CSCE 156 Lab: Recursion

Worksheet

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Activity 1: Modify the Fibonacci code as specified and answer the following questions
   1. When computing fibonacci(10), how many times would fibonacci(5) be called?
   2. When computing fibonacci(20), how many times would fibonacci(10) be called?
   3. How long does it take for fibonacci(45) to execute?
   4. Give an estimate of an asymptotic characterization of the number of times the function is called when fibonacci(n) is computed: is it constant, linear, quadratic, cubic, or exponential?
2. Activity 3: Modify the code that renders the Sierpinski Triangle as described in Case Study 3 and answer the following questions.
   1. For a depth of 4 (recursions = 4), how many triangles are drawn?
   2. For a depth of 10, how many triangles are drawn?
   3. For a depth of 13, how many triangles are drawn?
   4. (Optional) Without actually running it (the application will most likely crash), can you determine how many triangles are drawn for a depth of 20?
3. Activity 4 & 5: Demonstrate your working program, what are the first 5 and last 5 digits of the 1000-th Pell Number?