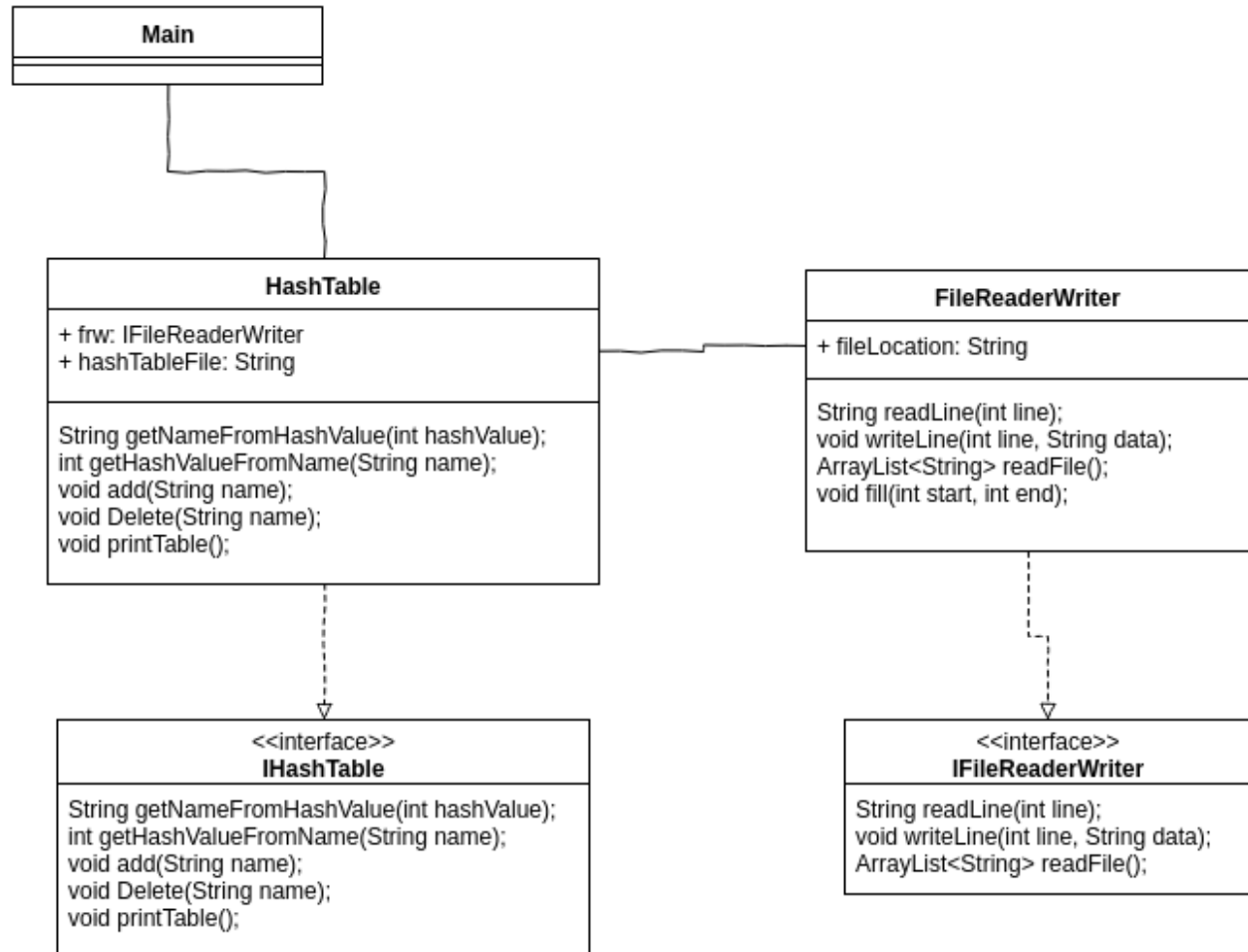


Tyler Thompson

## **Homework Assignment 5 Part 2 Due: December 1st, 2016**

"I do NOT give permission to the instructor to share my solution(s) with the class."

### **DESIGN**



### **DESIGN JUSTIFICATION**

The design of my program is laid out in the UML diagram above. The main method does not show an methods because those methods are irrelevant to understanding the structure of the program. In reality the main method runs an interactive menu that allows you to manipulate the hash table. When saving new entries to the hash table file, the program save the record as follows; `hashValue:studentName`. The hash value is saved next to the name, since the program specifications required it, but it is unnecessary for the program to run, since the hash value is just the line number in the file.

## **THEORETICAL COMPLEXITY ANALYSIS**

- **Add**

Theoretically, the add function runs in constant time,  $O(1)$ . In reality the runtime is dependent on the built-in java PrintWriter, which in all test does seem to run in constant time.

- **Delete**

Theoretically, the delete function also runs in constant time,  $O(1)$ . Initially the program will have to convert the name to a hash value,  $O(1)$ . Then it has to use the file writer to write the name to the file at the index of the hash value.

- **Search**

Searching is very simple for a hash table. Given a name, the program turns the name into a hash value,  $O(1)$ . Then it reads the file at that index, also  $O(1)$ . Given a hash value, the program just reads the value at that index of the file,  $O(1)$ . So, searching happens in  $O(1)$  whether you have are given a name or hash value.