

# CS 150 Lab 7

## Loops & Switches

The objective of today's lab is to practice Loops, Ifs, Switches!

- Be sure your output looks exactly like the specified output.
- Be sure to submit the completed project to CS150-01 Drop by Friday at 5pm.
- Be sure to follow the coding standards and add comments to your code!

### Lab 7.1

Create a project called **07\_1\_Lines**. This program will draw vertical and horizontal lines of varying length on the screen. This program must use a **switch** statement.

Ask the user for the length of the line, 1-20, and the direction, H or h for Horizontal and V or v for Vertical.

Draw a line of stars, the number of stars equal to the length of the line. Continue asking for line length and direction until the user specifies a negative length or a length greater than 20.

```
C:\Windows\system32\cmd.exe
*****
*          *
*   LINES   *
*          *
*****

Enter the line length and direction: 4 H
****

Enter the line length and direction: 4 h
****

Enter the line length and direction: 2 V
*
*

Enter the line length and direction: 2 v
*
*

Enter the line length and direction: 22 H
Press any key to continue . . .
```

```
C:\Windows\system32\cmd.exe
*****
*          *
*   LINES   *
*          *
*****

Enter the line length and direction: 3 H
***

Enter the line length and direction: 3 v
*
*
*

Enter the line length and direction: 2 H
**

Enter the line length and direction: 1 H
*

Enter the line length and direction: -1 V
Press any key to continue . . .
```

OPTIONAL: Rather than use stars, use - for horizontal lines and | for vertical lines.

**Show the instructor or TA your solution**

### Lab 7.2

The factorial,  $N!$ , of a number is defined as  $N! = N(N-1)(N-2) \dots (3)(2)(1)$  for values of  $N \geq 1$ .  $0!$  is defined as 1. Given this definition, we see that  $4!$  is  $4(3)(2)(1)$  which is 24.

Write a complete C++ program in a project called **07\_2\_Factorial** that prints the factorial of a number entered by the user. Your program must validate that the **user enters a non-negative number strictly less than 11** using a while loop.

```
*****  
* Factorial *  
*****
```

```
Find the Factorial of: 11  
Find the Factorial of: -8  
Find the Factorial of: 4
```

4! is 24

**Show the instructor or TA your solution**

## Lab 7.3 Optional Challenge (Good exam review)

Write a complete C++ program in a project called **07\_3\_Fibonacci** to solve the following problem. The first few Fibonacci numbers are 0 1 1 2 3 5 ... After the first two Fibonacci numbers, each subsequent number is found by adding the previous two numbers. Write a complete C++ program that prints a table of Fibonacci numbers. Your program must validate that the **user enters a number larger than 2** using a while loop.

```
*** Fibonacci Table ***
```

```
Enter number of Fibonacci's: 0  
Enter number of Fibonacci's: -8  
Enter number of Fibonacci's: 6
```

```
Fibonacci Numbers  
      0  
      1  
      1  
      2  
      3  
      5
```

**Show the instructor or TA your solution**

- 1) Your programs are to compile without any errors or warnings.
- 2) Do not use any magic constants in your program. Define your constants before defining the rest of your program's variables.

Once your projects are complete, place your solution into the CS150-01 Drop folder on grace. Your solution is to have ALL previous projects completely working and correct.