

# Exam 2 Review

## Lecture 10



# Format

- The exam will be 5-6 problems, with some problems having multiple sub-questions
- You are allowed a single 8.5x11” piece of paper with whatever notes you want on it
  - Can be handwritten or computer printed
  - You may use both the front and back
- No calculators, books, laptops, phones, or anything besides your single page of notes may be used
- Your responses must be **written in pen**



# Kinds of Questions to Expect

- Explain a program or part of a program
- Translate between “normal” math expressions and their C++ equivalents
- Write your own code
- Fix incorrect code / find bugs in code
- Fill in the blank (in a program)
- Short answer



# Content

Everything we've covered so far in the semester, including:

- Input and output (**cin** and **cout**)
- Mathematical expressions in C++ (order of operations, integer division, etc.)
- Conditional statements (**if-else**)
- Loops: **while**, **do-while**, **for**
- Functions
- Scope



# Review Exercises

- The following slides contain exercises that will help you prepare for the exam
- These exercises are all about writing code to help remind you of the things we've done so far this semester
- Refer back to the exam 1 review slides (and your actual exam) if you need a reminder of the style of questions



# Exercise

Write a program that reads in a series of positive integers and prints out the maximum value entered. The user will indicate they are finished entering numbers by entering zero or a negative integer.



# Answer

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

int main()
{
    int input;
    int max = -1;

    cout << "Enter positive integers, stopping with 0 (or a negative):" << endl;
    do
    {
        cin >> input;
        if ( input > max )
        {
            max = input;
        }
    } while ( input > 0 );

    cout << "The max value is " << max << endl;
    return 0;
}
```



# Exercise

Write a program that uses a **for** loop to calculate  $N!$  given  $N$ . First, ask the user for a value of  $N$ . Then your program should compute and print the value of  $N!$  ( $= 1 * 2 * 3 * \dots * N$ ).





# Answer

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

int main()
{
    int n;
    int i;
    int factorial = 1;

    cout << "Enter N: ";
    cin >> n;

    for ( i=1; i<=n; i++ )
    {
        factorial = factorial * i;
    }
    cout << n << "!=" << factorial << endl;

    return 0;
}
```



# Exercise

Write a program that uses a function to compute the gravitational force between two bodies:

$$F = G \frac{m_1 m_2}{d^2}$$

- $m_1$  is the mass of the first body
  - $m_2$  is the mass of the second body
  - $d$  is the distance between them
  - $G$  is a constant:  $6.673 \times 10^{-11} \text{ N} \cdot (\text{m}/\text{kg})^2$
- Both masses and the distance must be passed as arguments to the function



# Answer

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

const double G = 6.673 * pow( 10.0, -11 );

double g_force(double mass1, double mass2, double distance);

int main()
{
    cout << "Force is " << g_force( 1000, 1000, 1 )
         << " N" << endl;
    return 0;
}

double g_force(double mass1, double mass2, double distance)
{
    double force;

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

    return force;
}
```



# Wrap Up

- Review the previous slides and labs
- Work through all the examples and exercises
- Check the book for additional exercises
- Use the page of notes as a study guide to help you prepare for the exam
- Come see me with any questions or if you need some help understanding anything we've covered so far this semester

