CS135 (Fall 2017) Homework 1

Due Sep 20, 2017

1. What are the types of the following functions?

   (a) $second\ xs = head\ (tail\ xs)$

   (b) $swap\ (x, y) = (y, x)$

   (c) $twice\ f\ x = f\ (f\ x)$

2. Show how the meaning of the following curried function definition can be formalized in terms of lambda expressions:

$$mult :: Int \to Int \to Int \to Int$$
$$mult\ x\ y\ z = x * y * z$$

3. **String processing**: The Haskell function "words" breaks a string up into a list of words, each of which was delimited by white space (e.g., spaces, tab, newline, etc.). For example words "This is a test, isn't it?" returns $[This, is, a, test, `, `, isn't, it?]$. Now you can see that it couldn't separate the question mark from "it". Please write a function "pwords" that improves on this by separating punctuation from words. You may assume that the only punctuation marks are in ".,;?!". Make sure that you can handle the case when the punctuation mark is in the middle of the word because of typos ("John pushed Mary.She fell" $\to [John, pushed, Mary, She, fell]$)

4. **File processing**: Using funtion (readFile), you should be able to write a Haskell file "process_file.hs" that do the following things:

   - Wait for user to input a filename. Read the content of the file.
   - Print out the number of words in the file
   - Print out the number of words ending by "-ing" in the file

   You should also check this tutorial on input and output to have an idea of how to write Haskell IOs in a syntax similar to declarative languages.