CSE 1062 **Fundamentals of Programming**

Lecture #4

Spring 2016

Computer Science & Engineering Program
The School of EE & Computing
Adama Science & Technology University

- Basic C++ Programming Practice
  - Finding Errors
    - Syntax Errors
    - Runtime Errors
  - Heat Transfer Case Study
  - Size of Data Types
  - Practice Exercise 1
  - Practice Exercise 2
  - General Problems(Maths and Physics)

Syntax Errors

ASTU

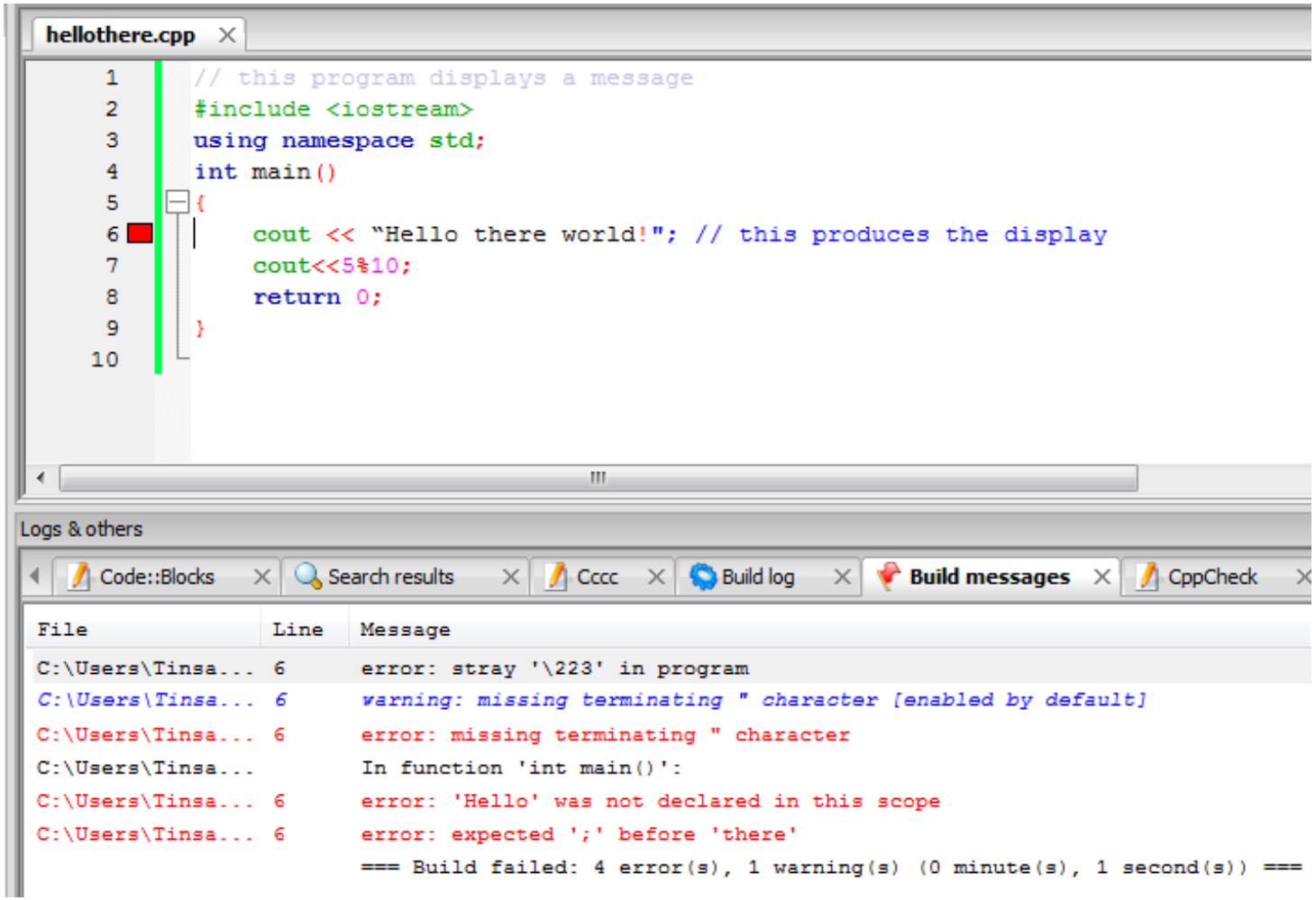
- Code::Blocks shows errors using the red marker
  - **The top most error shows up first**
  - See error details in the log window

```
1   // this program displays a message
2   #include <iosstream>
3   using namespace std;
4   int main()
5   {
6       cout << "Hello there world!"; // this produces the display
7       cout<<5%10;
8       return 0;
9   }
10
```

Syntax Errors

ASTU

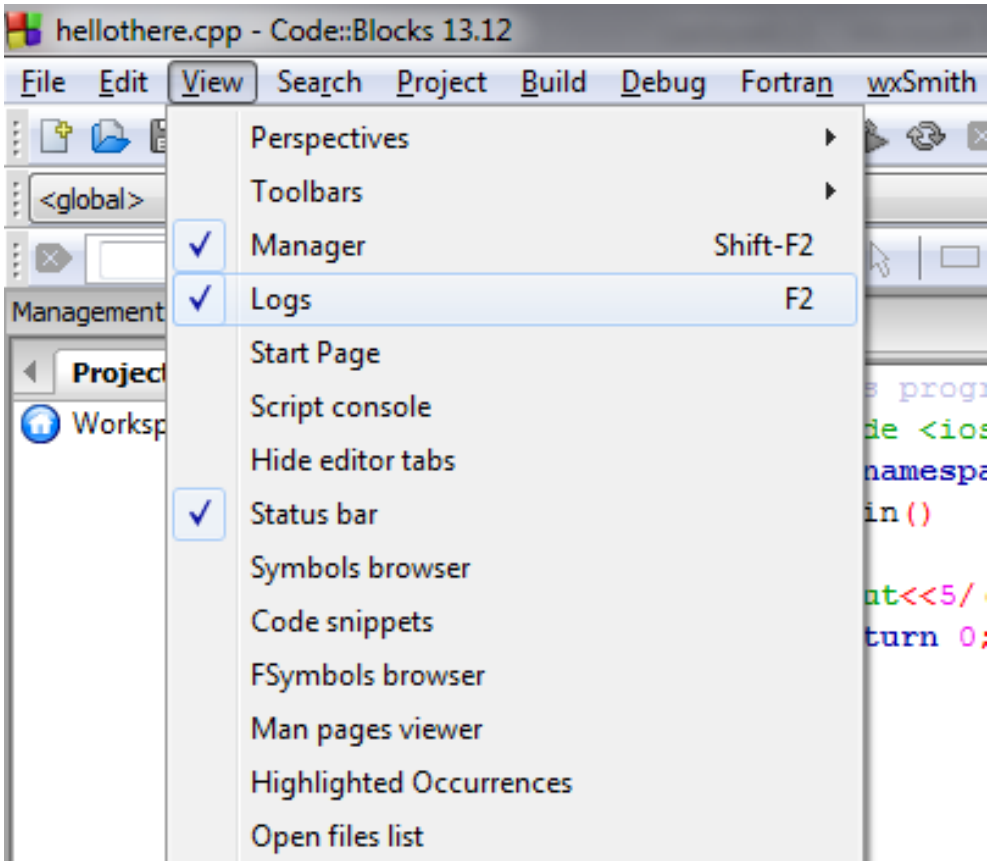
- The first error is corrected, now it moves to the next error



Can’t See Logs

ASTU

- If you can’t see the build messages, mak e sure the Logs is checked on View men u



Run-time Errors

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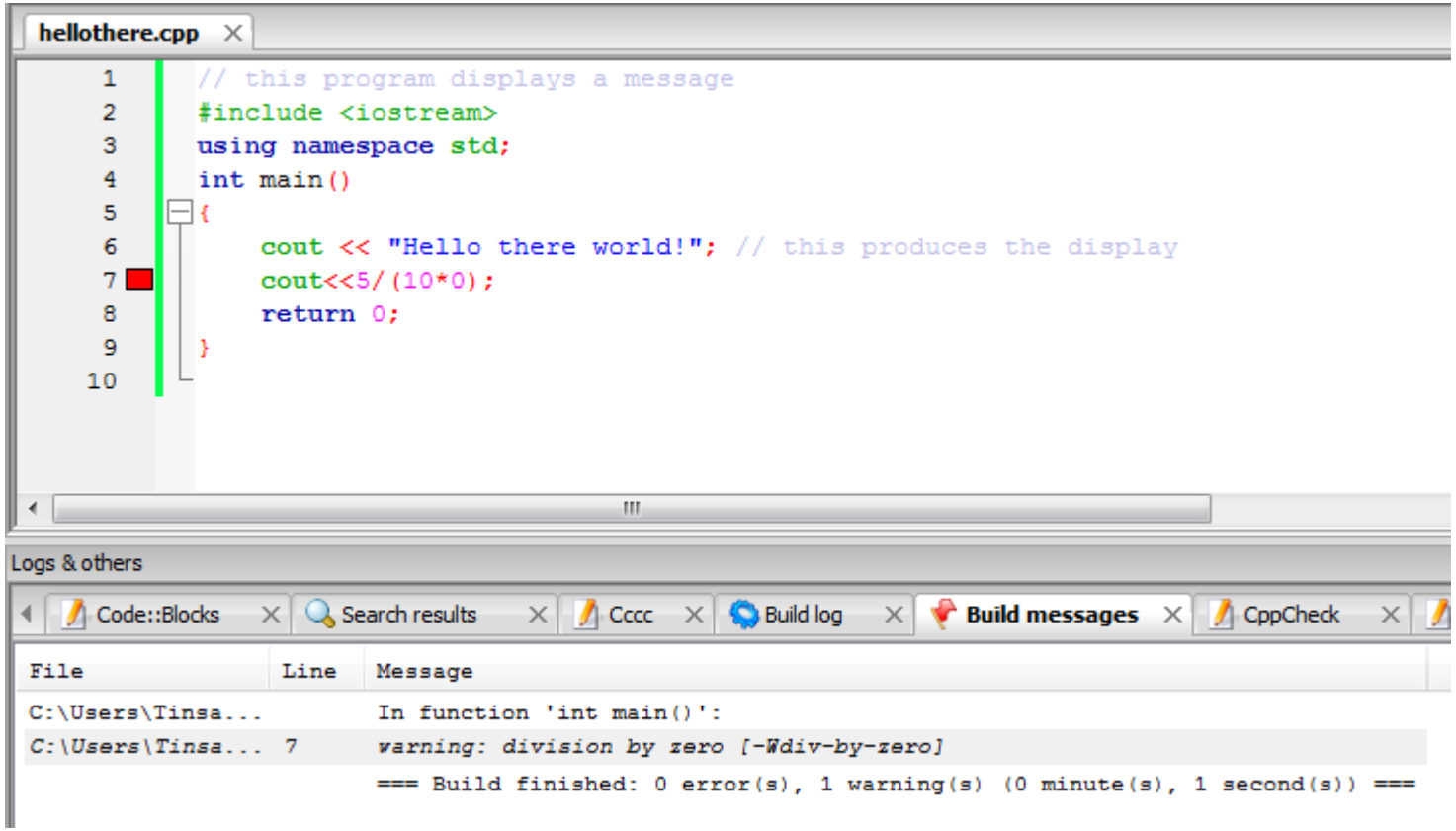
- The Program will break and code::blocks shows you a warning for the next build



Case Study: Heat Transfer

ASTU

- In Lecture 1 you developed simple al gorithm for the heat transfer problem
- Finish the remaining steps
  - **Coding**
  - **Testing**

Size of Data Types

- A unique feature of C++ is that you can see where and how values are stored
  - **`sizeof()`** operator provides the number of bytes used to store values of the data type named in the parenthesis
  - Values returned by **`sizeof()`** are compiler dependent

Size of Data Types

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```
1   #include <iostream>
2   using namespace std;
3   int main()
4   {
5     cout << "\nData Type    Bytes"
6          << "\n---------    -----"
7          << "\nint           " << sizeof(int)
8          << "\nchar          " << sizeof(char)
9          << "\nbool          " << sizeof(bool)
10         << '\n';
11    return 0;
12  }
13
```

Practice Exercise 1

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- Using cout, write a C++ program that di splays your name on one line, your id nu mber on a second line, and your city, reg ion, and phone number on a third line
- Run the program

Practice Exercise 2

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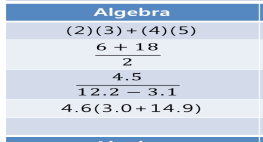
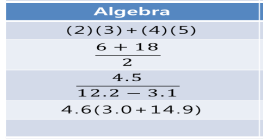
- For the following correct algebraic expressions and corresponding incorrect C++ expressions, find the errors and write corrected C++ expressions in one C++ program

Algebra	C++ Expression
$(2)(3)+(4)(5)$	(2)(3)+(4)(5)
	6+18/2
	4.5/12.2-3.1
$4.6(3.0+14.9)$	4.6(3.0+14.9)

Algebra	C++ Expression
(2)(3)+(4)(5)	(2)(3)+(4)(5)
$\frac{6+18}{2}$	6+18/2
$\frac{4.5}{12.2-3.1}$	4.5/12.2-3.1
4.6(3.0+14.9)	4.6(3.0+14.9)

Practice Exercise 2…

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- Write a C++ program that displays the results of the expressions

  3.0*5.0,

  7.1 * 8.3 - 2.2

  3.2 / (6.1 * 5).

- Calculate the value of these expressions manually to verify that the displayed values are correct.

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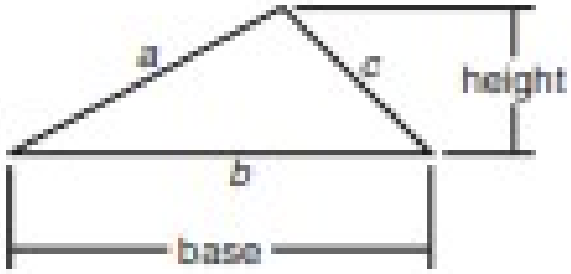
- Design, write, compile, and run a C++ program that calculates and displays the area of a triangle, with a base of 1 in and a height of 1.5 in.
- $Area = 1/2(base)x(height)$
- Test the program with different values



General Problems

- Design, write, compile, and run a C++ program to calculate the volume of a sphere with a radius, r, of 2 in.
- Test the program with different values

$$volume = \frac{4\pi r^3}{3}$$

- Design, write, compile, and run a C++ program to calculate the elapsed time it takes to make a 183.67-mile trip. This is the formula for computing elapsed time

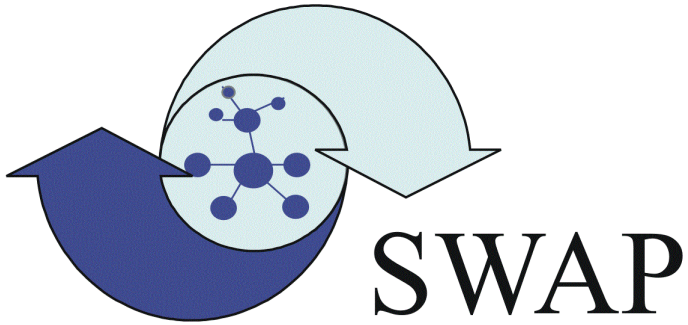
  elapsed time = total distance / average speed

  The average speed during the trip is 58 mph.

  - Test it with different average speeds

General Problems

- Write a program that accepts the value o f temperature in Fahrenheit and converts to its Celsius equivalent. (hint C=F-32*5/ 9)
- Test it with different temperatures



- Swap the contents of two variables usin g a third variable.
- Swap the contents of two variables with out using a third variable.

General Problems

- Input(cin) is covered in the next lecture
- Write a program that accepts the value o f temperature in Fahrenheit and converts to its Celsius equivalent. (hint C=F-32*5/ 9)
- Test it with different temperatures

- Suppose that the cost of sending an international fax is calculated as follows: The service charge is ETB 3.00, 20 cents per page for the first 10 pages, and 10 cents for each additional page. Write a C++ program that asks the user to enter the number of pages to be faxed. The program then uses the number of pages to be faxed to calculate the amount due.

General Problems

- Write a program that evaluate the following expressions by accepting the necessary values from the keyboard:

$$C = \sqrt{a^2 + b^2}$$

$$Y = 5x^2+9x-35$$