

# **CISC 1110 (CIS 1.5)**

## **Introduction to Programming Using C++**

Spring 2012  
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# Agenda

- What have we learned?
- Review solution to Lab 3
- Writing C++ Expressions
- cin statement
- Tips

# What have we learned?

- Basic C++ program structure
- cout statement
- variables
- variable declarations

# Step 1: Understand the problem

Newton's law of universal gravity states that the **force,  $F$** , between two bodies of **masses  $M_1$  and  $M_2$**  is given by:

$$F = k \left( \frac{M_1 M_2}{d^2} \right) \leftarrow$$

in which  **$k$**  is the gravitational **constant** and  $d$  is the distance between the bodies. The value of  **$k$**  is **approximately 0.667** dyn. cm<sup>2</sup>/kg<sup>2</sup>. Write a program to output the force between two bodies given that the mass of the first and second object is **59700kg** and **198892kg** respectively and they're **100** meters apart.

## Step 2: Write your pseudo code

Declare a variable force (float)

Declare a variable mass one (integer) and initialize it to 59700

Declare a variable mass two (integer) and initialize it to 198892

Declare a variable distance (integer) and initialize it to 100

Calculate the force between the objects (use equation above) and store the value in force

Display the value of variable force on the screen

# General Solution

Declarations

Assignment statement/Data Entry

Calculation

Output

## Step 3: Write the basic C++ code

```
#include <iostream>

using namespace std;

int main() {

    return 0;
}
```

## Step 4: Start coding

```
#include <iostream>

using namespace std;

int main() {

    float force;
    float k = 0.667;
    int mass1 = 59700;
    int mass2 = 198892;
    int distance = 100;

    force = (k * mass1 * mass2) / (distance * distance);

    cout << "Solution " << force;

    return 0;
}
```

# C++ Expressions

$$\textit{density} = \frac{M}{V}$$

```
density = M / V;
```

$$\textit{velocity} = \frac{x_1 + x_2}{t_1 + t_2}$$

```
velocity = (x1 + x2) / (t1 + t2);
```

## C++ Expressions Continued...

$$y = vt + \frac{1}{2}gt^2$$

$$y = (v * t) + (0.5 * g * t * t);$$

$$F = \frac{mv^2}{r}$$

$$F = (m * v * v) / r;$$

# cin Statement

```
cin >> variable;
```

- Puts data into variables from the standard input device (keyboard)

```
.  
. .  
double miles;
```

```
cin >> miles;  
. .  
.
```

# Tips

- Don't create new projects
- Don't use spaces in your file names (nor volume/flash drive name)
- Use the cpp extension only!
- EDIT -> SAVE -> COMPILE often