**CECS 274, Spring 2020**

**Programming and Problem Solving II**

**Program 4 – Human Pyramid (Recursion)**

**Due: April 13, 2020**

A human pyramid is a way of stacking people vertically in a triangle. With the exception of the people in the bottom row, each person splits their weight evenly on the two people below them in the pyramid. For example, in the pyramid above, the person on the first row is supported by both people on the second row.

The first person on the last row is supporting half the weight of the person on his left shoulder while the second person on the last row is supporting the other half on his right shoulder, plus he has weight on his left shoulder from the person standing on it.

Your job is to write a recursive program that will display how much weight a person is holding. You can assume that each person weighs 150 pounds. Your program will ask the user for a row and column and your program will display the weight that is being supported by that person. Your program will continue in a loop – asking the user for a row and column until the user enters 0 and 0 for the row and column.

Here is an example:

Welcome to the Human Pyramid.

How tall is your pyramid? (Enter number of rows): 5 // user enters 5

Here is the graph of your pyramid showing the weight each person is holding:

( 0)

( 75)( 75)

( 112)( 225)( 112)

( 131)( 318)( 318)( 131)

( 140)( 375)( 468)( 375)( 140)

Do you want to run again? (y/n) y // user types yes – results on next page

How tall is your pyramid? (Enter number of rows): 15 // user enters 15

Here is the graph of your pyramid showing the weight each person is holding:

( 0)

( 75)( 75)

( 112)( 225)( 112)

( 131)( 318)( 318)( 131)

( 140)( 375)( 468)( 375)( 140)

( 145)( 407)( 571)( 571)( 407)( 145)

( 147)( 426)( 639)( 721)( 639)( 426)( 147)

( 148)( 437)( 683)( 830)( 830)( 683)( 437)( 148)

( 149)( 442)( 710)( 907)( 980)( 907)( 710)( 442)( 149)

( 149)( 446)( 726)( 958)(1093)(1093)( 958)( 726)( 446)( 149)

( 149)( 447)( 736)( 992)(1176)(1243)(1176)( 992)( 736)( 447)( 149)

( 149)( 448)( 742)(1014)(1234)(1360)(1360)(1234)(1014)( 742)( 448)( 149)

( 149)( 449)( 745)(1028)(1274)(1447)(1510)(1447)(1274)(1028)( 745)( 449)( 149)

( 149)( 449)( 747)(1036)(1301)(1510)(1628)(1628)(1510)(1301)(1036)( 747)( 449)( 149)

( 149)( 449)( 748)(1042)(1319)(1556)(1719)(1778)(1719)(1556)(1319)(1042)( 748)( 449)( 149)

Do you want to run again? (y/n) n // user types n – program stops

**Question: Is there a limit to how tall your pyramid can be?**

Additional requirements:

1. Use an ArrayList to store the numbers as you create them. You will need to use an ArrayList of Integer.
2. Make sure the pyramid looks like a pyramid when you print it. (like the example above)
3. Create a recursive function called ***double weightOnBack(int row, int col)*** that accepts the row and the column of the person. This is the recursive function that will calculate the total weight on the back of a person. It needs to return a double type to keep track of the partial pounds, but you should only display the integer portion in the pyramid.