Homework 2

CS:3330 Summer 2019

Due Monday, July 8 at midnight

Instructions Complete the following tasks and questions.

1. Complete the implementations for the following classes:

   - `List`
   - `ListStack`
   - `ListQueue`
   - `SimpleHashMap`

   Hint: Once `List` is implemented, each of `ListStack`'s and `ListQueue`'s methods are each capable of being implemented in a single line of code.

2. After implementing `SimpleHashMap`, answer the following questions. Answering these questions requires running `App.java` (via the command `gradle run`) and playing with different parameters. Note that `App.java` prints the used memory (in megabytes) to stdout as well as writes a file called `data.csv` that shows the number of unique keys inserted in the map, the maximum chain size, and the average chain size.

   - What do you notice about the max chain size as more keys are inserted into the hash map? How does this change as the size of α increases? Why does this make sense?
   - What pattern do you notice about the average chain size? Why does this pattern occur?
   - What do you notice about the memory usage for different values of α? Explain why this makes sense.

     Note: *max chain size* is the size of the largest linked list across all buckets of the hash map. The *average chain size* is the average size over all linked lists in the hash map.