Exam 3 Review

Lecture 16

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
- All responses must be made 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`)
- `if-else` statements
- `for`, `while`, and `do-while` loops
- Functions, including call by value, call by reference, and array arguments
- File I/O
- Arrays

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 and 2 review slides (and your actual exams) if you need a reminder of the style of questions

Exercise

Write a program that opens a file named "values.txt" and prints out the last two numbers from the file. Make sure you handle cases where there are fewer than two numbers.

Answer

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

int main()
{
	ifstream ifs;
	ifs.open( "values.txt” );
	if ( ifs.fail() )
	{
		cout << "Failed to open values.txt" << endl;
		return 1;
	}
	double last_number=0, second_last_number, next_number;
	int count = 0;

	while ( ifs >> next_number )
	{
		second_last_number = last_number;
		last_number = next_number;
		count++;
	}
	if ( count >= 2 )
	{
		cout << second_last_number << endl << last_number << endl;
	}
	else if ( count == 1 )
	{
		cout << last_number << endl;
	}

	ifs.close();
	return 0;
}
```

Exercise

Write a function named **`get_three_sides`** that asks the user to input the lengths of three sides of a triangle. All three sides should be verified (positive lengths, form a valid triangle) and be given back to **`main`** when the function is done. The function should return zero if the triangle was valid and return one otherwise.

Answer

```
int get_three_sides(double& a, double& b, double& c)
{

    cout << "Please enter the length for side A: ";
    cin >> a;
    cout << "Please enter the length for side B: ";
    cin >> b;
    cout << "Please enter the length for side C: ";
    cin >> c;

    if ( ( a >= b+c ) || ( b >= a+c ) || ( c >= a+b ) )
    {
        return 1;
    }

    return 0;

}
```

Exercise

Write a program that asks the user for exactly ten integers and then prints them out in the reverse order given. Use an array to store the values so you can print them out after you have read in all ten.

Answer

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

int main()
{
    int values[10];

    cout << "Enter exactly ten integers: " << endl;
    for ( int i=0; i<10; i++ )
    {
        cin >> values[i];
    }

    cout << endl << "The values in reverse order: " << endl;
    for ( int i=9; i>=0; i-- )
    {
        cout << values[i] << endl;
    }

    return 0;
}
```

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