CSC 301: Data Structures II (Fall 2019)

Sec. 401:   TuTh 10:10AM – 11:40AM @ Lewis 01111
Sec. 402:   TuTh 11:50AM – 01:20PM @ Lewis 01111
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Contents

1   Course specifics

Description.   From the course catalog:

> 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), heaps, 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: CSC 300 and MAT 140

Prerequisites.   At the beginning of the course, the student is expected to:

- Have an understanding of how Java programs are developed, organized, and tested,
- Know what stacks, queues, bags, and priority queues are, and how to implement them,
- Know how to analyze the complexity of an algorithm and study their performance using both practical and theoretical tools.

These prerequisites correspond to Sections 1.1 through 1.5 and Sections 2.1, 2.4, and 2.5 of the reference book (see Resources below). *If the student does not feel comfortable with these topics before the course starts, I very much recommend reading these sections again and practice with the exercises, the solutions of which can be easily found online.*

Learning outcomes.   At the end of the course, the student will have:

1. Developed a permanent understanding of the following data structures:
   - Symbol tables,
   - Binary search trees,
   - Balanced search trees (2-3 trees, red-black trees),
   - Hash tables.

   This includes knowing about their implementation, in particular the algorithms associated with the primary operations on them.
2. Developed a permanent understanding of the notion of graph, directed and undirected. This includes knowing about their implementation, the vocabulary attached to them, and the fundamental traversal algorithms on them.
3. Acquired or strengthened the ability to write, debug, and test Java programs.

2   Resources

Reference book.   There is only one reference book for this course sequence:
     → *Algorithms, 4th edition,* by Robert Sedgewick and Kevin Wayne. (ISBN: 032157351X)
The book has a companion website that contains in particular libraries that simplify writing and
studying the algorithms in the class:
     → https://algs4.cs.princeton.edu/home/

D2L.   The course makes use of the D2L platform, and I strongly encourage students to post
questions over there. Everybody is welcome to discuss, all the while staying professional and
on topic. I will reply to each discussion usually within 24 hours. Likewise, I will use D2L to
communicate with the students.

Contacting me by email.   When possible, use D2L. If this is not possible, then send me an
email *with a subject that contains "CSC 301" and with your real name somewhere.* Emails that do
not respect this simple rule will be disregarded.

Office hours.   Office hours are posted and to be booked on BlueStar.

3   Schedule

Drop dates and the academic calendar at large can be found there:
     → https://academics.depaul.edu/calendar/Pages/default.aspx

The following is the week-by-week topic schedule—it is speculative and subject to change. The
section number in parenthesis refers to the reference book.

- Week 1 (09/12): Refresher
- Week 2 (09/17, 09/19): Symbol tables (3.1)
- Week 3 (09/24, 09/27): Binary search trees (3.2)
- Week 4 (10/01, 10/03): Balanced search trees (3.3)
- Week 5 (10/08, 10/10): Hash tables (3.4)
- Week 6 (10/15, 10/17): Applications (3.5) & review
- Week 7 (10/22, 10/24): Undirected graphs (4.1)
- Week 8 (10/29, 10/31): More undirected graphs (4.1)
- Week 9 (11/05, 11/07): Directed graphs (4.2)
- Week 10 (11/12, 11/14): More directed graphs (4.2) & review
- Week 11 (11/19): Review
- **Sec. 401 Final Exam: 11/21, 8:30am–10:45am**
- **Sec. 402 Final Exam: 11/26, 11:30am–1:45pm**

Additionally, there will be three comprehensive programming assignments due at 11:42pm on the dates indicated:

- Assignment 1 (10/13): Symbol tables (3.1), binary search trees (3.2)
- Assignment 2 (10/27): Balanced search trees (3.3), hash tables (3.4)
- Assignment 3 (11/17): Graphs (4.1 & 4.2)

4   Work expectations and grading

Weekly work.   This is summed up as:

> **Students MUST read the pertaining book section before the class.**

I cannot stress this enough; the class *will not* go over the book sections in any depth, but cover exercises and difficult points, and extend the material of the book when appropriate. Let me rephrase that:

> **There is no point coming to the class without having read the pertaining book section beforehand.**

This constitutes *the student's main assignment* every week. Sections are 30 pages long on average and should take the student about 3 to 4 hours to read. Each week, a quiz will test that the student read and understood the main parts of the section. The quiz is due before the first class of the week.

Programming assignments.   There will be three programming assignments during the quarter, announced on D2L, and no late submission will be accepted. Each will be comprised of several subquestions, but only one JAR will have to be sent. The JAR file has to run according to the specifications of the assignment; in particular, code that does not compile will receive zero mark.

Final grade.   The final grade will be computed as follows:

- Quizzes are worth 25% of the final grade,
- Programming assignments are worth 35% of the final grade,
- The final is worth 40% of the final grade.

5   Attendance

I will not be taking attendance after the first class and the final grade is not impacted by atten-
dance. Students joining the class are expected to remain for the whole duration. Students will
not be allowed in class if more than 15 minutes late.

6   In-person Proctored Exams for OL courses

If you are an online learning student living in the Chicagoland area (within 30 miles of Chicago),
you will need to come to one of DePaul's campuses to take an exam. Online learning students
outside of the Chicagoland area are required to locate a proctor at a local library, college or
university. You will need to take the exam within the window your instructor gives. Students
should examine the course syllabus to find exam dates and the instructor's policy on make-up
exams. Detailed information on proctored exams for online learning students can be found at

→ `https://www.cdm.depaul.edu/onlinelearning/Pages/Exams.aspx`

7   University policies

7.1   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 under Announcements in D2L and sent via email.

7.2   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 CampusConnect.

7.3   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.

7.4   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`

7.5   Incomplete Grades

An incomplete grade is a special, temporary grade that may be assigned by an instructor when unforeseeable circumstances prevent a student from completing course requirements by the end of the term and when otherwise the student had a record of satisfactory progress in the course. All incomplete requests must be approved by the instructor of the course and a CDM Associate Dean. Only exceptions cases will receive such approval. Information about the Incomplete Grades policy can be found at
→ `http://www.cdm.depaul.edu/Current%20Students/Pages/Grading-Policies.aspx`

7.6   Preferred Name & Gender Pronouns

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the quarter so that I may make appropriate changes to my records. Please also note that students may choose to identify within the University community with a preferred first name that differs from their legal name and may also update their gender. The preferred first name will appear in University related systems and documents except where the use of the legal name is necessitated or required by University business or legal need. For more information and instructions on how to do so, please see the Student Preferred Name and Gender Policy at
→ `http://policies.depaul.edu/policy/policy.aspx?pid=332`

7.7	**Students with Disabilities**

Students seeking disability-related accommodations are required to register with DePaul's Center for Students with Disabilities (CSD) enabling them to access accommodations and support services to assist with their success. There are two office locations:

- Loop Campus – Lewis Center #1420 – (312) 362-8002
- Lincoln Park Campus – Student Center #370 – (773) 325-1677

Students who register with the Center for Students with Disabilities are also invited to contact Dr. Gergory Moorhead, Director of the Center, privately to discuss how he may assist in facilitating the accommodations to be used in a course. This is best done early in the term. The conversation will remain confidential to the extent possible. Please see the following link for Services and Contact Information:
→ `https://offices.depaul.edu/student-affairs/about/departments/Pages/csd.aspx`

7.8	**Attitude**

A professional and academic attitude is expected throughout this course. Measurable examples of non-academic or unprofessional attitude include but are not limited to: talking to others when the instructor is speaking, mocking another's opinion, cell phones ringing, emailing, texting or using the internet whether on a phone or computer. If any issues arise a student may be asked to leave the classroom. The professor will work with the Dean of Students Office to navigate such student issues.

7.9	**Cell Phones/On Call**

If you bring a cell phone to class, it must be off or set to a silent mode. Should you need to answer a call during class, students must leave the room in an undisruptive manner. Out of respect to fellow students and the professor, texting is never allowable in class. If you are required to be on call as part of your job, please advise me at the start of the course