## Project 2
**Due:** Tuesday 16 April by 11:59 PM

## A. Overview
This project is meant to give you a chance to more fully apply some of the concepts covered in the course and/or to allow you to explore some additional algorithms or data structures that are not covered in the course.

## B. General Guidelines
- You may not work individually on this project. You must work in groups of 3 or 4 people, and the complexity of your final product should reflect the size of your group.
- Your project must include a coding portion and a presentation portion. All members of the group must be involved in all parts of the project.
- Overall, the workload should be about 10-15 hours per person.

## C. Specific Expectations
- The purpose of this project is to learn about a topic related to data structures and algorithms that is not already covered in the course. You will need to do some research into the topic and provide evidence of your work through a programming project and an uploadable presentation.

- Here are some suggestions for topics. **If you have a different topic in mind, you may submit it to me (Lotz) for approval as part of your Part 1 email.**
    - Fibonacci Heaps
    - Pattern Matching Algorithms
    - Tries
    - AVL Trees
    - Huffman Encoding
    - NP-Completeness
    - Splay Trees
    - Union Find
    - Graph Algorithms not covered in the course

- Programming Portion
    - For the programming portion, you must provide an implementation of the data structure/algorithm *from scratch*. All coding must be your own work, and it should be done in Java.
    - Your programming portion must also include test or client code that illustrates clearly that your code works as expected. You can also include a video of your code running as evidence that it works, but that is not sufficient on its own.
    - Your programming portion must include a README that explains what the code does and how to run it. Code should also be well-formatted and

well-documented. All test code should be well-documented as well, so we know what is being tested. Make sure it is thorough.

- Presentation
    - Your presentation should be a video that showcases all the aspects of your project.
    - Specifically, it needs to include the following:
        - A thorough presentation of the topic as if you were teaching it to a class. This means including a discussion of relevant runtimes.
        - An overview of the code, including showing evidence that the code works.
- Other Requirements
    - Working in groups can be challenging, but it is also a necessary skill for you to learn as much of CS-related work is done on teams.
    - You will need to submit various items to help you with this process and help me help you if any conflicts or issues arise. It will also be an opportunity for you to check in on your progress and get feedback.

## D. Submission & Deadlines.

There are various smaller deadlines before the final deadline as noted below.
**Note:** I feel like I shouldn't have to say this, but just in case: All these deadlines are in 2024.
**Note that for each item, there should just be one submission per group. Once I know who your groups are, I can set them up on D2L so you can submit once per group. The exception to this is the Final Work Distribution and Reflection.**

- **Tuesday, March 19, by 11:59 PM:** Email me at lotz@cs.arizona.edu to let me know the members of your group. I only need one email per group, but I need to know this soon so that I can set up the groups on D2L before the first item needs to be submitted there. If you need help finding a group, you may post on Piazza to try to find one. Anyone who does not have a group by March 19 at 11:59 PM will be automatically put in a group.
- **Tuesday, March 26, by 11:59 PM:** Meet with your group and complete the "Collaboration Plan & Project Proposal". Submit it to D2L.
- **Tuesday, April 2, by 11:59 PM:** Submit "Update 1" to D2L.
- **Tuesday, April 9, by 11:59 PM:** Submit "Update 2" to D2L.
- **Tuesday, April 16, by 11:59 PM:** Submit all project materials to D2L. Also, individually, submit the "Final Work Distribution and Reflection" to D2L.

**Early/Late Submissions.**

- Except for the final submission, all submission deadlines above are final. If you do not submit the required item on time, you will forfeit those points.
- For the final submission, we will follow the policy in the syllabus:
    - **Late Policy for Project:** The project can be submitted up to three days late. Any part of a day counts as a full day. Each day will result in a 5-point deduction from your project grade.
    - **Early Submission Policy for Project:** You can also turn in your project early and earn a few extra points. You can earn one extra point per day, up to

5 days. This only applies if it is your final submission (i.e. if you decide to make changes and submit again, that is fine, but we will consider that your official submission). If you do submit your final submission early, email lotz@cs.arizona.edu so we know we can start grading. If you do not send that email, you will not get the extra points.

## E. Grading & Summary of Deadlines

Please note that the actual awarded points here will depend on the quality and complexity of your work. This is to give you an idea of how the points will be broken down and what the maximum number of points is in each category.

| Item | Points | General Criteria | Deadline (by 11:59 PM) |
|---|---|---|---|
| Email with group members | 5 | On time | March 19 |
| Collaboration Plan and Project Proposal | 25 | On time, complete, well-developed, and well-organized | March 26 |
| Update 1 | 5 | On time, complete, and well-developed | April 2 |
| Update 2 | 5 | On time, complete, and well-developed | April 9 |
| **Final Submission** | | | **April 16** |
| Program(s) | 50 | • Complete<br>• Correct<br>• Compiles and runs<br>• Thorough tests provided<br>• Well-documented<br>• README is complete | |
| Presentation | 50 | • Complete<br>• Correct<br>• Well-organized<br>• Provides evidence that the code works | |
| Final Work Distribution and Reflection | 10 | Complete and well-thought-out<br>**Note: This part will be submitted and assessed individually.** | |