

GNG1106 C  
PROFESSOR: SHERVIN SHIRMOHAMMADI

LAB REPORT BY  
NIBRAS MUHAMMAD SHAHIN  
STUDENT ID: 7927069

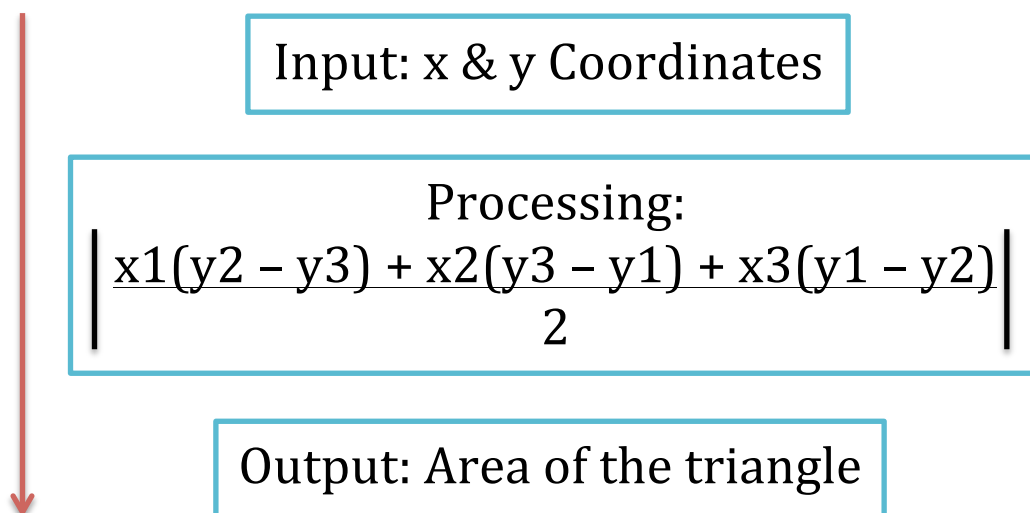
***LAB 1***  
***COMPUTE THE AREA OF A TRIANGLE***

## Step 1: Problem Identification & Definition

We need to develop a software that will compute the area of a triangle using the coordinates entered by the user.

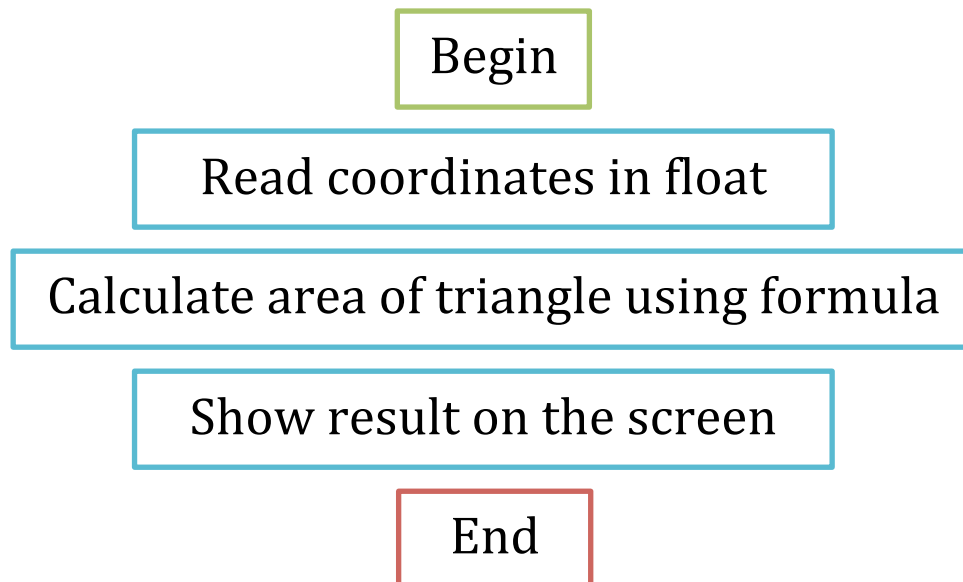
## Step 2: Gathering of Information & I/O Description

- The points of the coordinates must be float to allow input of decimal numbers.
- User should be prompted to enter the x coordinate first and then the y coordinate for each point
- A formula for calculating the area of the triangle must be used to produce a result
- The value after calculation must be converted to an absolute value (using fabs) to avoid showing a negative result.



### Step 3: Algorithm Development & Verification

- Indicate that the following variables are float
- Print the instruction for the user to enter the x coordinate of the first point
- Scan the variable for the program to be able to read the float number entered
- Use `\n` to print the instruction for the y coordinate of the first point in the next line
- Repeat previous 3 steps to obtain coordinates of all 3 points
- Use a formula to calculate the area of the triangle using the coordinates of the points entered.



Points	Test 1	Test 2	Test 3
x1	15.0	2.0	4.5
y1	15.0	2.0	6.0
x2	23.0	-2.0	-3.0
y2	30.0	2.0	4.0
x3	50.0	0.0	6.3
y3	25.0	-4.0	0.0

Test 1

$$\left| \frac{15(30 - 25) + 23(25 - 15) + 50(15 - 30)}{2} \right|$$

=222.5

Test 2

$$\left| \frac{2(2 - (-4)) + -2(-4 - 2) + 0(2 - 2)}{2} \right|$$

=12

Test 3

$$\left| \frac{4.5(4 - 0) + -3(0 - 6) + 6.3(6 - 4)}{2} \right|$$

=24.3

## Step 4: Implementation

```
1 #include <stdio.h>
2
3 void main ()
4 { //Code by Nibras Muhammad Shahin 7927069.
5     float x1, y1, x2, y2, x3, y3, a; //Indicating that the values we are going to deal with are float type
6
7     printf("USING THIS PROGRAM YOU CAN FIND THE AREA OF A TRIANGLE! WOW!"); //Introducing the user to the program
8
9     printf("\n\nPlease enter the x coordinate of the first point: ");
10    scanf("%f", &x1); //Indenting each scan to make it easier for others and myself to read the code
11    printf("\nPlease enter the y coordinate of the first point: ");
12    scanf("%f", &y1);
13    printf("\nPlease enter the x coordinate of the second point: ");
14    scanf("%f", &x2);
15    printf("\nPlease enter the y coordinate of the second point: ");
16    scanf("%f", &y2);
17    printf("\nPlease enter the x coordinate of the third point: ");
18    scanf("%f", &x3);
19    printf("\nPlease enter the y coordinate of the third point: ");
20    scanf("%f", &y3);
21
22    a= (x1*(y2 - y3) + x2*(y3 - y1) + x3*(y1 - y2))/2; //Formula used (without abs) to find the area of the triangle
23
24    printf("\n\nThe area of the triangle is %f unit square", fabs(a)); //fabs used to avoid negative result
25 }
26
```

```
#include <stdio.h>
```

```
void main ()
```

```
{ //Code by Nibras Muhammad Shahin 7927069.
```

```
float x1, y1, x2, y2, x3, y3, a; //Indicating that the values we are going to deal with are float type
```

```
printf("USING THIS PROGRAM YOU CAN FIND THE AREA OF A TRIANGLE! WOW!"); //Introducing the user to the program
```

```
printf("\n\nPlease enter the x coordinate of the first point: ");
```

```
scanf("%f", &x1); //Indenting each scan to make it easier for others and myself to read the code
```

```
printf("\nPlease enter the y coordinate of the first point: ");
```

```
scanf("%f", &y1);
```

```
printf("\nPlease enter the x coordinate of the second point: ");
```

```
scanf("%f", &x2);
```

```
printf("\nPlease enter the y coordinate of the second point: ");
```

```
scanf("%f", &y2);
```

```
printf("\nPlease enter the x coordinate of the third point: ");
```

```
scanf("%f", &x3);
```

```
printf("\nPlease enter the y coordinate of the third point: ");
```

```
scanf("%f", &y3);
```

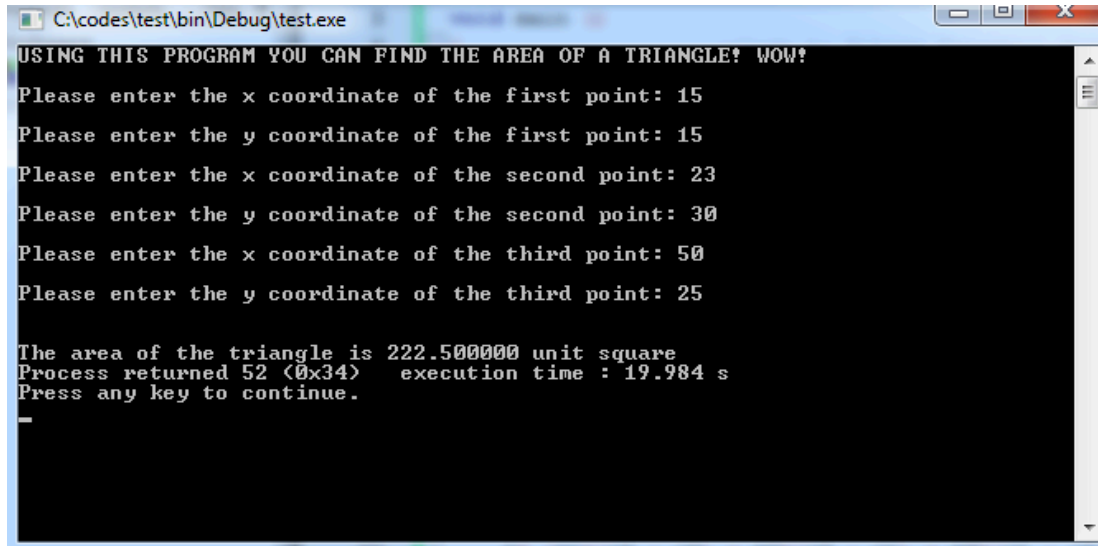
```
a= (x1*(y2 - y3) + x2*(y3 - y1) + x3*(y1 - y2))/2; //Formula used (without abs) to find the area of the triangle
```

```
printf("\n\nThe area of the triangle is %f unit square", fabs(a)); //fabs used to avoid negative result
```

```
}
```

# Step 5: Testing and Validation

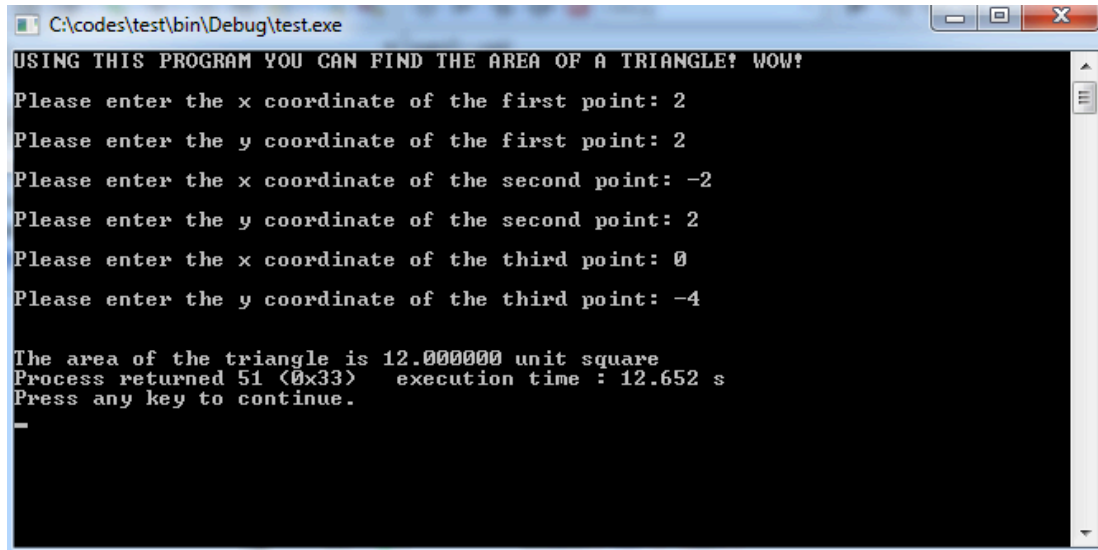
## Test 1



```
C:\codes\test\bin\Debug\test.exe
USING THIS PROGRAM YOU CAN FIND THE AREA OF A TRIANGLE! WOW!
Please enter the x coordinate of the first point: 15
Please enter the y coordinate of the first point: 15
Please enter the x coordinate of the second point: 23
Please enter the y coordinate of the second point: 30
Please enter the x coordinate of the third point: 50
Please enter the y coordinate of the third point: 25

The area of the triangle is 222.500000 unit square
Process returned 52 (0x34)   execution time : 19.984 s
Press any key to continue.
-
```

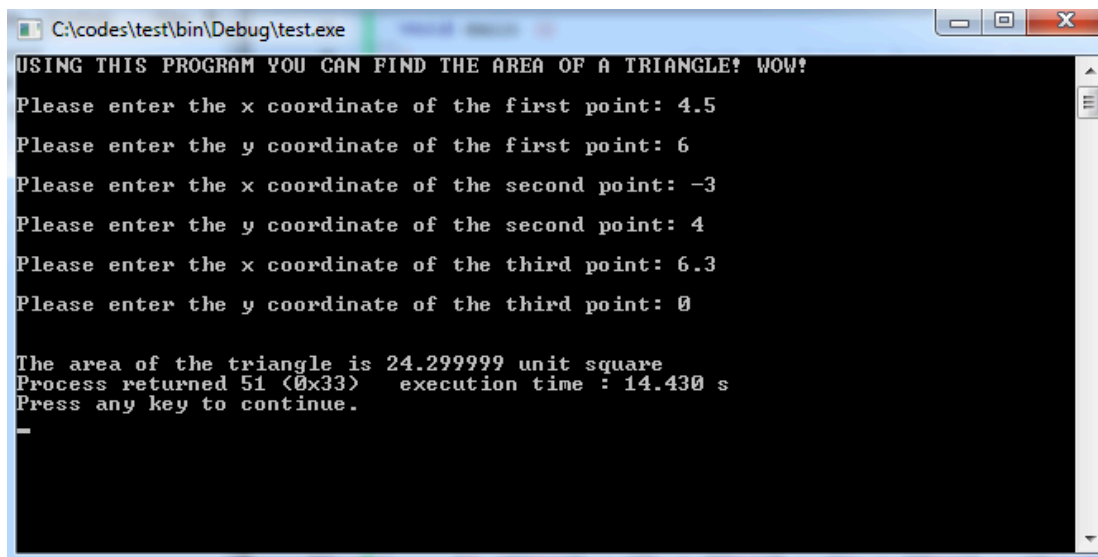
## Test 2



```
C:\codes\test\bin\Debug\test.exe
USING THIS PROGRAM YOU CAN FIND THE AREA OF A TRIANGLE! WOW!
Please enter the x coordinate of the first point: 2
Please enter the y coordinate of the first point: 2
Please enter the x coordinate of the second point: -2
Please enter the y coordinate of the second point: 2
Please enter the x coordinate of the third point: 0
Please enter the y coordinate of the third point: -4

The area of the triangle is 12.000000 unit square
Process returned 51 (0x33)   execution time : 12.652 s
Press any key to continue.
-
```

## Test 3



```
C:\codes\test\bin\Debug\test.exe
USING THIS PROGRAM YOU CAN FIND THE AREA OF A TRIANGLE! WOW!
Please enter the x coordinate of the first point: 4.5
Please enter the y coordinate of the first point: 6
Please enter the x coordinate of the second point: -3
Please enter the y coordinate of the second point: 4
Please enter the x coordinate of the third point: 6.3
Please enter the y coordinate of the third point: 0

The area of the triangle is 24.299999 unit square
Process returned 51 (0x33)   execution time : 14.430 s
Press any key to continue.
-
```