CSC 361
Homework 1

Name: _____

1. Consider the following Modula-2 program that calculates the greatest common divisor of two integers x and y:

Note the following: every Modula-2 program has a name. The FROM and IMPORT here are just to include standard input and output. A procedure in Modula-2 followed by a ":" then data type is a function that returns a value (vs. the usual void function in C). Note that this function is recursive. Note also that MOD has the same meaning as "%" for non-negative integers.

```
MODULE ModSample;

FROM InOut
IMPORT WriteString, ReadInt, WriteInt, WriteLn;

PROCEDURE gcd( u, v : INTEGER ) : INTEGER;
BEGIN
        IF v = 0 THEN
                RETURN u
        ELSE
                RETURN gcd( v, u MOD v )
        END;
END gcd;

VAR x, y : INTEGER;

BEGIN (* main program *)
        WriteString( 'Input two integers: ' );
        WriteLn;
        ReadInt(x);
        Writeln;
        ReadInt(y);
        WriteLn;
        WriteString( 'The gcd of ' );
        WriteInt( x, 1 );
        WritelnString( ' and ' );
        WriteInt( y, 1 );
        WriteString( ' is ' );
        WriteInt( gcd( x, y ), 1 );
        WriteLn;
END ModSample.
```

Translate this program into a C++ program here:

2. Consider the following Pascal function that returns the number of digits in an integer:

Note here that div is ordinary integer division. As in Modula := is the assignment. d*iv* is integer division like "/" in C++ between two integers.

```
function numdigits ( x : integer ) : integer;
var
        t, n : integer;
        n := 1;
        t := x;
        while t >= 10 do begin
                n := n + 1;
                t := t div 10
        end;
        numdigits := n
end;
```

Translate this function into a C++ function here:

3. What can you say about the following?

a. How are semicolons used in Pascal differently than in C++?

b. The begin and end statements in Pascal and Modula-2 correspond (almost exactly) to what in C++?

c. The way of returning a value in a Modula-2 procedure is very similar to a value-returned function C++. However, how does Pascal return a value in a function?
