

CSC 301 Data Structures II
Winter 2023-2024
M,W 10:10PM-11:40PM
CDM 226

Prof. Will Marrero
wmarrero@cdm.depaul.edu
Office: CDM 737 phone: 312-362-5065
Office Hours: W 3:00PM – 4:30PM

Course Policy Quiz

There is already a quiz on D2L called Course Policies. All students must correctly answer all questions on the quiz. Answers to all questions can be found in this syllabus and students must continue to retake the quiz until they get all the answers correct. Unlike the normal quizzes, you make retake the quiz as often as necessary and each time you retake it, you will only be asked the questions you missed. This quiz is what I use to determine if a student is participating in the class when the university asks me to report on non-participating students. Please complete this quiz as soon as possible (answering all questions correctly) so that you are not marked as not participating. This course policy quiz is not factored into your grade for the course in any way.

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

CSC300 and MAT140

Learning Outcomes:

After successful completion of this class, students should be able to:

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

The Java programming language and Eclipse development environment

We will be using the Java programming language as well as the Eclipse IDE. See D2L for links you can use to download these tools onto your computer (Content → Software), as well as for videos to walk you through the process of installing the tools on your computer (Content → Weekly Materials → Week 0).

Grading Policy

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

Homework	50%
Quizzes	30%
Final Project	20%

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 SE9 for the Impatient, 2nd edition* by Cay Horstmann (Addison-Wesley, 2015).
ISBN: 9780134694726 (Check DePaul Library E-books)

Quizzes

There will be three quizzes that will be administered online using the D2L quiz feature. Quizzes must be completed by 11:59PM on the day they are due. 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. Each quiz is one hour in length and you will have a 4-day window during which you must take the quiz.

Note that saving the problems is not the same thing as submitting. Make sure to submit when finished. Finally, quizzes are individual work. Collaboration is not allowed on the quizzes.

Homework

Students should expect a homework assignment due every week. Homework is always due by 11:59PM the day before a class meeting. All assignments will be posted in the Submissions section of D2L and students must submit their assignments in the Submissions section of D2L before the due date posted for the assignment. The submission folder will remain open for an additional 8 hours after the deadline, however submissions made after the deadline and before the submission folder closes will lose 2% per hour late. No submissions will be accepted after the 8 hour late window. All deadlines are enforced using the clock on the D2L. Please make sure to submit early to ensure you meet the posted deadline. You may resubmit as often as you like before the deadline. We will grade only the last submission you make (with the appropriate penalty if the last submission is made after the deadline).

On many assignments, you will be allowed to resubmit to try to improve your grade. The names of the D2L submission folders for these resubmissions will end in 'R'. The deadline for the resubmission is one week after the original deadline and there is a 15-point penalty on resubmissions. If the grade on your resubmission is higher, it will replace the grade of your original submission for that assignment. Note that you are allowed to make use of the resubmit option even if you failed to submit anything originally.

Apart from resubmission chances mentioned above, I do not accept late submissions. Also, because there are only five homework assignments, no grades will be dropped before calculating your homework average so make sure to complete and submit all homework assignments.

Homework Requirements and Guidelines

- I will typically give you some source files to begin with. You may not add new fields (variables outside of any methods) to the classes I give you unless the instructions specifically say you should. Generally, you will only be adding code inside of methods that are included in the class skeleton I provide. The exception is that you are free to add new **private** methods.
- Before calling any methods or using any classes not directly provided in the assignment, make sure that you are allowed to do so. You are not allowed to use methods or libraries that we have not discussed in class. Doing this can at times destroy the purpose of the assignment. If the assignment does not specifically mention a class/library you can use, you should double check with the instructor that it is OK to do so.

- You are **never** allowed to change the name of a file I provide or the name of the class itself.
- You are **never** allowed to change the method header lines in any code I provide. In other words, you may not change the name or return type of any method I include in the code I give you or the number or the types of the arguments to those methods. I often give you skeleton code that I will call later from a testing harness. If you change the function header line, all tests will fail and you will receive a grade of 0.
- **Your code may never modify the input to a function or program unless the description of the assignment specifically states that you should modify the input.** For example, if a function takes an array as input, you are not allowed to sort the array, remove items from the array, change the values of any slots in the array, etc., unless the problem specifically says that you are allowed to do so.
- Your code should never include any printing statements unless the problem description specifically states that you must print something to the screen. Like python, “returning” a value and “printing” a value are two completely different things. If you add printing statements to help you debug your code, you must remove them or comment them out before submitting.
- I may provide you with multiple source files but ask you to modify and submit only one of them. Make sure you follow those instructions. I will only use the one required file when testing your code even if you submit multiple files. If you make changes to files other than the ones the instructions specify, your submission will not work and will receive a grade of 0.
- I will typically ask you to submit both the modified .java file as well as a screenshot of what happens when you run my test harness. Make sure to submit both! Failure to submit source code will result in a grade of 0. Failure to submit a screenshot when required will result in a loss of points. Do **not** submit .class files. I will only grade .java files.
- Get started early so that you can ask questions when you get stuck.
- Testing your code is absolutely vital. I often provide a testing harness so you can use to see what grade you will receive. However, that harness is not a good way to debug your code. You should write your own small tests to help you fix your code.
- Verify your submission! Make sure you receive a notification that your submission was accepted and also download the files you currently have submitted on D2L and verify that they are the files you intend to submit and that any screenshots are readable. This will only take a couple of minutes and could save you from receiving a grade of 0 on an assignment that you completed but for which you submitted the wrong files.

Collaboration

Students may work in groups of at most 3 students on the homework assignments (but not on the final project nor on the quizzes) 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 in the group must submit a solution to the assignment and must list the names of the other students in their group 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 identical files 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.

Final Project

There will be a final project in the course. The project will be individual work and will have multiple deliverables with separate deadlines for each deliverable. Details about the final project will be made available later in the quarter.

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 to check their DePaul email (BlueM@il). I will use D2L to send you private email and it uses your BlueM@il address.
- 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 by posting 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 you send me an email, send it from your BlueM@il account. This will make minimize the chances of the email getting filtered and will maximize the chance that I will recognize the message as coming from a student. Also, include "CSC301" in the subject or you will likely receive a reply asking you which class you are in.

- If you ask me a question about the homework via email, make sure to include all of the following:
 - An explanation of what is going wrong. (What is happening vs what you were expecting)
 - If Eclipse provided an error message, a copy and paste of the exact error message
 - A screenshot of what you see when you get the error
 - A description of anything you have tried to solve the issue
 - Attach any .java files your wrote/modified in the email. Most of the time I won't look at them. But if I do need to look at them, you want to avoid a reply from me asking you to send them and then waiting another day for a reply from me. Make sure to add the .java file as an attachment. Do NOT send a screenshot of your code.
- If your question was answered in the lecture or on the discussion forum, I will simply refer you 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 a reply that just points you to the lecture or discussion forum.

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 Table Intro & SequentialSearchST	Section 3.1
2	List Recursion and BinarySearchST	
3	Intro to Trees & Binary Search Trees	Section 3.2
4	Ordered Symbol Table Operations and 2-3 trees	Section 3.3
5	Left leaning Red Black Trees	
6	Hashing	Section 3.4
7	Undirected Graphs	Section 4.1
8	Directed Graphs	Section 4.2
9	Minimum Spanning Trees	Section 4.3
10	Shortest Paths	Section 4.4

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.

Respect for Diversity and Inclusion at DePaul University as aligned with our Vincentian Values

At DePaul, our mission calls us to explore “what must be done” in order to respect the inherent dignity and identity of each human person. We value diversity because it is part of our history, our traditions and our future. We see diversity as an asset and a strength that adds to the richness of classroom learning. In my course, I strive to include diverse authors, perspectives and teaching pedagogies. I also encourage open dialogue and spaces for students to express their unique identities and perspectives. I am open to having difficult conversations and I will strive to create an inclusive classroom that values all perspectives. If at any time, the classroom experience does not live up to this expectation, please feel free to contact me via email or during office hours

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. Please see <https://resources.depaul.edu/teaching-commons/teaching/Pages/online-teaching-evaluations.aspx> for additional information.

Academic Integrity and Plagiarism

This course will be subject to the university's academic integrity policy. All students are expected to abide by the University's Academic Integrity Policy which prohibits cheating and other misconduct in student coursework. Publicly sharing or posting online any prior or current materials from this course (including exam questions or answers), is considered to be providing unauthorized assistance prohibited by the policy. Both students who share/post and students who access or use such materials are considered to be cheating under the Policy and will be subject to sanctions for violations of Academic Integrity.

More information can be found at <https://resources.depaul.edu/teaching-commons/teaching/academic-integrity/Pages/default.aspx>.

Posting work on online sites, such as Hero

All students are expected to abide by the University’s Academic Integrity Policy which prohibits cheating and other misconduct in student coursework. Publicly sharing or posting online any prior or current materials from this course (including exam questions or answers), is considered to be providing unauthorized assistance prohibited by the policy. Both students who share/post and students who

access or use such materials are considered to be cheating under the Policy and will be subject to sanctions for violations of Academic Integrity.

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>

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>

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>

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 (312) 362-8002
- Lincoln Park Campus (773) 325-1677
- Email: csd@depaul.edu

Students who register with the Center for Students with Disabilities are also invited to contact Dr. Gregory 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 <https://offices.depaul.edu/student-affairs/about/departments/Pages/csd.aspx> for Services and Contact Information.