

CS 149D  
Spring 2006  
Recitation, Feb. 207, 2006

## Fun with Algorithms & C++

Name \_\_\_\_\_

**Objective:** To experiment with a simple C++ program

The following page contains a computer program written in the popular language C++. Some comments on the program:

1. Text lines that start with “//” are completely ignored by the computer. They are called “comments” and programmers include them in programs to help other programmers understand the program.
2. Several parts of this program we will talk about later; for this assignment, you can safely ignore them. If you have questions, the lab instructor can explain them briefly.
3. You are not expected to understand all details of this program, but the meaning of certain small pieces should be clear after you have experimented with the program.

In this lab, you will be asked to experiment by making several simple changes to the program to see what happens. By observing what happens, you should gain some understanding of what some of the statements in the C++ program do. We will talk about other parts of the program later.

Follow the instructions of the lab instructor (after you log on) and complete these steps:

1. Read the comments at the beginning of the program. These describe what the program is supposed to do. The instructor will do some examples to help you understand these comments.
2. Start the Visual C++ programming environment; the instructor will show you how.
3. Enter the program below into this environment. Again, the instructor will show you a shortcut that will save you typing.
4. Compile the program (by clicking on the build icon) as directed by the instructor.
5. Run the program (by clicking on the “!”).
6. Note that a window is opened on your computers screen that contains text produced by the program.

The C++ program (from the other textbook for this course:

```
// Program from Etter, pg 99.

// Timber regrowth. A problem in timber management is to determine
// how much of an area to leave uncut so that the harvested portion is
// reforested within a certain period. It is assumed that reforestation
// takes place at a known rate per year depending on climate and soil
// conditions. A reforestation equation expresses the growth as a function
// of the amount of timber standing after harvesting and the reforestation
// rate.

// For example, if 100 acres are left standing after harvesting, and
// the reforestation rate is 0.05, then 100 + 0.05 x 100 acres are
// forested at the end of the first year. At the end of the second year,
// the number of acres forested is 105 + 0.05 x 105, or 110.25 acres.

// 9. Assume that there are 14,000 acres with 2,500 acres uncut and
// that the reforestation rate is 0.02. Print a table showing the
// number of acres reforested at the end of each year, for a total
// of 20 years.

#include <iostream>
#include <iomanip>

using namespace std;

void main ()
{
    double Acres;

    Acres = 2500;
    cout << "Year  Acres" << endl;
    for ( int i=1; i<=20; i++)
    {
        Acres = Acres + 0.02 * Acres;
        cout << setw( 3 ) << i << "    " << setprecision( 6 ) << Acres << endl;
    }
}
```

7. What does the last number produced by the program represent (the one after the 20)?
  
8. Change the line "Acres = 2500;" to "Acres = 3500;" Compile the program (by clicking on the build icon), then run the changed program (by clicking on the "!").
  - a. What number is now printed after the 20 (the last number again)?
  
  - b. In the problem described in the program comments (the lines starting with "//", what would changing the 2500 to 3500 as described above represent?
  
9. Change the line "Acres = Acres + 0.02 \* Acres" to "Acres = Acres + 0.05 \* Acres", then compile and run the changed program.
  - a. What number is now printed after the 20 (the last number)?

b. In the problem described in the program comments, what would this change represent?

10. Change line "for (int i=1; i<=20; i++)" to "for ( int i=1; i<=30; i++ )", then compile and run.

a. Describe what happened?

b. In the problem described in the program comments, what would this change represent?