ECE 150: Fundamentals of Programming

(Sections 001 and 002)

Project 1- Part A

Deadline: 11:59 PM on Friday October 12, 2018

Problem 0: Pascal's Triangle and Binomials

Pascal's triangle (https://en.wikipedia.org/wiki/Pascal%27s_triangle) is a triangular array of binomial coefficients. Below is an example of Pascal's triangle the number of rows n = 14 (note that the first row of 1 is not included in the 14).

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
1 10 45 120 210 252 210 120 45 10 1
1 11 55 165 330 462 462 330 165 55 11 1
1 12 66 220 495 792 924 792 495 220 66 12 1
1 13 78 286 715 1287 1716 1716 1287 715 286 78 13 1
1 14 91 364 1001 2002 3003 3432 3003 2002 1001 364 91 14 1
```

Taken directly from the Wikipedia page: "The rows of Pascal's triangle are conventionally enumerated starting with row n = 0 at the top (the 0th row). The entries in each row are numbered from the left beginning with k = 0 and are usually staggered relative to the numbers

in the adjacent rows. The triangle may be constructed in the following manner: In row 0 (the topmost row), there is a unique nonzero entry 1. Each entry of each subsequent row is constructed by adding the number above and to the left with the number above and to the right, treating blank entries as 0. For example, the initial number in the first (or any other) row is 1 (the sum of 0 and 1), whereas the numbers 1 and 3 in the third row are added to produce the number 4 in the fourth row."

Part A

Implement a C++ function called `int pascal_triangle( int n )` that prints to the console Pascal's triangle for n rows of the triangle, and returns the number of integers in the triangle. Use an iterative method to implement this function (no recursion).

Part B

Using recursion implement a C++ function called `int pascal_triangle_recursive( int n )` that prints to the console Pascal's triangle for n rows of the triangle, and returns the number of integers in the triangle. Additional helper functions are permitted.

Marmoset Submission Instructions

Your code file name must be PascalsTriangle.cpp.