CMPSC 112
Introduction to Computer Science II
Fall 2016

Exam 2 Study Guide
Delivered: Monday, November 21, 2016
Exam 2: Thursday, December 1, 2016, 9:30 am

Introduction

This course will have its second exam on Thursday, December 1, 2016 from 9:30 to 10:45 am. The exam will be "closed notes" and "closed book" and it will cover the following materials. Please review the "Course Schedule" on the web site for the course to see the content and slides that we have covered to this date. Students may post questions about this material to our Slack team. The questions on the examination will be drawn from the content in *Data Structures and Algorithms in Java* (DSAAJ) by Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser.

- All prior sections of the textbook covered for the first examination
- Chapter Three in DSAAJ, only Sections 3.2–3.5 (i.e., "Linked Lists")
- Chapter Six in DSAAJ, all sections of the chapter (i.e., "Stacks, Queues, and Deques")
- Chapter Seven in DSAAJ, skipping Sections 7.6 and 7.7 (i.e., "Lists and Iterators")
- Using the many commands in the Linux operating system; editing in `gvim`, compiling and executing programs in Linux; knowledge of the basic commands for using `git` and Bitbucket.
- Your class notes and lecture slides and laboratory assignments 1 through 9.

The examination will include a mix of questions that will require you to draw and/or comment on a diagram, write a short answer, explain and/or write a source code segment, or give and comment on a list of concepts or points. The emphasis will be on the following list of illustrative subjects. Please note that this list is not exhaustive — rather it is designed to suggest representative topics.

- Key programming constructs in Java (e.g., conditional logic, iteration, and recursion).
- The structure of a singly and doubly linked list and the nodes of which they are comprised.
- The strengths and weaknesses associated with using singly, doubly, and circularly linked lists.
- The trade-offs associated with using either arrays or linked lists to implement data structures.
- The implementation trade-offs of the stack abstract data type with an array or a linked list.
- The applications of the stack data type (e.g., reversing an array or matching HTML tags).
- The implementation trade-offs of the queue abstract data type with an array or a linked list.
- How to design and implement array lists and dynamic arrays in an object-oriented language.
- The worst-case time complexities of all of the data structures studied for this examination.
- Practical laboratory techniques (e.g., editing, compiling, and running programs; effectively using files and directories; correctly using Bitbucket through the command-line `git` program).
- Understanding Java programs (e.g., given a short, perhaps even one line, source code segment written in Java, understand what it does and be able to precisely describe its output).

Examination Policies

Minimal partial credit may be awarded for the questions that require a student to write a short answer. You are strongly encouraged to write short, precise, and correct responses to all of the questions. When you are taking the examination, you should do so as a "point maximizer" who first responds to the questions that you are most likely to answer correctly for full points. Please keep the time limitation in mind as you are absolutely required to submit the examination at the end of the class period unless you have written permission for extra time from a member of the Learning Commons. Students who do not submit their examination on time will have their overall point total reduced. Please see the course instructor if you have questions about any of these policies.

Reminder Concerning the Honor Code

Students are required to fully adhere to the Honor Code during the completion of this exam. More details about the Allegheny College Honor Code are provided on the syllabus. Students are strongly encouraged to carefully review the full statement of the Honor Code before taking this exam.

The following provides you with a review of Honor Code statement from the course syllabus:

The Academic Honor Program that governs the entire academic program at Allegheny College is described in the Allegheny Academic Bulletin. The Honor Program applies to all work that is submitted for academic credit or to meet non-credit requirements for graduation at Allegheny College. This includes all work assigned for this class (e.g., examinations, laboratory assignments, and the final project). All students who have enrolled in the College will work under the Honor Program. Each student who has matriculated at the College has acknowledged the following pledge:

I hereby recognize and pledge to fulfill my responsibilities, as defined in the Honor Code, and to maintain the integrity of both myself and the College community as a whole.

Strategies for Studying

As you study for this examination, you are encouraged to form study groups with individuals who were previously, during a laboratory session, a member of one of your software development and empirical study teams. You can collaborate with these individuals to ensure that you understand all of the key concepts mentioned on this study guide. Additionally, students are encouraged to create a Slack channel that can host questions and answers that arise as you continue to study for the test. Even though the course instructor will try to, whenever possible, answer review questions that students post in this channel, you are strongly encouraged to answer the questions posted by your colleagues as this will also help you to ensure that you fully understand the material.

When studying for the test, don't forget that the Web site for our course contains mobile-ready slides that will provide you with an overview of the key concepts that we discussed in the first modules. You can use the color scheme in the slides to notice points where we, for instance, completed an in-class activity, discussed a key point, or made reference to additional details available in the DSAAJ textbook. Finally, students are strongly encouraged to schedule a meeting during the course instructor's office hours so that we can resolve any of your questions about the material and ensure that you have the knowledge and skills necessary for doing well on this examination. Remember, while the test is taken individually, your review for it can be done collaboratively!