EXAM TIME: Monday May 2, 8:00 – 10:30 A.M.

The exam is closed-book and closed-note. Exception you may bring two sheets of handwritten notes (normal sized paper). You may write notes on both the front and the back. You may also wish to bring a few blank pages of paper to work out solutions. There will be sufficient space on the exam to put your final answers on the exam.

The exam focus is on applying the programming, algorithmic, and data structure concepts listed below.

1. Built in data structures: arrays (one and two dimensional) and type String.

2. Application of data structures based on their logical properties. Based on descriptions, examples, and application, we have learned how to use a variety of data structures in this course. Some of them are directly provided in the Java API. Others have been specified as part of the course. In all cases, you should be able to both trace through and implement algorithms based on Java code using these data structures. In addition, given a problem description, you should be able to recognize and justify a choice of data structure for solving the problem. Relevant data structures include the following:
   - List (possible implementations are ArrayList and LinkedList)
   - Stack
   - Queue (implementing class is LinkedList)
   - PriorityQueue
   - HashTable
   - BinaryTree (API provided in Program 6 specification)
   - BinarySearchTree (derivative of BinaryTree where the tree is organized based on ordering of the data items)

3. Class definition fundamentals as illustrated by Dice and BigInt. Class application (via API) as illustrated by the Dice, BigInt, GroceryItem, and WordItem definitions.

4. In all cases for all the data structures and classes listed in the previous items, you should be able to write small code segments to do the following:
   - declaration (understand the difference between an object and a reference to an object)
   - initialization (including object construction)
   - manipulation (using basic API operations)

5. Algorithmic and programming concepts
   - iteration vs. recursion
   - Space time tradeoff principle
   - Basic execution time analysis

Tips for Preparing

- Work and rework sample exercises and problems. If you understand the material well enough to write code to solve problems, you have a good understanding of the material. Form study groups and ask each other questions or else individually work on problems and compare solutions.
- Think about what notes you are going to write down. Focus on things you have a hard time remembering. Make sure you have a good handle on the basic API operations for all of the data structures we have studied.
- Be well rested so that you can think clearly and read carefully.

Exam Period Office Hours: Spring 2016 (Regular office hours end Monday April 25)

- **Tuesday** April 26: 10:00 – 11:30 A.M.
- **Wednesday** April 27: 1:30 – 3:30 P.M.
- **Friday** April 29: 9:00 A.M. – 10:00 A.M. and 1:30 – 3:00 P.M.