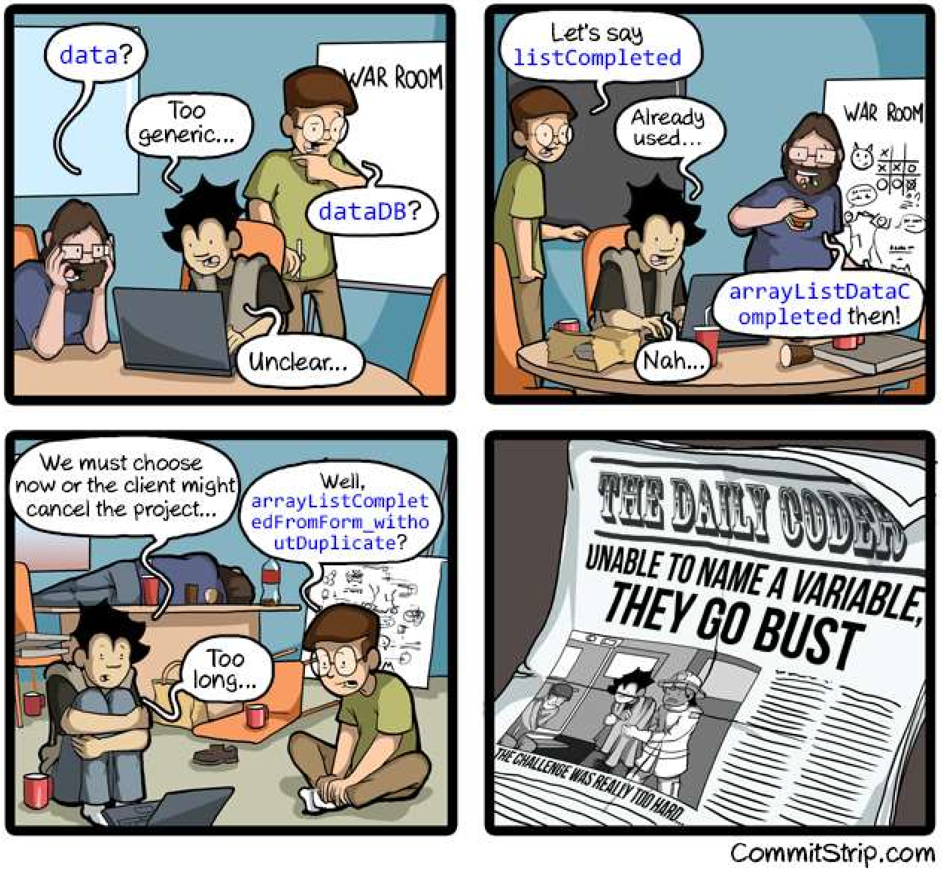
CS 161, Lecture 2: Variables and Math – 12 January 2018


data?
Too generic...
dataDB?
Unclear...
WAR ROOM
Let's say listCompleted
Already used...
arrayListDataCompleted then!
Nah...
WAR ROOM
We must choose now or the client might cancel the project...
Well, arrayListCompletedFromForm_withoutDuplicate?
Too long...
THE DAILY CODER
UNABLE TO NAME A VARIABLE, THEY GO BUST
THE CHALLENGE WAS REALLY TOO HARD
CommitStrip.com

How to Name

- Names also known as identifiers are given to variables and function
- Start with letter: upper case, lower case, underscore
- Followed by sequence of letters and digits
  - Good: myVar, result_of_eq1, _hello
  - Bad: 1234, my-Var, 2eq_res
- Can’t use keywords

Assigning Values to Variables

- Point of variables is to hold data
- Declare a variable
  - int my_num;
- Use '=' followed by the data you want to store (data must be same type as what was declared)
  - my_num = 5;
- '=' is the assignment operator not a test for equivalence
  - say my_num "is assigned" or "gets" 5
- Can declare and assign on same line
  - int my_num = 5;

char letter = 'a';

string my_Str = "my string";

Printing Variables

- cout << “The result is: “ << result << endl;
- Alters out stream

Constants

- Constants do not change
- Two ways to create a constant
  - Define a macro
    - At top of program, no semicolon
    - #define MAX_SIZE 10000
    - MAX_SIZE will always be 10000 through out the entire program
  - Use const keyword
    - Same as declaring variable
    - const int MAX_SIZE 10000;

Predefined Macros

- Some macros already exist for things, typically import in library
- C++: <limits>
- Use MIN and MAX

Expressions

- Set of operations producing a value
- 12*4+6*10
- ((12*4)+6)*10
- var1*var2+var3*var4
- ((var1*var2) +var3)*var4

int num1 = ;

Pieces of an Expression

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

Precedence and Division Types

- Precedence: binding power of operator
  - Override with parenthesis
- Integer Arithmetic
  - std::cout << 3/8;
  - std::cout << 34/5;
  - int age = 5;
  - std::cout << age/2;
- Floating Point Arithmetic
  - std::cout << 3.0/8.0;
  - std::cout << 34.0/5.0;
  - float age = 5.0;
  - std::cout << age/2.0;

Type Casting

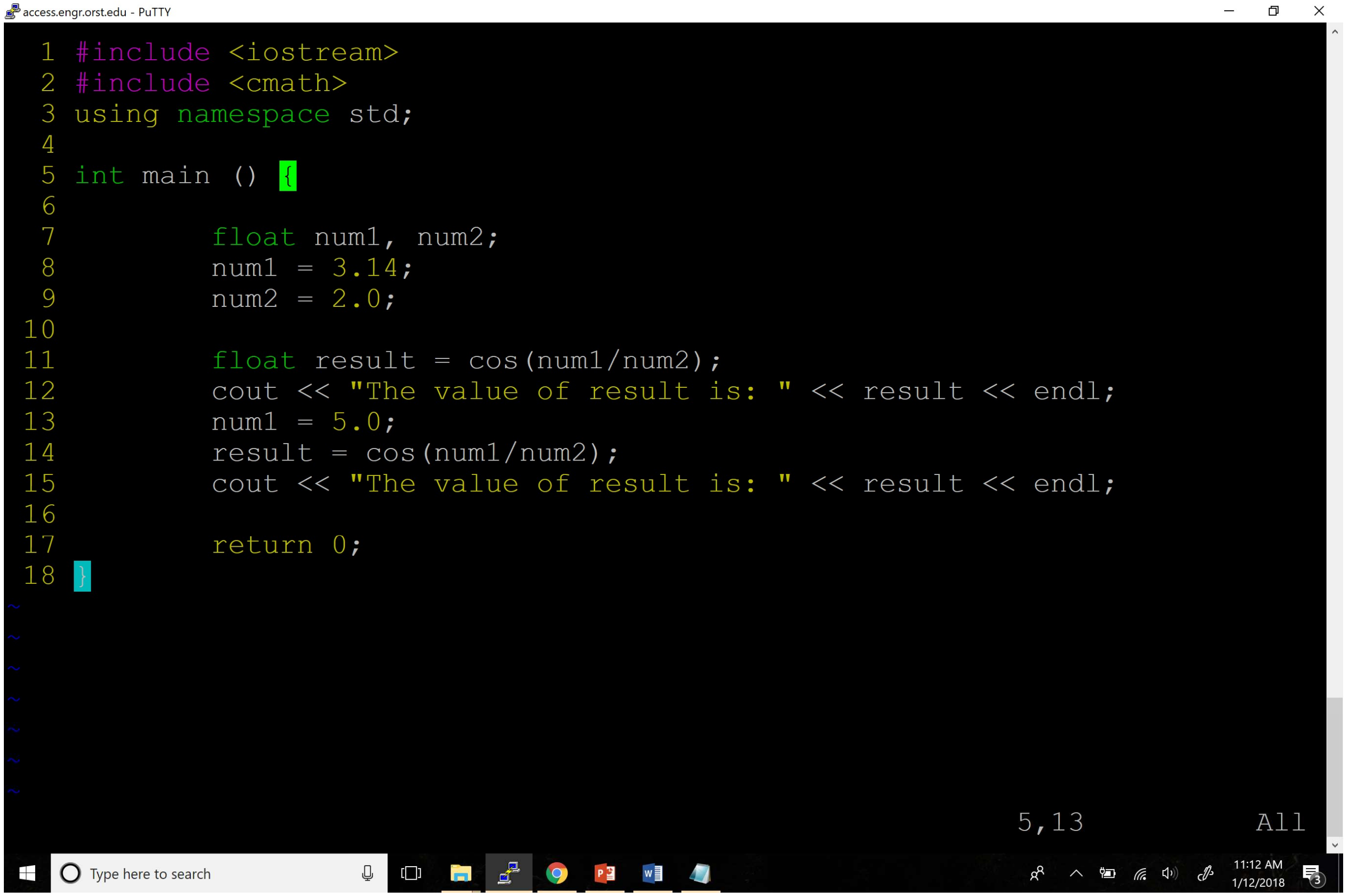
- Casting:
  - std::cout << age / (int) years; /*prints 2*/
  - std::cout << (int) (age / years); /*prints 2*/
  - std::cout << (float) age / 2; /*prints 2.5*/
- What is wrong with these?
  - std::cout << (int) age / years; /*prints 2.5*/
  - std::cout << (float) (age/2); /*prints 2.0*/

Additional Operators

- Fetch/store same variable
  - var = var + 2
  - var = var * 2
- Assignment/operator combination
  - var += 2
  - var *= 2
- Pre/Post increment/decrement: ++ and –
  - age++ vs. ++age

- https://tinyurl.com/yb9uzp28

Demo



```
#include <iostream>
#include <cmath>
using namespace std;

int main () {

        float num1, num2;
        num1 = 3.14;
        num2 = 2.0;

        float result = cos(num1/num2);
        cout << "The value of result is: " << result << endl;
        num1 = 5.0;
        result = cos(num1/num2);
        cout << "The value of result is: " << result << endl;

        return 0;
}
~
~
~
~
~
~
~
                                                  5,13          All
```