CS 161
Intro to CS I

More Programming and Conditional Statements

OSU Oregon State University

Odds and Ends…

- Recitation Quiz #1 due today by 11:59pm
  - Email to specific recitation TA

- Assignment #1 due Sunday by 11:59pm
  - Submit on TEACH
  - If off campus, need VPN for mapped network drive
  - It must compile and run on ENGR!!!

- Make demo appointment (signup homepage)

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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;**

Intro to Macros

- C++: <climits>
- Use MIN and MAX macros from library
  http://www.cplusplus.com/reference/clibrary/climits/
  (Note that the values listed are not the values on our system!!!)
  - INT_MAX
  - INT_MIN
  - LONG_MAX
  - LONG_MIN
  - SHRT_MAX
  - SHRT_MIN
- Remember unsigned too…

Demo…

Expressions

- ## What is an expression?
    - ### Set of operations producing a value
        - Combining literal values

        12 * 4 + 6 * 10 vs. ((12 * 4) + 6) * 10

        - Combining variables

        var1 * var2 + var3 * var4 vs. ((var1 * var2) + var3) * var4

Expressions cont.

- Pieces of an Expression:
  - Operators
    - Indicate operation, e.g. +, *, /, -, %
  - Operands
    - Values in the expression
  - Evaluation
    - Process of obtaining results from operations on operands

Arithmetic Operators

- Add
  34 + 23
- Subtract
  34 - 23
- Multiply
  2 * 23
- Divide
  40 / 10
- Remainder/Mod
  34 % 5

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

- Integer Arithmetic
  ```
  std::cout << 3/8;   /*prints 0*/
  std::cout << 34/5;   /*prints 6*/
  int age=5;
  std::cout << age/2;   /*prints 2*/
  ```

- Floating Point Arithmetic
  ```
  std::cout << 34.0/5.0;   /*prints 6.8*/
  std::cout << 3.0/8;   /*prints .375*/
  float years=2.0;
  std::cout << age/years;   /*prints 2.5*/
  ```

Type Casting

- Casting

  std::cout << age / (int) years; /*prints 2*/

  std::cout << (int) (age / years); /*prints 2*/

  std::cout << (float) age / 2;   /*prints 2.5*/

- What is wrong with these?

  std::cout << (int) age / years; /*prints 2.5*/

  std::cout << (float) (age/2);   /*prints 2.0*/

Demo…

Additional Operators

- Common operation: fetch/store same variable

  var=var + 2; //increment variable contents

  var=var * 2; //double variable contents

  – Assignment/operator combination (all ops supported):

    var += 2;

    var *= 2;

- Pre/Post increment/decrement: ++ and –

  – Example: age++ vs. ++age

Demo…

Decisions in Life

- What is a decision?
- When do we make decisions?
- How do we make decisions?

  If it is sunny today

    then I'll go to the beach and fly a kite

  Else if it is raining today

    then I'll stay inside and read a book

  Else if it is snowing

   then I'll go to the mountains to ski

Decisions within Decisions

- What happens if there is no wind at the beach?

- How does this change our decisions?

  If it is sunny today

    then I'll go to the beach

    if it is windy at the beach

      then I'll fly a kite

    if it is not windy at the beach

      then I'll walk on the shore

Flow chart for decisions