

CS119 – Lab 1

Due Date: February 6

Purpose: We will be using the programming language Haskell throughout this course and writing programs in a functional language will force you to think in new ways. To start out, we need to consider expressions and defining functions which return the value of an expression. The purpose of this lab is to get you thinking in terms of expressions rather than in terms of statements as you have previously done.

Knowledge: This lab will help you become familiar with the following content knowledge:

- How to write expressions that evaluate to various types like Language or Image
- How to write expressions the use an if expression

Task: Follow the steps in this lab carefully to complete the assignments. Write all of your functions in the file `Example1.hs`.

Assignment 1:

Write the following function using only those functions provided for you in the Words module.

```
insertAnd :: Language -> Language
insertAnd s = _____
```

which inserts the word "and" as the next to last word of the sentence.

For example,

```
> insertAnd (sent "John Bill Wayne Fred")
[John Bill Wayne and Fred]
```

Criteria for Success: Your function works for any parameter which is a sentence with at least two words.

Assignment 2:

Try the provided function `plural` on the words "fly" and "cat". But if you try the function on "toy" or "box" you won't get the correct results. Modify the function so that it works correctly for words ending in a vowel followed by the letter "y", as well as words ending in the letter "x".

Criteria for Success: Your function generates the correct plural for words that end in y regardless of whether a vowel or non-vowel precedes the y. Your function should also work correctly for words that end in an x as well as other words that don't end in x or y.

Assignment 3:

Define the quilt functions `halfTurn` and `quarterTurnLeft` which rotate a quilt image appropriately. These functions should be written in the `Example1.hs` file. Be sure to **maintain abstraction by not looking at the Quilt module!**

Criteria for Success: Your functions correctly rotate an image, and do so by using our previously defined Quilt functions.

Assignment 4:

Define the quilt function `sideBySide` which combines two quilt images next to each other, with the first quilt on the left and the second quilt on the right. Make sure that the two images stay in their original orientation.

Criteria for Success: Your function joins any quilts that are the same height and leaves them in the proper orientation.

Assignment 5:

Define a function `pinwheel` where

`draw (pinwheel testBB)` will look like:



Test out `pinwheel` on some other quilt images as well.

Criteria for Success: Your function `pinwheel` any quilt image.

If you look at the bottom of the Quilt module (I know I told you not to look before!) you will see the definitions of the basic blocks. They are formed by defining polygons to be drawn. Just for fun, you can create some basic blocks of your own and test them out.

The icon for Firefox is on the top of the toolbar. Use this browser to open up Canvas and submit your `Example1.hs` file for grading.