# CPSC 1110 – LAB 8

More Recursion

In this lab we will implement a program that generates all the substrings of a given String. This is problem **E13.14** from the book. **PLEASE COMMENT YOUR CODE.** You will have points taken off if you do not comment your code. You can see sample comments in my starter code for how you should comment your code. Keep your code neat.

You should add your .java files and a pdf containing a screenshot of your output to a .zip file to upload to UTC Learn.

**Some useful links:**

BlueJ tutorial [www.bluej.org/tutorial/tutorial-201.pdf](http://www.bluej.org/tutorial/tutorial-201.pdf)

Java tutorial home page: <http://docs.oracle.com/javase/tutorial/>

Start here: <http://docs.oracle.com/javase/tutorial/java/index.html>

Arrays <http://docs.oracle.com/javase/tutorial/java/nutsandbolts/arrays.html>

Array Lists <http://docs.oracle.com/javase/7/docs/api/java/util/ArrayList.html>

**Some helpful tips:**

1. Compile often – do it.
2. Break up the problem into two tasks initially, your base case and then your recursive case. The base case will be much less code than the recursive case.

## Tasks: Follow the directions below to complete your lab assignment

For today's lab we will be completing **Exercise E13.14** from the book. Starter code is included on UTCLearn – SubstringTester.java and SubstringGenerator.java.

**E13.14 –** Implement a SubstringGenerator (class) that generates all substrings of a string recursively. For example, the substrings of the string “rum” are the seven strings

“rum”, “ru”, “r”, “um”, “u”, “m”, “”

***Hint***: First enumerate all substrings that start with the first character. There are n of them if the string has length n. Then enumerate the substrings of the string that you obtain by removing the first character.

Here is what your output should look like after your project is completed. (The order of your substrings is not important, if your generator produces all substrings correctly).

Substrings of "ab"

Actual: '' 'b' 'a' 'ab'

Expected: '' 'b' 'a' 'ab'

Substrings of "abc"

Actual: '' 'c' 'b' 'bc' 'a' 'ab' 'abc'

Expected: '' 'c' 'b' 'bc' 'a' 'ab' 'abc'

Substrings of "abc123"

Actual: '' '3' '2' '23' '1' '12' '123' 'c' 'c1' 'c12' 'c123' 'b' 'bc' 'bc1' 'bc12' 'bc123' 'a' 'ab' 'abc' 'abc1' 'abc12' 'abc123'

Expected: '' '3' '2' '23' '1' '12' '123' 'c' 'c1' 'c12' 'c123' 'b' 'bc' 'bc1' 'bc12' 'bc123' 'a' 'ab' 'abc' 'abc1' 'abc12' 'abc123'

Once your project is done, take a screen-shot or capture the text of your output and submit this along with your project.

***IMPORTANT!!*** Follow the name conventions shown in the lab documentation. For this lab you will simply need to complete the recursive getSubstrings method provided in the starter code.

## To Turn In via UTC Learn

You should turn in 1 .ZIP file containing your java files and a screen shot of your output. 1 file should be uploaded to UTC Learn. ***IMPORTANT!!!*** You should name your file in the following manner. lastname-firstname-lab8.zip. So John Smith would submit smith-john-lab8.zip.