



1. (30 pts) Write a complete C++ program to solve the following problem, including

- an opening comment (*don't* put your name in the comment! -2 pts if you do!)
- all necessary “stuff” that goes before the main program
- a full main program complete with comments

**Problem Statement:** Ask the user of the program to input two positive integers. Then print a message indicating whether the larger is a multiple of the smaller one, or not. If the two numbers are the same, indicate that.

Examples:

input	output
9 3	9 is a multiple of 3
7 8	8 is not a multiple of 7
7 49	49 is a multiple of 7
5 5	Both numbers input were 5

Your program should provide appropriate prompts to the user, and should also label the output appropriately and neatly. Your program should also check for an error condition: if either of the numbers input is negative or zero, then print an error message, and terminate the program immediately.

Extra space in case you need it

2. (10 pts) One of your lab exercises involved writing functions to draw pictures using for loops. This questions tests your knowledge of that concept.

Complete the function `drawL` in the program listed below.

The function should draw a picture on standard output in the shape of the letter L of the given height and width, followed by a blank line.

If either height or width is less than 2, the function simply draws nothing (no error message is produced, and no blank line is printed).

The complete program appears below (with the body of function `drawL` omitted), with sample output on the following page. You may fill in the function in the space provided, or rewrite the complete function in the blank space on the next page (below the sample output.)

```
// e02.cc Exam question for CISC181
// P. Conrad, 10/04/04

#include <iostream>
using namespace std;

void drawL(int height, int width, char c)
{

}

int main(void)
{
    drawL(2,2,'s');
    drawL(3,2,'y');
    drawL(4,3,'x');
    drawL(2,1,'a');
    drawL(3,5,'z');
    return 0;
}
```

## Output:

```
> g++ e02.cc
> ./a.out
s
ss

Y
Y
YY

x
x
x
xxx

z
z
zzzzz

>
```

3. Number conversions:

(a) (3 pts) Convert 73 from decimal to binary

(b) (3 pts) Convert 2A from hexadecimal to decimal

(c) (3 pts) Convert the following from binary to hexadecimal:  
1100 0001 1000 0001 0010 1111 1010 1011

Extra space in case you need it





```
// e01.cc Exam question for CISC181
// P. Conrad, 10/04/04
```

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

```
int mysteryFunc(int x, int y)
{
    x = -y + x * 5;
    y--;
    cout << "x= " << x << endl;
    return y;
}
```

```
int main(void)
{
    int a, b, c;
    a = 3;
    b = 5;
    c = 7;

    cout << "a= " << a << endl;
    a = mysteryFunc(b,c);
    cout << "a= " << a ;
    cout << " b= " << b << endl;
    cout << " c= " << c << endl;
}
```

5. Consider the C++ program on the following page.

(a) (4 pts) Give the output when the input is 5


(b) (4 pts) Give the output when the input is 67


(c) (1 pts) What relational operator appears in this program?

(d) (2 pts) List two relational operators that are in C++ but do NOT appear in this program (give the C++ symbols.)

```
// e03.cc Exam question for CISC181
// P. Conrad, 10/04/04
```

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

```
int main(void)
{
    int x;
    cout << "Enter x: ";
    cin >> x;

    int i=1;
    while (i < x)
    {
        cout << "*";
        i *=2;
    }
    cout << endl;
}
```

## Unix Commands

6. (2 pts) Which of the following Unix commands creates a new directory:

*Circle one:* (a) `chmod` (b) `pwd` (c) `cd` (d) `mkdir`

7. (2 pts) Which of the following is the *directory* where a web page accessed via `http://udel.edu/~jsmith/cisc181` would be stored on strauss?

*Circle one:*

- (a) `~jsmith/public_html`  
(b) `~jsmith/cisc181`  
(c) `~jsmith/cisc181/index.html`  
(d) `~jsmith/public_html/cisc181`

8. (2 pts) Which of the following would be used to change the file access permissions (e.g. to make a web directory readable by others)?

*Circle one:* (a) `chmod` (b) `pwd` (c) `cd` (d) `mkdir`

## Short Answer

9. (1 pts) What symbol is used for the stream insertion operator in C++?
10. (2 pts) In the C++ statement `a = b + 7 * 4;` what is the left operand of the assignment operator?
11. (2 pts) In the C++ statement `a = b + 7 * 4;` what is the right operand of the addition operator?

## Multiple Choice

12. (1 pts) Which of the following tests whether x is equal to 10?

(a) `if (x == 10)` (b) `if (x = 10)`

13. (1 pts) Which of the following assigns the value of 2 times y to x?

(a) `x == 2 * x;` (b) `2 * y = x;` (c) `x = 2 x y;` (d) `x = 2 * y;`

14. (1 pts) In the expression  $100101 \times 2^{10010}$ , which part is the mantissa?

(a) 100101 (b)  $\times$  (c) 2 (d) 10010

15. (1 pts) The C++ statement `x = x / 2;` is equivalent to which of the following statements?

(a) `x /= 2;` (b) `x += 2;` (c) `x = 2;` (d) `x = 2 / x ;`

## Working with C++ programs

16. Suppose you have a C++ program in a file named `lab03.cpp`  
What Unix command do you enter to perform each of the following operations?
- (a) (2 pts) Enter a text editor to make changes to the program
  
  - (b) (2 pts) Display the contents of the source code on your screen.
  
  - (c) (2 pts) Compile the program
  
  - (d) (2 pts) Copy the program to a new file called `lab03b.cpp`.

Total Points: 100