

CS150-01 Final Review  
Fall 2010

1. Given the following statements:

```
int x, y;  
cin >> x >> y;
```

- a. Write a single if statement that will print POSITIVE if both x and y are greater than zero and print NOT POSITIVE otherwise.
  - b. Write a for loop that will print all numbers from y to x that are divisible by 4.
  - c. Write a while loop to do the same thing.
2. Ask the user for an even number that is greater than zero and odd, and store it into y. Keep asking for input until the user gives an acceptable number.
3. Declare an array of 100 integers and fill it with the first 100 even numbers starting at 2. Be sure to write this code efficiently.
- a. Write a function that will take an integer parameter (and any other parameters it needs) and fill the array with 100 prime numbers starting at the integer parameter. Create an isPrime() function and use it here.
  - b. Write a **function** that will write the array to a file, one integer per line. The filename should be a parameter to the function.
4. Declare a two dimensional array (10 rows, 10 columns) to store a multiplication table. The value stored at row A and column B in the array should be the solution to multiplying A by B.
- a. Write a function to fill the array.
  - b. Write a function to display the table, nicely formatted, to the screen.
  - c. Write a function that will write the array to a file, 1 row per line, with each integer separated by a tab.
5. The file sudoku.txt contains a 9 by 9 grid of integers (9 integers per line, each integer separated by a space; 9 lines of data). You need to write a complete program that will read in the data and determine if the grid is a valid Sudoku solution. Print an appropriate message to the screen to let the user know if the grid is valid or invalid. See the rules for Sudoku here:  
<http://en.wikipedia.org/wiki/Sudoku>

## 6. What's the output?

```
int size = 3;

for( int i = 0 ; i < size ; i++)
{
    for ( int k = 0 ; k < size - i +1; k++ )
    {
        cout << "*";
    }
    for ( int k = 0 ; k < 2*i -1 ; k++ )
    {
        cout << " ";
    }
    for ( int k = 0 ; k < size - i +1; k++ )
    {
        if( ! ( i == 0 && k == size) )
        {
            cout << "*";
        }
    }
    cout << endl;
}

for( int i = size ; i >= 0 ; i--)
{
    for ( int k = 0 ; k < size - i +1; k++ )
    {
        cout << "*";
    }
    for ( int k = 0 ; k < 2*i -1 ; k++ )
    {
        if ( i == size && k == ( 2*i-1) / 2 )
        {
            cout << "*";
        }
        else
        {
            cout << " ";
        }
    }
    for ( int k = 0 ; k < size - i +1; k++ )
    {
        if( ! ( i == 0 && k == size) )
        {
            cout << "*";
        }
    }
    cout << endl;
}
```