

The Development Process

Syntax, Semantics,
The Curator, and
Debugging

Syntax and Semantics

- *Syntax* is the set of rules for combining language components (words, punctuation, etc.) into valid instructions.
- *Semantics* is the set of rules defining the meaning of valid instructions.

Syntax and Semantics (Example)

- Syntax for the assignment statement

```
Variable = Expression ;
```

- Semantics
 - Assign the value of the expression on the right of the equals sign to the variable named on the left.

3

Struble - Syntax...

Syntax Errors

- Failed to follow the syntax rules
- Detected by the compiler
 - When you build your executable
- Examples
 - Forgetting a semicolon at the end of declarations
 - Using a variable name that is not declared
 - Misspelling or different capitalization
 - Forgetting a curly brace to end the main program
 - Forgetting a comma between two identifiers in a variable declaration
 - Assigning a `string` to an `int` variable

4

Struble - Syntax...

Syntax Errors (Recovery Examples)

- Look carefully at the line the error occurred on to see if you broke a syntax rule (missing semicolon)
- For invalid identifiers, check your declarations and the line of the error for misspelling or different capitalization.

5

Struble - Syntax...

Linker Errors

- When the linker cannot find object files or other information for building your program
 - After the `Linking...` message
- Examples
 - Misspelled standard features to include like using `iostraem` instead of `iostream`
 - Using wrong project type
 - `WinMain` is somewhere in the error message

6

Struble - Syntax...

Execution Errors

- Program compiles just fine (Yahoo!), but something goes wrong during execution
 - Division by 0
- Detected when you run the program
- Computer usually prints an error message and stops
 - Sometimes you'll see the "Blue Screen of Death"

7

Struble - Syntax...

Logic Errors

- Program compiles OK
- Program executes and finishes normally
- The output of the program is wrong
 - Programmer has to find and fix errors
 - Most difficult to find
 - Must check algorithm and compare algorithm with code.
 - Often requires testing by hand.

8

Struble - Syntax...

Curator Grading

- The Curator automatically grades your program output by comparing it to the output of an instructor solution.
- The Curator responds to a submission via email
- All programs have a raw score of 100 points

9

Struble - Syntax...

Curator Grading

- Interpreting a line in the instructor solution output.

```
// Correct Output File: 12 lines
// _____
// [ 0]Programmer:  Bill McQuain
// [ 4]StarFleet Payroll
```

Points the
line is
worth

Contents of the line
of output

10

Struble - Syntax...

Curator Grading

- Points are split up evenly across *tokens* in a line.
 - Text between spaces

```
// [ 4]StarFleet Payroll
```

```
// Macro$oft Corporation Payroll
```

Compares
each token
from left to
right

11

Struble - Syntax...

Curator Grading

- Most common mistakes
 - Spelling
 - valeus instead of values
 - Extra spaces
 - summed : instead of summed:
 - Missing spaces
 - GrossPay instead of Gross Pay
 - Capitalization
 - Values instead of values

12

Struble - Syntax...

Curator Grading

- Fails to compile
 - May have submitted input file or executable, submit source (.cpp) file instead
- Fails to create output file
 - Make sure output file name is spelled properly
 - Make sure input file name is spelled properly
 - Check for other run time errors using input sent by the Curator

13

Struble - Syntax...

Curator Grading

- If you fail to score 100 on the raw score
 - Don't submit again before identifying and fixing the problem
 - Test your program with the Curator's input file
- Other problems
 - Extra or missing lines
 - Never completing (we'll talk about this later)

14

Struble - Syntax...