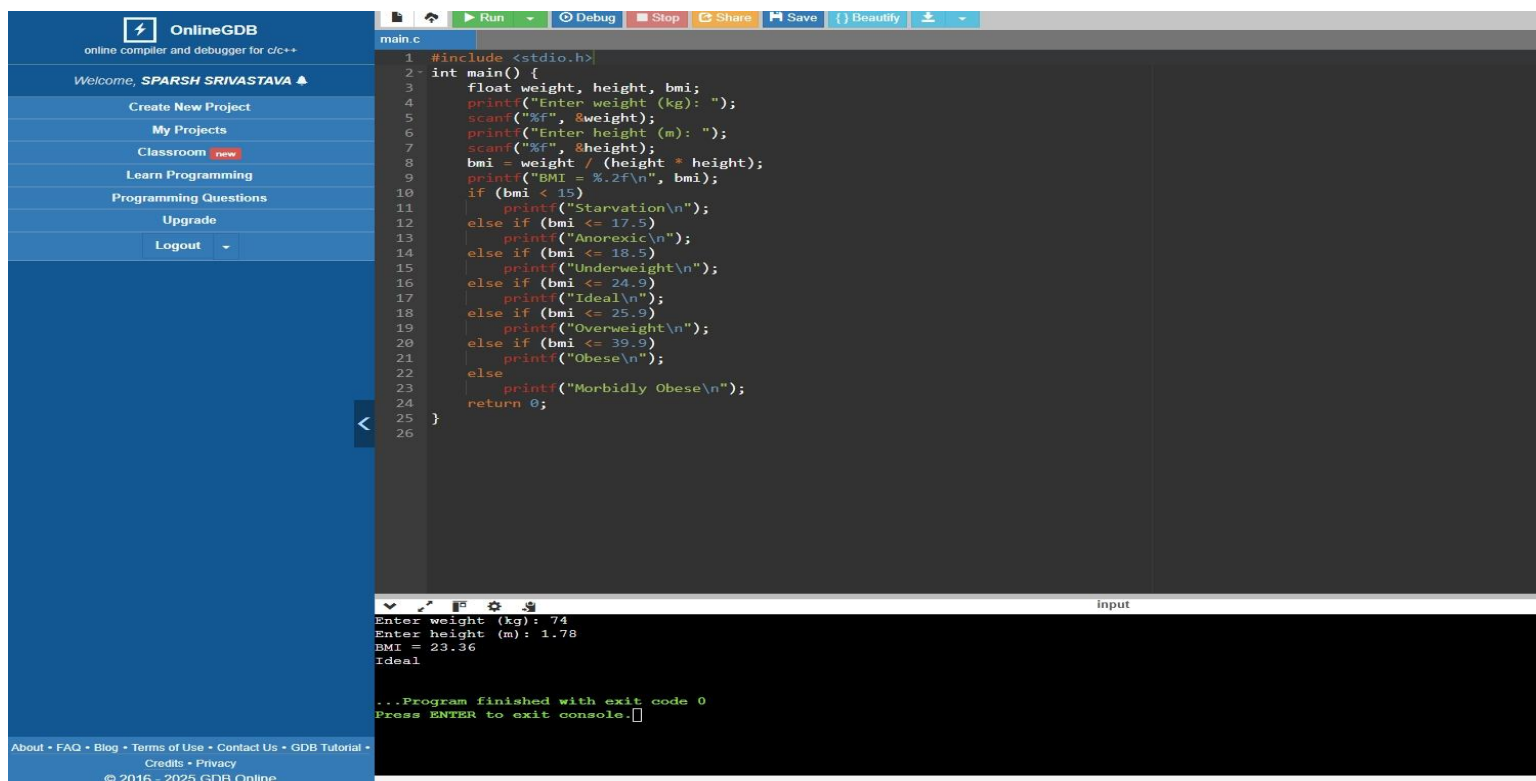
1. WAP to take check if the triangle is valid or not. If the validity is established, do check if the triangle is isosceles, equilateral, right angle, or scalene. Take sides of the triangle as input from a user.



```
1 #include <stdio.h>
2 int main() {
3     float a, b, c;
4     printf("Enter three sides of triangle: ");
5     scanf("%f %f %f", &a, &b, &c);
6     if (a + b > c && b + c > a && c + a > b) {
7         printf("Valid triangle\n");
8         if (a == b && b == c)
9             printf("Equilateral triangle\n");
10        else if (a == b || b == c || c == a)
11            printf("Isosceles triangle\n");
12        else
13            printf("Scalene triangle\n");
14        if ((a*a + b*b == c*c) || (b*b + c*c == a*a) || (c*c + a*a == b*b))
15            printf("Right-angled triangle\n");
16    } else {
17        printf("Not a valid triangle\n");
18    }
19    return 0;
20 }
```

Input: 2 3 4  
Valid triangle  
Scalene triangle  
...Program finished with exit code 0  
Press ENTER to exit console.

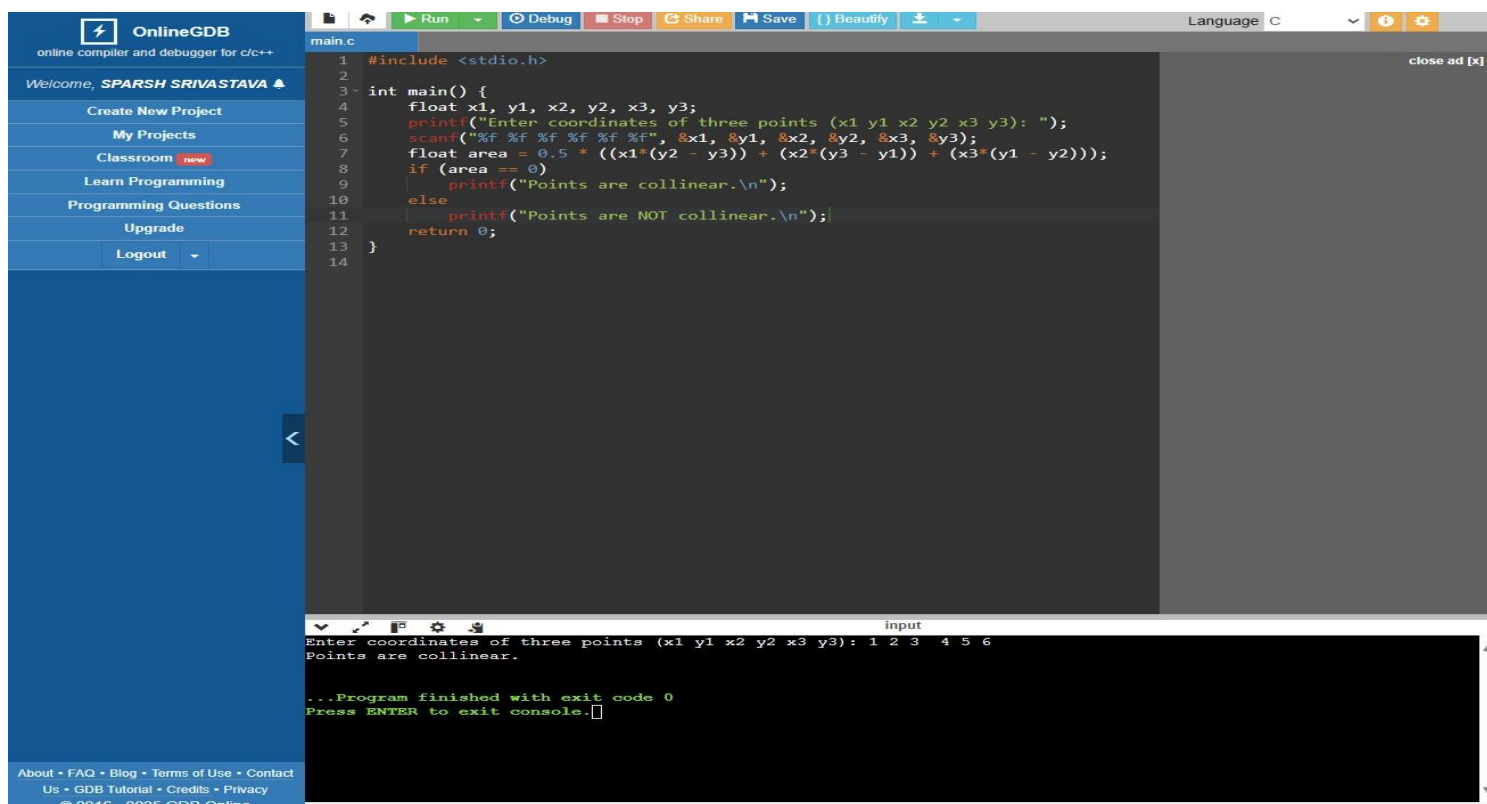
2. WAP to compute the BMI Index of the person and print the BMI values as per the following ranges. You can use the following formula to compute  $BMI = \text{weight(kgs)} / \text{Height(Mts)} * \text{Height(Mts)}$ .



```
1 #include <stdio.h>
2 int main() {
3     float weight, height, bmi;
4     printf("Enter weight (kg): ");
5     scanf("%f", &weight);
6     printf("Enter height (m): ");
7     scanf("%f", &height);
8     bmi = weight / (height * height);
9     printf("BMI = %.2f\n", bmi);
10    if (bmi < 15)
11        printf("Starvation\n");
12    else if (bmi <= 17.5)
13        printf("Anorexic\n");
14    else if (bmi <= 18.5)
15        printf("Underweight\n");
16    else if (bmi <= 24.9)
17        printf("Ideal\n");
18    else if (bmi <= 25.9)
19        printf("Overweight\n");
20    else if (bmi <= 39.9)
21        printf("Obese\n");
22    else
23        printf("Morbidly Obese\n");
24    return 0;
25 }
```

Input: 74 1.78  
BMI = 23.36  
Ideal  
...Program finished with exit code 0  
Press ENTER to exit console.

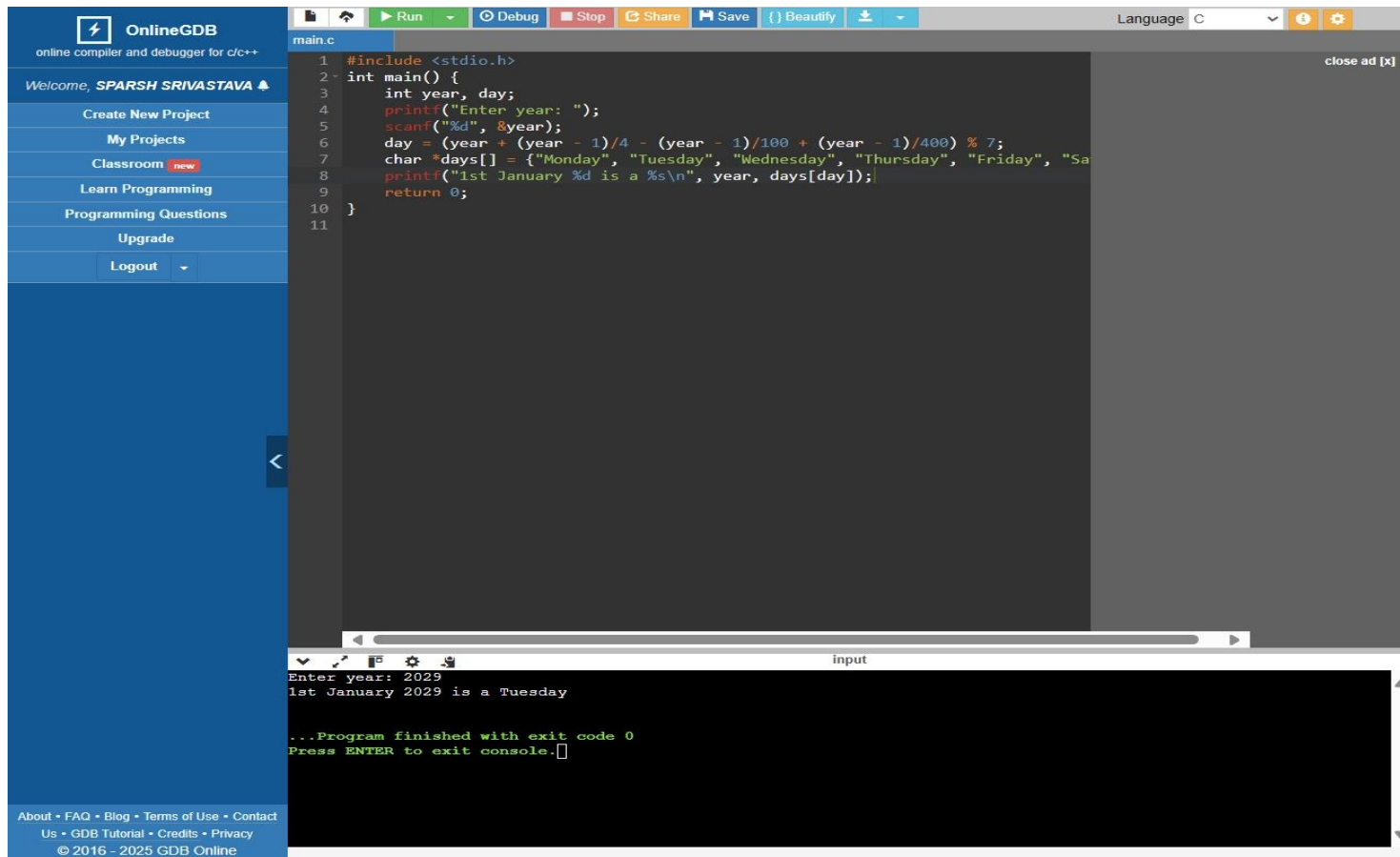
3. WAP to check if three points (x1,y1), (x2,y2) and (x3,y3) are collinear or not.



```
1 #include <stdio.h>
2 int main() {
3     float x1, y1, x2, y2, x3, y3;
4     printf("Enter coordinates of three points (x1 y1 x2 y2 x3 y3): ");
5     scanf("%f %f %f %f %f %f", &x1, &y1, &x2, &y2, &x3, &y3);
6     float area = 0.5 * ((x1*(y2 - y3)) + (x2*(y3 - y1)) + (x3*(y1 - y2)));
7     if (area == 0)
8         printf("Points are collinear.\n");
9     else
10        printf("Points are NOT collinear.\n");
11    return 0;
12 }
```

Input: 1 2 3 4 5 6  
Points are collinear.  
...Program finished with exit code 0  
Press ENTER to exit console.

4. According to the gregorian calendar, it was Monday on the date 01/01/01. If Any year is input through the keyboard write a program to find out what is the day on 1st January of this year.

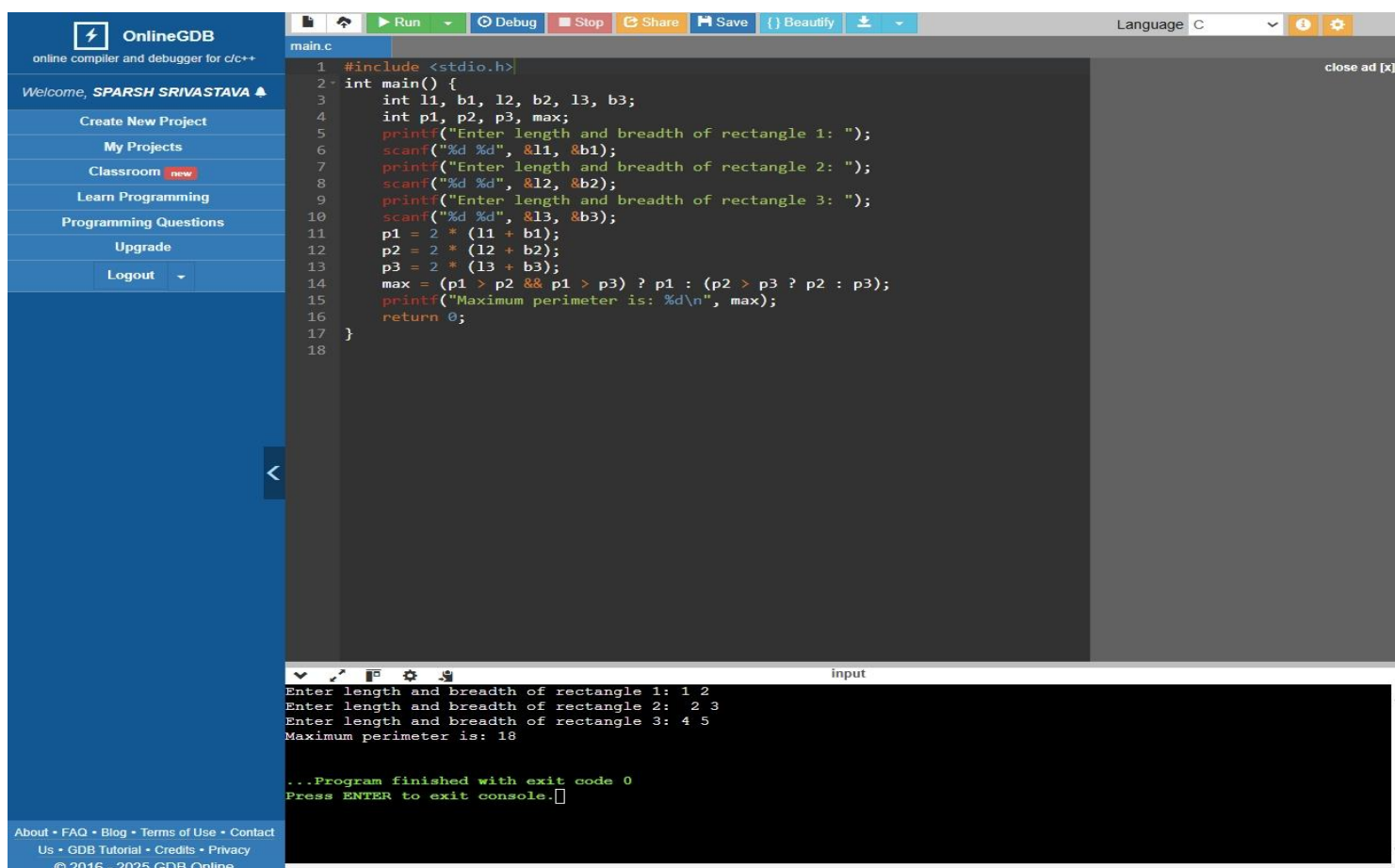


```
1 #include <stdio.h>
2 int main() {
3     int year, day;
4     printf("Enter year: ");
5     scanf("%d", &year);
6     day = (year + (year - 1)/4 - (year - 1)/100 + (year - 1)/400) % 7;
7     char *days[] = {"Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday", "Sunday"};
8     printf("1st January %d is a %s\n", year, days[day]);
9     return 0;
10 }
11
```

Enter year: 2029  
1st January 2029 is a Tuesday

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

5. WAP using ternary operator, the user should input the length and breadth of a rectangle, one has to find out which rectangle has the highest perimeter. The minimum number of rectangles should be three.



```
1 #include <stdio.h>
2 int main() {
3     int l1, b1, l2, b2, l3, b3;
4     int p1, p2, p3, max;
5     printf("Enter length and breadth of rectangle 1: ");
6     scanf("%d %d", &l1, &b1);
7     printf("Enter length and breadth of rectangle 2: ");
8     scanf("%d %d", &l2, &b2);
9     printf("Enter length and breadth of rectangle 3: ");
10    scanf("%d %d", &l3, &b3);
11    p1 = 2 * (l1 + b1);
12    p2 = 2 * (l2 + b2);
13    p3 = 2 * (l3 + b3);
14    max = (p1 > p2 && p1 > p3) ? p1 : (p2 > p3 ? p2 : p3);
15    printf("Maximum perimeter is: %d\n", max);
16    return 0;
17 }
18
```

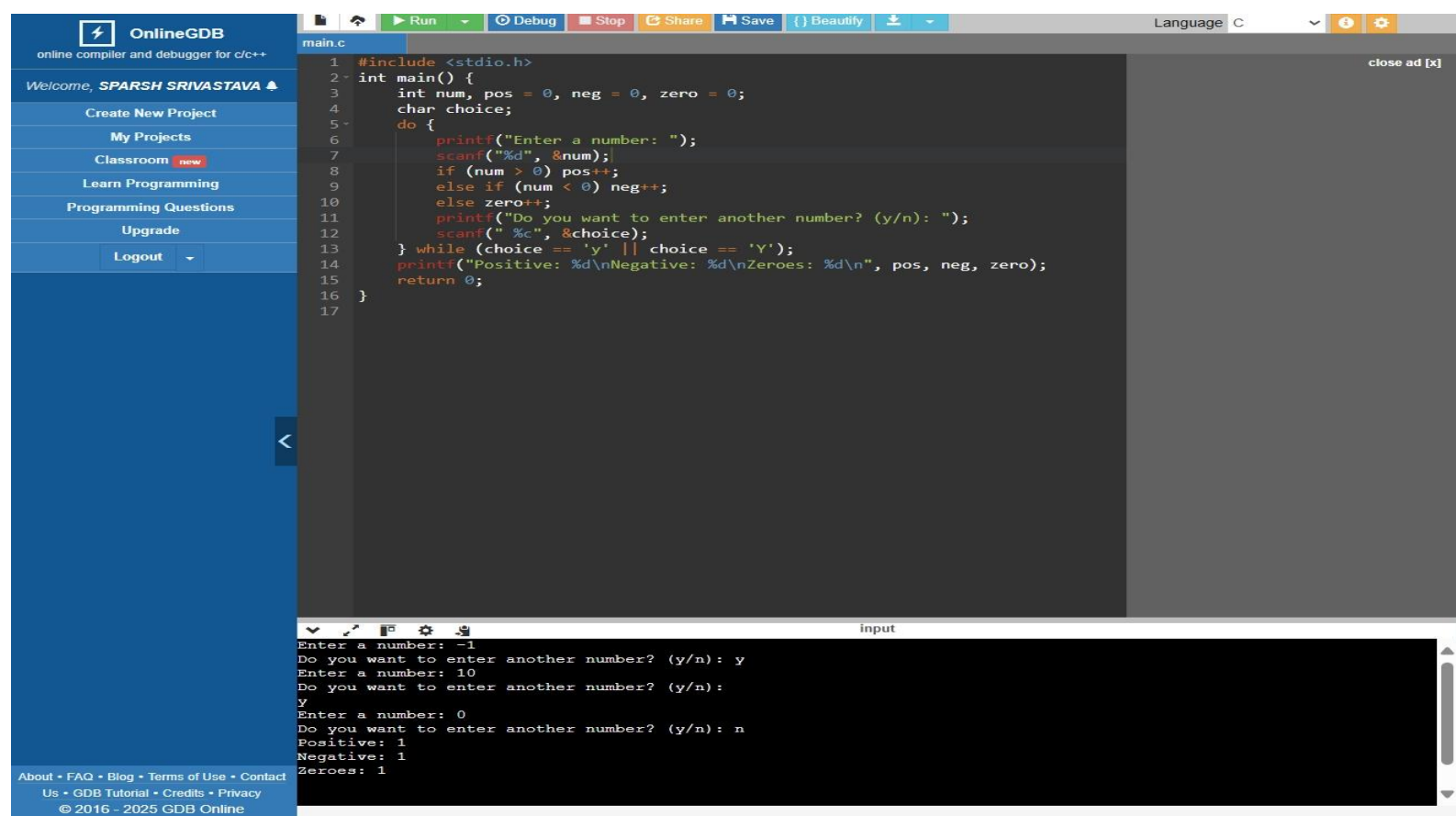
Enter length and breadth of rectangle 1: 1 2  
Enter length and breadth of rectangle 2: 2 3  
Enter length and breadth of rectangle 3: 4 5  
Maximum perimeter is: 18

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

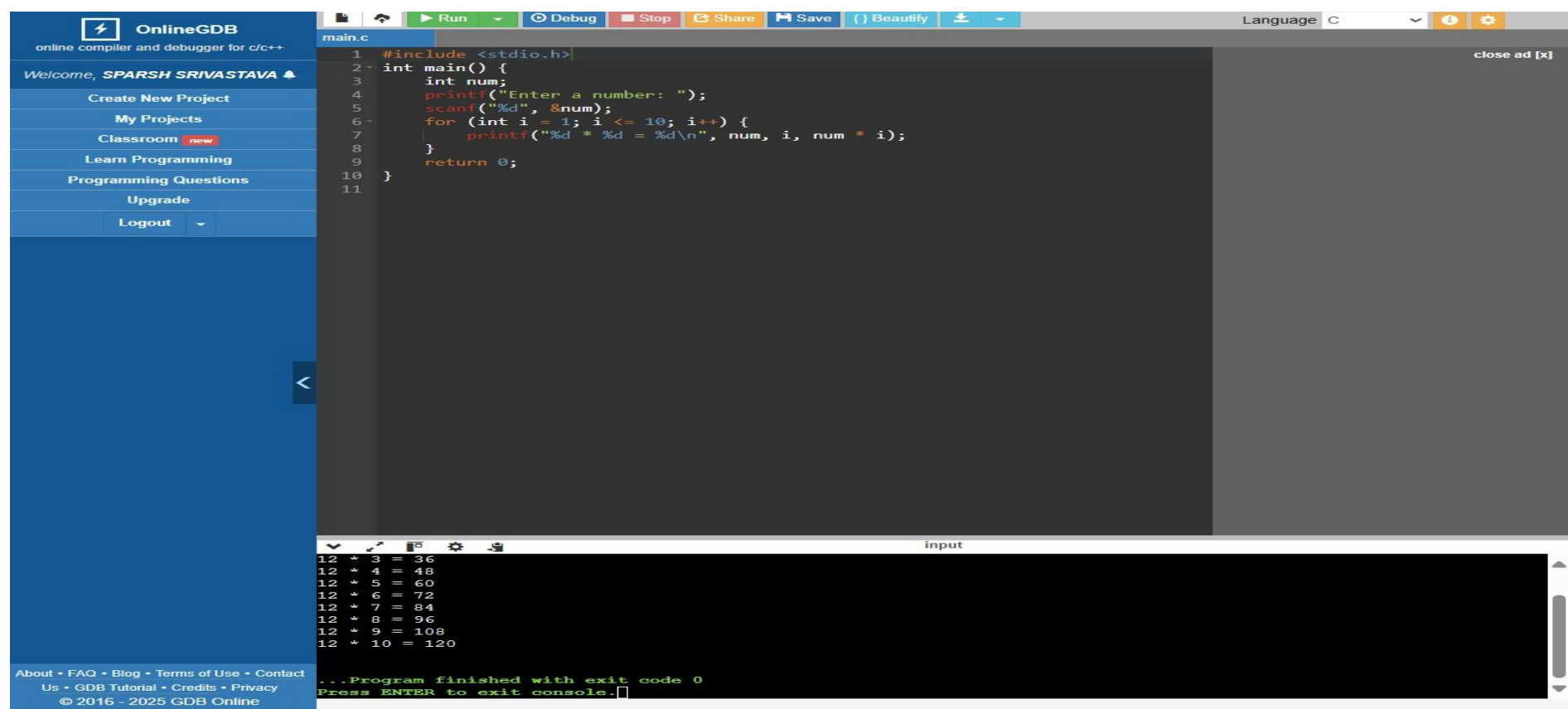
## Experiment 3.2: Loops



1. WAP to enter numbers till the user wants. At the end, it should display the count of positive, negative, and Zeroes entered.



2. WAP to print the multiplication table of the number entered by the user. It should be in the correct formatting. Num \* 1 = Num



3. WAP to generate the following set of output.

a. 1  
2 3  
4 5 6

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main.c

```
1 #include <stdio.h>
2
3 int main() {
4     int rows = 3, num = 1;
5
6     for (int i = 1; i <= rows; i++) {
7         // Print leading spaces for centering
8         for (int space = 1; space <= rows - i; space++) {
9             printf(" "); // Adjust spacing here
10        }
11
12        // Print numbers with consistent spacing
13        for (int j = 1; j <= i; j++) {
14            printf("%3d ", num++);
15        }
16
17        printf("\n");
18    }
19
20    return 0;
21 }
22
```

close ad [x]

input

```
1
2 2 3
3 4 5 6

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

b. 1  
1 1  
1 2 1  
1 3 3 1  
1 4 6 4 1

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main.c

```
1 #include <stdio.h>
2 int main() {
3     int rows = 5;
4     for (int i = 0; i < rows; i++) {
5         int val = 1;
6         for (int space = 1; space <= rows - i; space++) {
7             printf(" "); // Two spaces per gap
8         }
9         for (int j = 0; j <= i; j++) {
10            printf("%4d", val);
11            val = val * (i - j) / (j + 1);
12        }
13        printf("\n");
14    }
15    return 0;
16 }
17
```

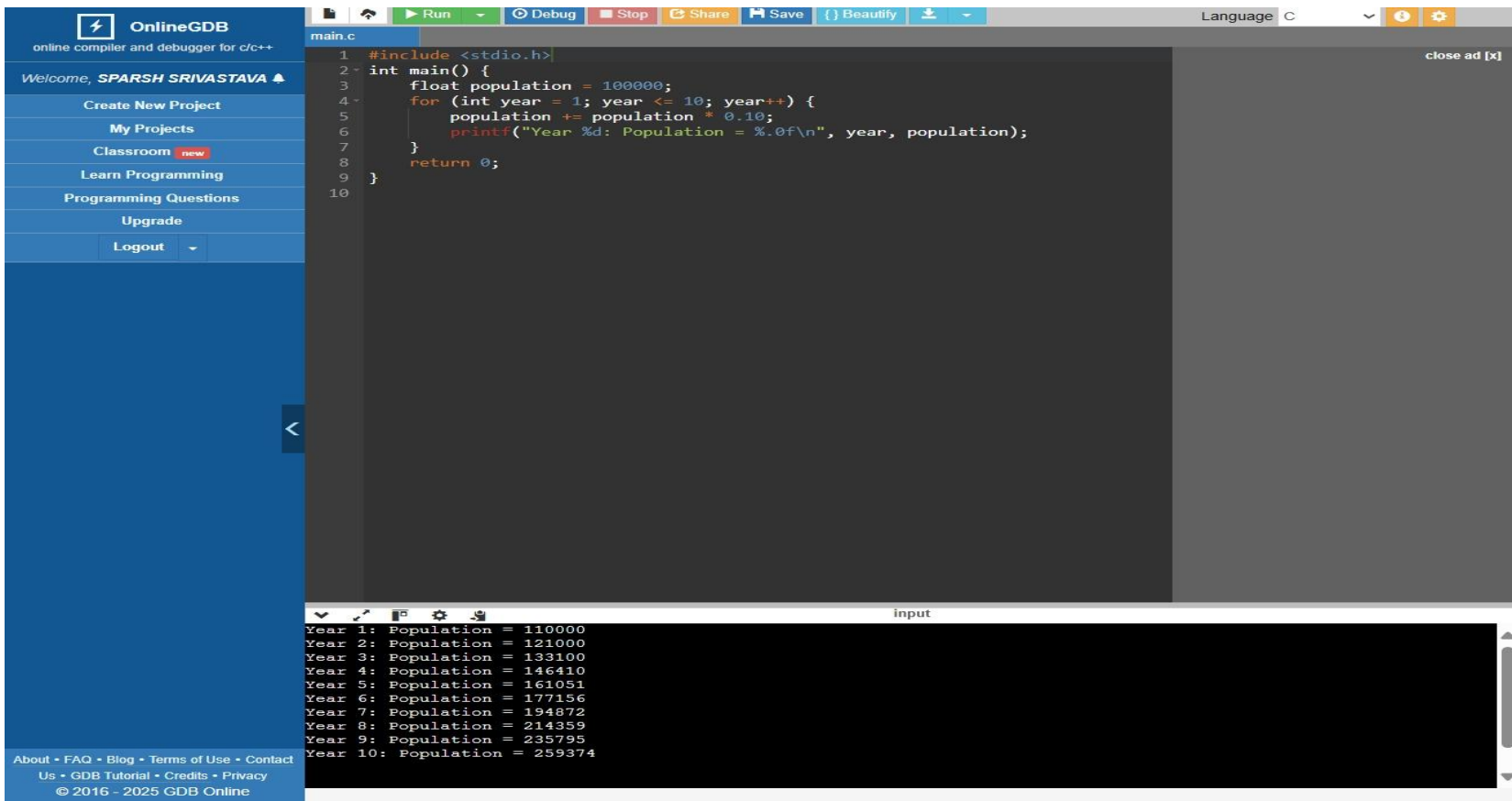
close ad [x]

input

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

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

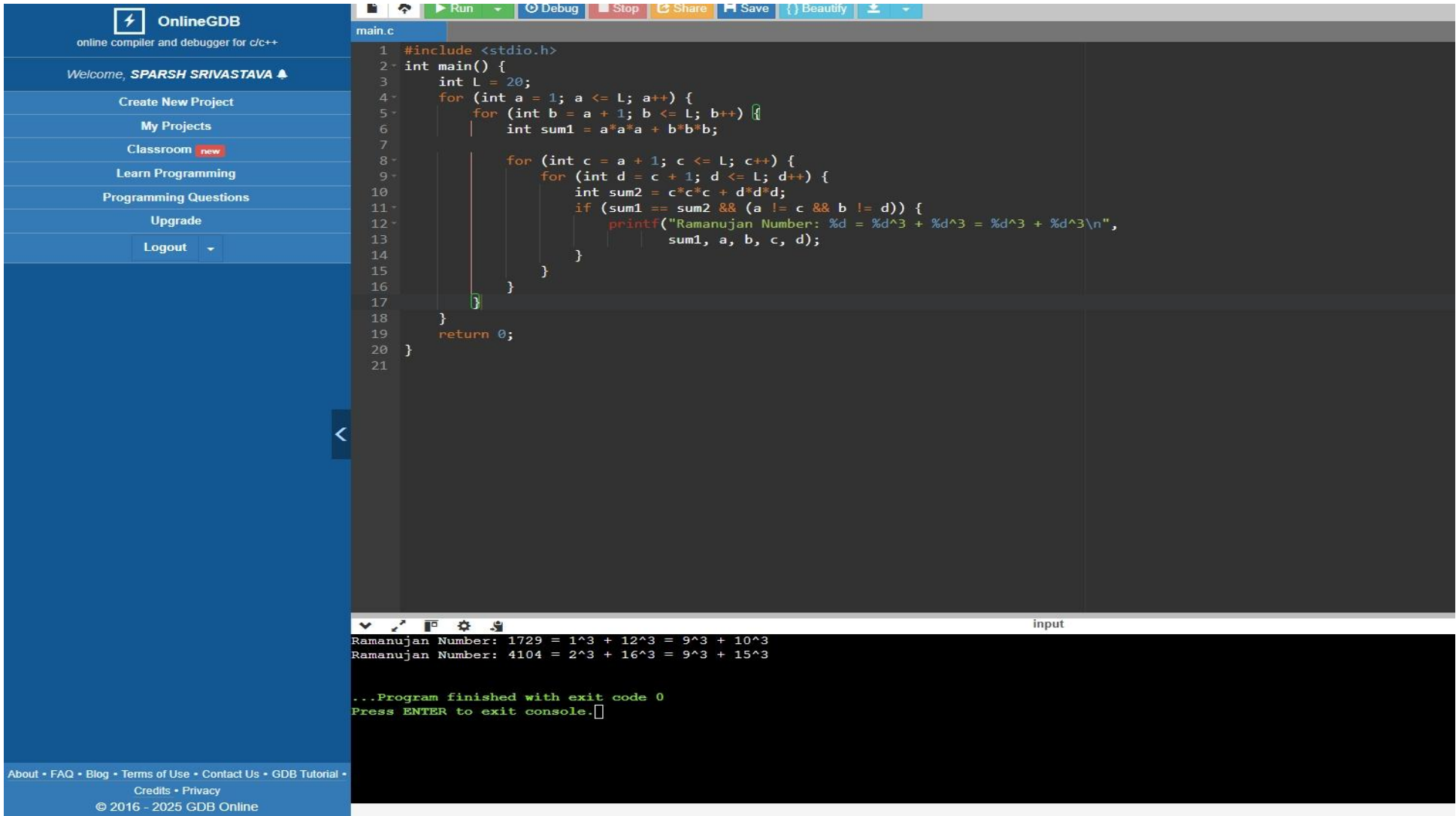
4. The population of a town is 100000. The population has increased steadily at the rate of 10% per year for the last 10 years. Write a program to determine the population at the end of each year in the last decade.



```
1 #include <stdio.h>
2 int main() {
3     float population = 100000;
4     for (int year = 1; year <= 10; year++) {
5         population += population * 0.10;
6         printf("Year %d: Population = %.0f\n", year, population);
7     }
8     return 0;
9 }
10
```

Year 1: Population = 110000  
Year 2: Population = 121000  
Year 3: Population = 133100  
Year 4: Population = 146410  
Year 5: Population = 161051  
Year 6: Population = 177156  
Year 7: Population = 194872  
Year 8: Population = 214359  
Year 9: Population = 235795  
Year 10: Population = 259374

**5. Ramanujan Number is the smallest number that can be expressed as the sum of two cubes in two different ways. WAP to print all such numbers up to a reasonable limit. Example of Ramanujan number: 1729  $12^3 + 1^3$  and  $10^3 + 9^3$ . for a number  $L=20$ (that is limit)**



```
1 #include <stdio.h>
2 int main() {
3     int L = 20;
4     for (int a = 1; a <= L; a++) {
5         for (int b = a + 1; b <= L; b++) {
6             int sum1 = a*a*a + b*b*b;
7
8             for (int c = a + 1; c <= L; c++) {
9                 for (int d = c + 1; d <= L; d++) {
10                     int sum2 = c*c*c + d*d*d;
11                     if (sum1 == sum2 && (a != c && b != d)) {
12                         printf("Ramanujan Number: %d = %d^3 + %d^3 = %d^3 + %d^3\n",
13                             sum1, a, b, c, d);
14                     }
15                 }
16             }
17         }
18     }
19     return 0;
20 }
21
```

Ramanujan Number: 1729 = 1^3 + 12^3 = 9^3 + 10^3  
Ramanujan Number: 4104 = 2^3 + 16^3 = 9^3 + 15^3

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

## EXPERIMENT 4

1) <https://onlinegdb.com/xBUVyJTbp>

2) <https://onlinegdb.com/3wvQzVgZX>



## Experiment 5

- 1) <https://onlinegdb.com/nMUyTKpmE>
- 2) <https://onlinegdb.com/Gd6YkpEFI> (chatgpt)
- 3) <https://onlinegdb.com/l6Gi-0y6N> chatgpt
- 4) [https://onlinegdb.com/\\_GajliAub](https://onlinegdb.com/_GajliAub) chatgpt

## Experiment 7.1

- 1) [https://onlinegdb.com/\\_lbtdf1yt](https://onlinegdb.com/_lbtdf1yt)
- 3) <https://onlinegdb.com/RAa4CyZe1X>
- 4 ) [https://onlinegdb.com/w\\_StGlCew](https://onlinegdb.com/w_StGlCew)