

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)

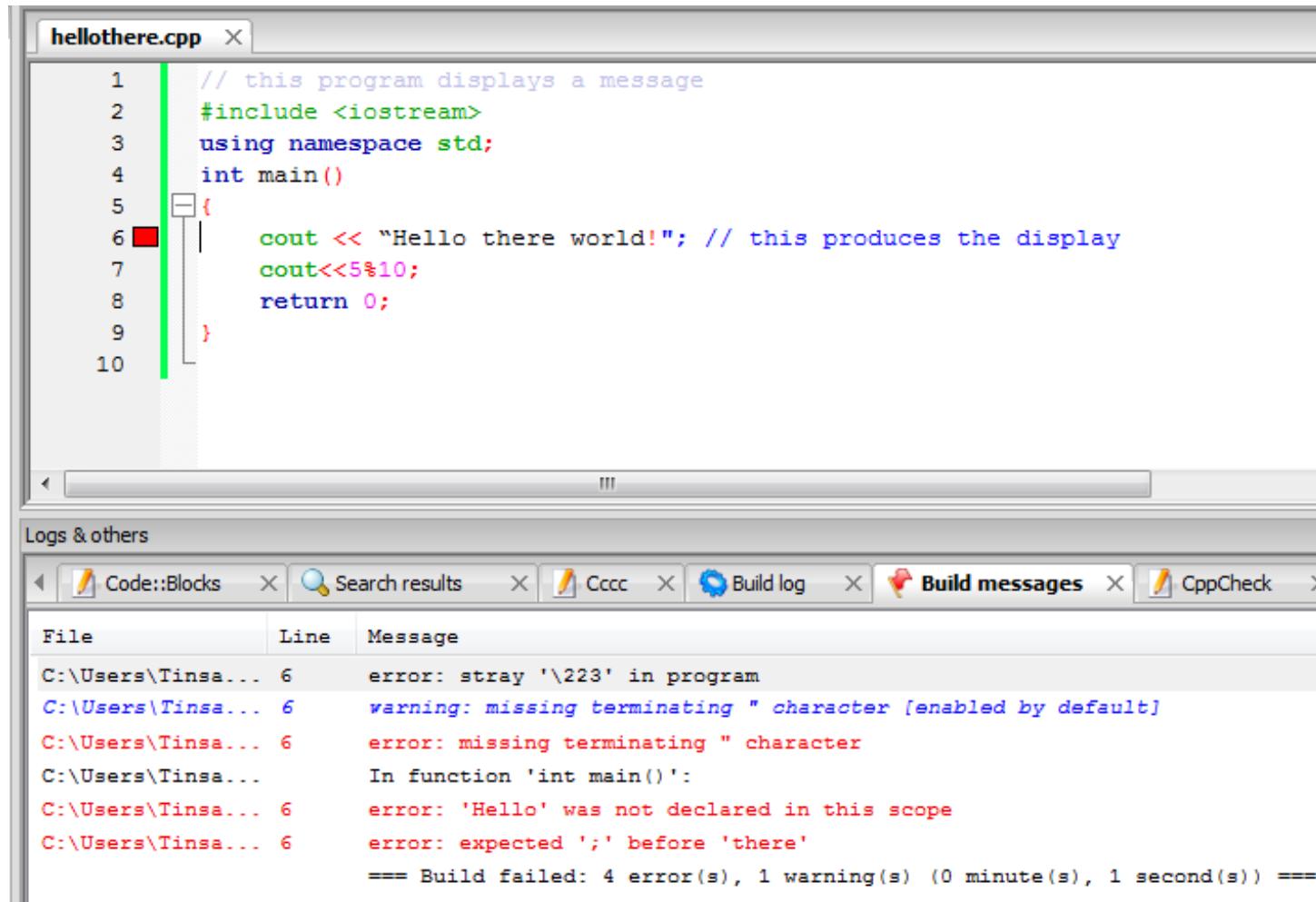


- Code::Blocks shows errors using the red marker
 - **The top most error shows up first**
 - See error details in the log window

```
1 // this program displays a message
2 #include <iostream>
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 }
```

A screenshot of a C++ code editor showing a syntax error. Line 2, which contains the preprocessor directive '#include <iostream>', has a red square marker next to it, indicating an error. A vertical green bar highlights the entire line of code. A small blue square icon is positioned near the start of line 5, likely indicating the current cursor position or the start of a block.

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

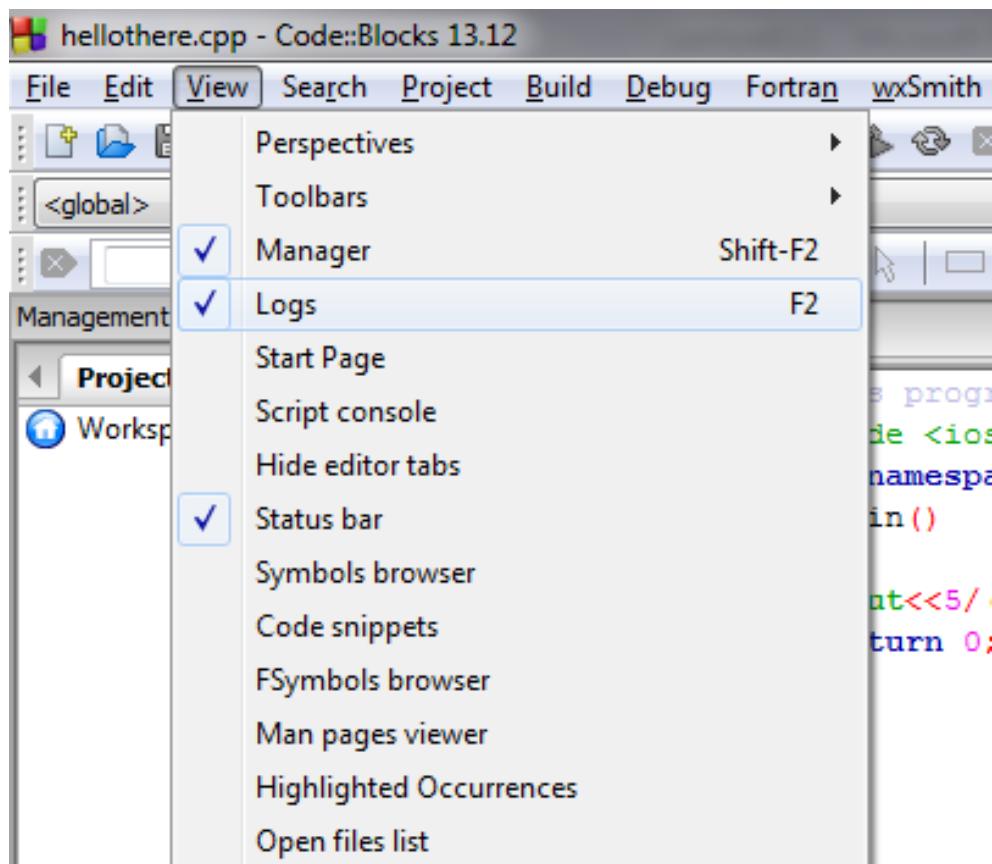


The screenshot shows the Code::Blocks IDE interface. The top window displays the code file `hellothere.cpp` with line numbers 1 through 10. A red square highlights the opening brace of the `main()` function at line 6. The bottom window, titled "Logs & others", shows the "Build messages" tab with the following log output:

File	Line	Message
C:\Users\Tinsa...	6	error: stray '\223' in program
C:\Users\Tinsa...	6	warning: missing terminating " character [enabled by default]
C:\Users\Tinsa...	6	error: missing terminating " character
C:\Users\Tinsa...		In function 'int main()':
C:\Users\Tinsa...	6	error: 'Hello' was not declared in this scope
C:\Users\Tinsa...	6	error: expected ';' before 'there'
		== Build failed: 4 error(s), 1 warning(s) (0 minute(s), 1 second(s)) ==

Can't See Logs

- If you can't see the build messages, make sure the Logs is checked on View menu





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

The screenshot shows the Code::Blocks IDE interface. The main window displays a file named "hellothere.cpp" with the following code:

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

A red square marker highlights the division by zero operation at line 7. The bottom part of the interface shows the "Build messages" tab in the logs & others panel, displaying the following output:

File	Line	Message
C:\Users\Tinsa...		In function 'int main()':
C:\Users\Tinsa...	7	warning: division by zero [-Wdiv-by-zero]
== Build finished: 0 error(s), 1 warning(s) (0 minute(s), 1 second(s)) ==		

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

- 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

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



- Using cout, write a C++ program that displays your name on one line, your id number on a second line, and your city, region, and phone number on a third line
- Run the program

Practice Exercise 2

- 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				
$(2)(3)+(4)(5)$ <table border="1"><thead><tr><th>Algebra</th><th>C++ Expression</th></tr></thead><tbody><tr><td>$(2)(3)+(4)(5)$ $\frac{6 + 18}{2}$ $\frac{4.5}{12.2 - 3.1}$ $4.6(3.0 + 14.9)$</td><td>$(2)(3)+(4)(5)$ $6 + 18 / 2$ $4.5 / 12.2 - 3.1$ $4.6(3.0 + 14.9)$</td></tr></tbody></table>	Algebra	C++ Expression	$(2)(3)+(4)(5)$ $\frac{6 + 18}{2}$ $\frac{4.5}{12.2 - 3.1}$ $4.6(3.0 + 14.9)$	$(2)(3)+(4)(5)$ $6 + 18 / 2$ $4.5 / 12.2 - 3.1$ $4.6(3.0 + 14.9)$	$(2)(3)+(4)(5)$ $6 + 18 / 2$
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$4.6(3.0 + 14.9)$	$4.6(3.0 + 14.9)$				

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

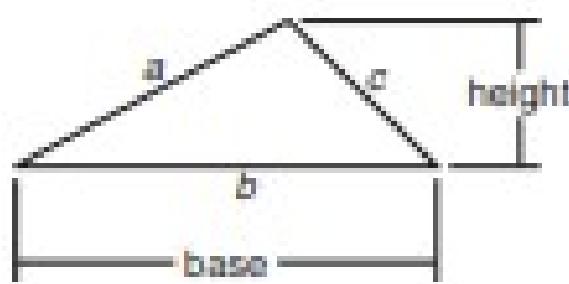
$3.0 * 5.0,$

$7.1 * 8.3 - 2.2$

$3.2 / (6.1 * 5).$

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

- 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.
- $Area = 1/2(base) \times (height)$
- Test the program with different values



- 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

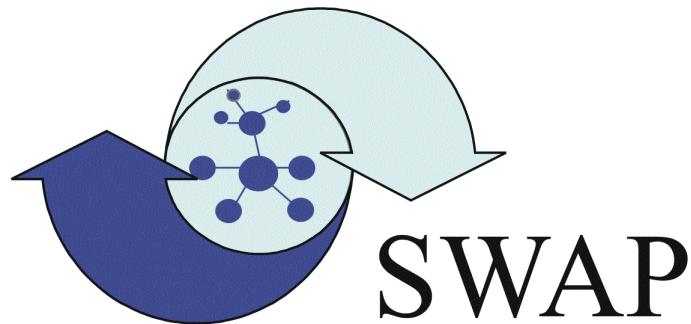
elapsed time = total distance / average speed

The average speed during the trip is 58 mph.

- Test it with different average speeds



- Write a program that accepts the value of 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 using a third variable.
- Swap the contents of two variables without using a third variable.

- **Input(cin) is covered in the next lecture**
- Write a program that accepts the value of 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.

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

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

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