

Important

There are general homework guidelines you must always follow. If you fail to follow any of the following guidelines you risk receiving a **0** for the entire assignment.

1. All submitted code must compile under **JDK 8**. This includes unused code, so don't submit extra files that don't compile. (Java is backwards compatible so if it compiles under JDK 7 it *should* compile under JDK 8.)
2. Do not include any package declarations in your classes.
3. Do not change any existing class headers, constructors, or method signatures.
4. Do not add additional public methods when implementing an interface.
5. Do not use anything that would trivialize the assignment. (e.g. don't import/use `java.util.LinkedList` for a Linked List assignment. Ask if you are unsure.)
6. Code exactly what is asked for. No more and no less.
7. You must submit your source code, the `.java` files, not the compiled `.class` files.
8. After you submit your files redownload them and run them to make sure they are what you intended to submit. You are responsible if you submit the wrong files.

Skip Lists

You are to code a skip list. The bottom layer of the skip list is an ordinary linked list with every element.

Coin Flipper

This will be the source of randomness for your skip list. You must use the `CoinFlipper` passed into the given constructor and no other source of randomness (eg a `CoinFlipper` you instantiate, a new `Random` object, etc) or you will get a 0. When adding an item to your skip list, it will always be on the first level. After that, you will use the coin flipper to determine if it will be promoted to the next level. Heads means that you promote the item to the next level. Example: You are adding the String "i <3 skiplists". You flip HHT. That means it will be put on the bottom level and then promoted two levels. It will be on the bottom 3 levels.

Methods

See the interface for details. Note that some methods are worth more than others. If `put()` is incorrect, then you are likely to fail most tests, as putting things into the skip list is crucial to the usability of a data structure.

Style and Formatting

It is important that your code is not only functional but is also written clearly and with good style. We will be checking your code against a style checker that we are providing. It is located in resources along with instructions on how to use it. We will take off a point for every style error that occurs. If you feel like what you wrote is in accordance with good style but still sets off the style checker please email Jonathan Jemson (jonathanjemson@gatech.edu) with the subject header of "CheckStyle XML". **Please make sure you are using the latest CheckStyle (CS1332-checkstyle-v2.xml).**

Javadocs

Javadoc any helper methods you create in a style similar to the Javadocs for the methods in the interface.

Debugging

It is not required, but is strongly encouraged that you add a method that will print the skip list by level. Do not leave debug prints in the final submission.

The following would be a helpful format to quickly find errors.

```
level 4: 1 70 100
level 3: 1 25 70 100
level 2: 1 25 60 70 100
level 1: 1 25 50 60 70 75 80 100
```

Provided

The following file(s) have been provided to you.

1. `CoinFlipper.java` This is the source of randomness that you will use to implement your skip list. **Do not alter this file.**
2. `SkipListInterface.java` This is the interface you will implement. All instructions for what the methods should do are in the javadocs. **Do not alter this file.**
3. `SkipList.java` This is the class in which you will actually implement the interface. Feel free to add private helpers but **do not add any new public methods.**
4. `Node.java` This class encapsulates the data and has various methods for you to use. **Do not alter this file.**
5. `SkipListTestStudent.java` This is the test class that contains a set of tests covering the basic operations on the SkipList. It is not intended to be exhaustive nor guarantee any type of grade. **Write your own tests to ensure you cover all edge cases.**

Deliverables

You must submit all of the following file(s). Please make sure the filename matches the filename(s) below. Be sure you receive the confirmation email from T-Square, and then download your uploaded files to a new folder, copy over the interfaces, recompile, and run. It is your responsibility to re-test your submission and discover editing oddities, upload issues, etc.

1. `SkipList.java`

You may attach each file individually, or submit them in a zip archive.