**Name:**

**Advanced Programming in C++**

**Lab Exercise 4/22/2025**

**Introduction to Recursion**

In this exercise you will use recursion to solve a variety of problems. Recursion is merely a function that calls itself creating a copy of the function running in computer memory. One of the key things you need to realize in recursive function calls is that you are recursing from complex to simple. Recursion ends when you call the trivial case of the function.

1. Recursive factorial. Write a recursive factorial function. The trivial case is that 0! = 1. Write a driver program to test this function.
2. Recursive Fibonacci. Write a recursive Fibonacci function that returns the nth Fibonacci number. Write a driver program to test this function.
3. Recursive multiplication. Write a recursive multiplication function that accepts two arguments into parameters x and y. The function should return the value of x times y. Hint: multiplication is repeated addition.
4. String Reverser. Write a recursive function that accepts a string as its argument, and prints the string in reverse order. Test the function by writing a driver program.
5. Using the factorial function that you wrote in question 1, write a function that returns the combinations to two numbers. Write a driver program to test your program. Use the following prototype:

int combinations(int n, int r);

Note: Use the following formula for the combinations:



For example if you had 8 flavors of ice cream and you were going to make sundaes of 3 flavors you would have 56 different sundaes.

When you complete these problems, submit your source code and a sample output.