

CSC 403 Data Structures II  
2016-2017 Spring  
Thurs 4:45PM – 9:00PM  
Lewis 1111  
<http://d2l.depaul.edu/>

Prof. Will Marrero  
wmarrero@cdm.depaul.edu  
312-362-5065  
Thurs 4:00PM-5:30PM  
CDM 737

## Course Summary

This is the second course in a two-course sequence on data structures using Java. The course focuses mainly on the following data structures, their analysis, and their applications: trees (search trees, balanced search trees), associative arrays, hash tables, and data structures for representing graphs. The implementation of the basic operations on each data structure are discussed and analyzed in terms of their efficiency. The applications discussed highlight and exploit the unique characteristics of the different data structures, and emphasize problem solving and recursive thinking.

## Prerequisites

CSC402

## Course Goals

1. Basic object oriented programming techniques
2. Use of debuggers
3. Use of testing
4. Understanding the design and characteristics of various implementations of the symbol table abstract data type, including linked list, sorted array, binary search tree, balanced tree, and hash table.
5. Understanding graphs

## Learning Outcomes

After successful completion of this class, students should:

- be able to implement, test, and debug binary search trees, balanced trees, hash tables, and graphs
- be able to describe the efficiency/performance of insert, find, delete, min, max, iterate operations on those data structures,
- be able to simulate these operations on a given data structure
- be able to select the best data structure to use for a given application/use case
- be able to implement and use depth first search and breadth first search.

## The Java programming language and development environment

We will be using the Java programming language as well as the Eclipse IDE. See D2L for a link you can use to download these tools onto your computer.

### Grading Policy

Your overall grade for the course will be computed as follows:

|                |     |
|----------------|-----|
| Homework       | 30% |
| Online Quizzes | 10% |
| Midterm exam   | 30% |
| Final exam     | 30% |

Letter grades will be assigned according to the table below; however, the instructor reserves the right to adjust the scale in the student's favor. In other words, the table indicates the minimum letter grade you will receive for the given overall percentage. You may receive a slightly higher grade if the instructor feels an adjustment is necessary.

|        |    |
|--------|----|
| 93-100 | A  |
| 90-92  | A- |
| 87-89  | B+ |
| 83-86  | B  |
| 80-82  | B- |
| 77-79  | C+ |
| 73-76  | C  |
| 70-72  | C- |
| 67-69  | D+ |
| 60-66  | D  |
| 0-59   | F  |

### Textbooks and Printed Resources

#### required

*Algorithms 4e* by Robert Sedgewick and Kevin Wayne (Addison-Wesley, 2011). ISBN: 9780321573513

#### additional optional resources

*How to Think Like a Computer Scientist* by Allen Downey. <http://fpl.cs.depaul.edu/jriely/thinkapjava/>  
*Java for Python Programmers* by Brad Miller. <http://fpl.cs.depaul.edu/jriely/java4python/>  
*Core Java for the Impatient* by Cay Horstmann (Addison-Wesley, 2015). ISBN: 9780321996329

## Software

All coding will be done in Java. Also, I will at times provide JUnit test cases. So students should have some development environment that allows them to write and execute Java as well as JUnit. I will be using Eclipse in class. Strictly speaking, Eclipse is not necessary, but if you want to mimic what I do in class, you will need to have Eclipse on your machine.

## Exams

The midterm exam is on Thursday, May 4, at the usual class time. The final exam is on Thursday, June at the usual class time. Block these times out now as there are no make-ups for the exam. Exams are closed book and closed notes except for a single 8.5" by 11" sheet of notes (both sides) that must be turned in with the exam. The sheet of notes will be collected with the exam and not returned so make a copy for yourself before coming to the exam.

Online Students: You must register through D2L to take the exam. Note that you will have a 2 day window to take the exams (5/4-5/5 for the midterm and 6/8-6/9 for the final). Even if you are not ready to register now, check that this option is available to you on D2L. If it is not, you are registered for the live section and must take the exam in the classroom with the live class.

## Homework

Students should expect a homework assignment due every week. Homework will typically be due by 11:59PM the day BEFORE a class meeting. All assignments will be posted in the dropbox section of D2L and students must submit their assignments in the dropbox section of D2L before the deadline posted for the assignment. All deadlines are enforced using the clock on D2L. Students are responsible for checking the Dropbox section of D2L for assignments. Late assignments will not be accepted so please make sure to submit early to ensure you meet the posted deadline. You may resubmit as often as you like before the deadline. I will grade only the last submission you make.

Circumstances come up where a student may be unable to complete an assignment on time. Since I do not accept late homework, I do drop the single lowest homework grade before computing the homework average. This means you can miss a single assignment without hurting your grade.

## Colaboration

Students may work in groups of at most 3 students on the homework assignments under the following conditions:

- All students in the group must contribute to all parts of the assignment. You may not divide up the assignment and have different students working on different parts.

- Each student must submit a solution to the assignment; however, if you collaborated with other students, you must list their names in the comment box when submitting. Failure to do so is considered plagiarism.
- If you worked in a group and indicated the names of all group members in the submission, it is permissible to submit an identical file as another member of your group or to submit a simple note saying who you worked with and which member of the group submitted the actual assignment.

## Quizzes

Quizzes will be handled online on the D2L site for the course. Quizzes must be completed by 11:59PM on the day they are due. Typically, this is the evening before a class meeting. Late quizzes will not be accepted and will receive a grade of 0, so make sure to finish them early and to save your work as you finish each problem. **Note:** Saving the problems is not the same thing as submitting. Make sure to submit when finished. Also, you may retake the quiz once (before the deadline) to try to improve your score. Also, the quizzes are individual work. Collaboration is not allowed on the quizzes.

## Tentative Schedule

Below is the planned schedule for the class so that students can prepare ahead of time for class. The schedule is tentative and subject to change. It is a bit ambitious so we may not get to all the topics

| Week | Topics                           | Book        |
|------|----------------------------------|-------------|
| 1    | Symbol Tables (lists and arrays) | Section 3.1 |
| 2    | Binary Search Trees              | Section 3.2 |
| 3    | Balanced Search Trees            | Section 3.3 |
| 4    | Hash Tables                      | Section 3.4 |
| 5    | Symbol Table Clients             | Section 3.5 |
| 6    | Midterm                          |             |
| 7    | Undirected Graphs                | Section 4.1 |
| 8    | Directed Graphs                  | Section 4.2 |
| 9    | String Sorts                     | Section 5.1 |
| 10   | Tries                            | Section 5.2 |

## Email and Discussion Forum

Email and the D2L Discussion forum is the primary way I communicate with students outside of class. To make communication as smooth as possible, please make sure to do the following:

- Students should be sure their email listed under "demographic information" at <http://campusconnect.depaul.edu> is correct. All my private emails to you will go to that address.
- Send me email from an address that identifies who you are. You have the best chance of getting through the email spam filter if you use your DePaul email address. You have the greatest chance of the email being filtered or of me ignoring it if you send it from an address that I cannot recognize immediately as a student in my class. (I once had a student send me email from [way2sexy@hotmail.com](mailto:way2sexy@hotmail.com) and complain 2 weeks later that I wasn't answering his email.) Also include the course number (CSC301) in the subject of all emails. This will make it easier for me to spot your email and will eliminate the possibility that my first response would be "What class are you in?"
- Post any questions that do not include code for homework assignments on the D2L discussion forum. This makes it possible for other students to answer your question which means you may get an answer quicker this way than if you sent it to me via email. If you do send it to me via email, I will just copy and paste it to the discussion forum anyway (as long as it is not of a personal nature, like your grade in the class) so give your classmates a chance to answer your question and post it on the discussion forum yourself.
- All students must subscribe to the D2L discussion forum. I will make announcements to this forum and all students are responsible for announcements posted there. By subscribing, you will receive all discussion forum posts by email.
- If your question was answered in the lecture or on the discussion forum, I will simply refer to the lecture or the discussion forum. So if you did not understand something I said in class or in the discussion forum, be specific. Point out exactly what you didn't understand in my prior communication so that you don't get the generic reply of watch the video/read the discussion forum.

### **Changes to Syllabus**

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class, posted on D2L and notice sent via email.

### **Online Course Evaluations**

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a

requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in Campus Connect.

### **Academic Integrity and Plagiarism**

This course will be subject to the university's academic integrity policy. More information can be found at <http://academicintegrity.depaul.edu/>. If you have any questions, be sure to consult with your professor.

### **Academic Policies**

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Information on enrollment, withdrawal, grading and incompletes can be found at:

<http://www.cdm.depaul.edu/Current%20Students/Pages/PoliciesandProcedures.aspx>

### **Students with Disabilities**

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.

To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at: [csd@depaul.edu](mailto:csd@depaul.edu).

Lewis Center 1420, 25 East Jackson Blvd.

Phone number: (312)362-8002

Fax: (312)362-6544

TTY: (773)325.7296