



Oregon State
University

COLLEGE OF ENGINEERING

School of Electrical Engineering
and Computer Science

CS 161

Intro to CS I

Variables and Input

Odds and Ends



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- Sign up for Assignment 1 Demo
- Peerceptiv Peer Reviews
 - Peer Reviews due Thursday, 11:59pm
 - Back evaluations due Sunday, 11:59pm
- Assignment 2 posted
- Questions?

Reflections



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- Why do we care about `climits` or `sizeof()`?
- Why did we have to typecast `pow()`?

More C++



- Programming Style: please read your class style guide
 - Program Header/Description
 - Placement of {}
 - Indentation: spaces vs. tabs
- String Literal in quotations, ""
 - Not single quotes!
 - INCORRECT: std::cout << 'Hello World';
 - Do not span more than one line!
 - INCORRECT: std::cout << "Hello
World";

More C++



- Escape Sequences
 - Display special characters
 - Use backslash, \, before special character to print
- Examples:

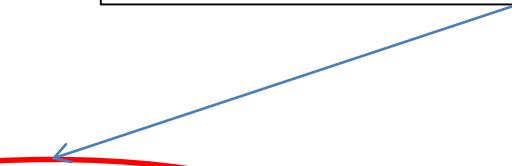
```
std::cout << "\"Hello World\"\\n";
```
- Refer online for common escape sequences:
<http://en.cppreference.com/w/cpp/language/escape>



Data Type

- What is data?
 - Information
 - Ex: std::cout << "Hello World!" << std::endl;
 - Literals
 - 23, 79.5, "Hello", etc.
- What is a data type?
 - Description of the kind of information
 - Primitive Data
 - User Created – (we will cover later)

What are you sending the function?



C++ Primitive Types



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- **char, double, float, int, long, short, bool**
- Fundamental
 - **short/int/long**: whole numbers, e.g. 45, -89, 0
 - **float/double**: real numbers, e.g. 2.612, -30.5, 2.3e5
 - **char**: characters, e.g. 'A', '&', 'x', '\'
- Signed by default, need to preface with **unsigned** keyword
 - **unsigned int**
 - **unsigned float**
 - **unsigned char**



Pieces of an Expression

- **Operators:** indicate operation
 - Add +
 - Subtract -
 - Multiply *
 - Divide /
 - Remainder %
- **Operands:** values in the expression
- **Evaluation:** process of obtaining results from operations on operands

Precedence



- What is precedence?
 - Binding power of operator
 - $(*, /, \%)$ vs. $(+, -)$
- How do we override precedence?
 - Parenthesis!
- Examples:
 $12 * 4 + 6 * 10$ vs. $((12 * 4) + 6) * 10$

Arithmetic



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- **Integer Arithmetic**

```
std::cout << 3/8; /*prints 0*/
```

```
std::cout << 34/5; /*prints 6*/
```

- **Floating Point Arithmetic**

```
std::cout << 34.0/5.0; /*prints 6.8*/
```

```
std::cout << 3.0/8; /*prints .375*/
```

```
std::cout << 3/8.0; /*prints .375*/
```



Type Casting

- **Casting**

```
std::cout << 34 / (int) 5.0; /*prints 6*/  
std::cout << (int) (34 / 5.0); /*prints 6*/  
std::cout << (float) 34 / 5; /*prints 6.8*/
```

- **What is wrong with these?**

```
std::cout << (int) 34 / 5.0; /*prints 6.8*/  
std::cout << (float) (34/5); /*prints 6.0*/
```

Variables



- What is a variable?
 - Memory location with name and type to store value
- What is a declaration?
 - Statement requesting variable w/ name and type
 - Examples:
 - double height;
 - int age;



Variables/Identifiers

- Identifier: name given to item in program
 - Ex. Variables and Functions
 - Start with letter
 - Letters include: upper-case, lower-case, underscore (_)
 - Followed by sequence of letters and digits
- **Good examples:** hiThere, two_plus_two, _hello
- **Bad examples:** 5dogs, hi-there, hello there
- Can't Use Keywords:
<http://en.cppreference.com/w/cpp/keyword>

Variables



- How do we get a value in the variable?
 - Assignment Statement

```
int age;
```

```
age = 20;
```

Or

```
int age = 20;
```

- **=** IS NOT equal to!!!!
 - “gets” or “is assigned”



Printing Variables/Reading Into Variables

- C++: **cout**
 - Example:

```
std::cout << "The integer value is: "<< value;
```
 - What about the newline?
- C++: **cin**
 - Example:

```
std::cin >> value;
```

variable to print

value

Demo...



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randO demo...



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Constants

- What is a constant?
- How do we define a constant?
 - Use of a macro
 - `#define`
 - Placed at top of program
 - No semicolon at end
 - Example: **#define MAX_SIZE 100**
 - Use of `const`
 - Same as declaring variable but `const`
 - Example: **const int MAX_SIZE = 100;**

Demo...



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Additional Operators

- Common operation: fetch/store same variable
 - var=var + 2; //increment variable contents
 - var=var * 2; //double variable contents
 - operator/assignment combination (all ops supported):
 - var += 2;
 - var *= 2;
- Pre/Post increment/decrement: ++ and --
 - Example: age++ vs. ++age

Demo...



Prediction



- What are conditional statements?
- How do we implement these in C++?