Assignment #8
CS 3060 Programming Languages, Spring 2021
Instructor: S. Roy

# Haskell #2

**Due Date:** Apr 20 @ 11:59 PM.
**Total Points:** 50 points

**Directions:** Using the source provided via Gitlab `https://gitlab.com/sanroy/sp21-cs3060-hw/`, complete the assignment below. The process for completing this assignment should be as follows:

1. You already forked the Repository “sanroy/sp21-cs3060-hw” to a repository “yourId/sp21-cs3060-hw” under your username. If not, do it now.
2. Get a copy of hw8 folder in “sanroy/sp21-cs3060-hw” repository as a hw8 folder in your repository “yourId/sp21-cs3060-hw”
3. Complete the assignment, committing changes to git. Each task code should be in a separate file. As an example, task1.hs for Task 1.
4. Push all commits to your Gitlab repository
5. If you have done yet done so, sdd TA (username: prabeshpaudel) as a member of your Gitlab repository

**Tasks:**

1. **Task #1: (30 points)** Write a Haskell function for each of the following. In your code, you need to specify the **input and output type** of each function.

   (a) (10 points) Write a Haskell function *bar* which takes an integer $x$ as input parameter and returns the sum of all positive odd integer($y$)s' cubes whereas $y$ is smaller than $x$. You need to use *foldl* to do the above computation. As an example, if $x$ is 10, then *bar* will compute $(1^3 + 3^3 + \ldots + 9^3)$. *Writing README carries 1 point.*

   (b)(10 points) Write a Haskell function *charCount* which takes a string *word* as input, and counts how many letters (say $c1$) in *word* are in uppercase and how many letters (say $c2$) in *word* are in lowercase, and returns two counts ($c1$, $c2$) as a single tuple. As an example, if *word* is "abDfGi", then *charCount* returns (2,4). *Writing README carries 1 point.*

   (c)(10 points) Write a Haskell function *longStrCount* which takes a list of strings as input, and counts how many strings have length more than 7, and returns the count. As an example, if input *list* is ["abcd", "de", "fghtestwsd"], then *longStrCount* returns 1. *Writing README carries 1 point.*

2. **Task #2: (20 points)** Refer to the user-defined types `Card` and `Hand` in the textbook (cards-with-show.hs). Also, see the `value` and `cardvalue` function therein. Write a Haskell function for each of the following. In your code, you need to specify the **input and output type** of each function.

   (a) (7 points) Write a function named `lowerCard` which takes two Cards and returns the lower value Card. If there is a tie, then either Card can be returned.

   (b) (6 points) Write a function named `productValue` which takes a Hand and returns the product of all values of cards in that Hand.

   (c) (7 points) Write a function named `higherHand` which takes two Hands and returns the Hand which has the higher `productValue`. If there is a tie, then either Hand can be returned.

   *Writing README carries 2 points.*