

**CMPSC 102**  
**Discrete Structures**  
**Fall 2019**

**CS102 Course Project Assignment:**  
**Your Create a Practical Demo!**

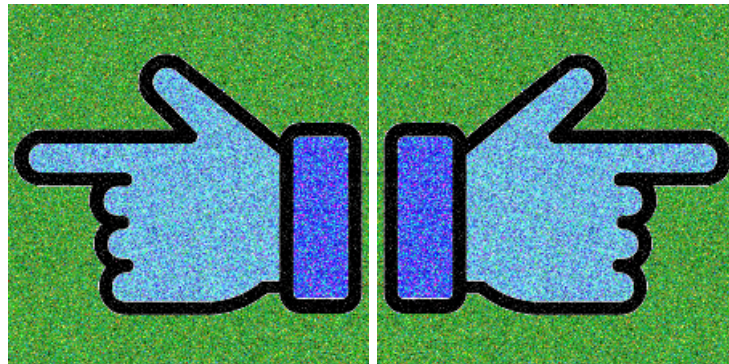


Figure 1: You create the practical demonstration for Discrete Structures! Your topic can cover any concept from the course, or that should be in the course.

## Summary

Through-out the semester, you have been learning to combine concepts from discrete mathematics and computer science. Each week our practicals provided an opportunity to learn about a topic in discrete structures. During our practicals, Python programming was used to extend the ideas of the practical into the realm of computer science.

During this time, you have been linking together these concepts with Python programming which gave you the computational power to drive mathematical concepts to demonstrate an application from Discrete Structures. For example, we studied Morse code in light of generator functions, and an pixel-scanner which was driven by Boolean functions. Each practical topic served to each and to explore at the same time.

In your class project, you are to create a learning opportunity that is similar to a class practical where one can use Python programming to learn about some concept of discrete structures (which is hinted at by the charming graphic of Figure 1.) **Since you have already chosen your topic (see from lab 5), your task now is to write-up your topic into a work that appears like something that you would expect to see as a class practical in our course.**

You are to provide working Python3 code and meaningful discussion of the application and theory behind your project's work. Be sure to justify why your project idea belongs in discrete structures.

## GitHub Starter Link for Groups

**STOP! STOP!**

<https://classroom.github.com/g/zaPdKzEC>

Note, this is the same link as your lab5 repository where you have saved your five ideas, you will use this repository to store your project files.

To push your changes, you can use the following commands to add a single file, you must be in the directory where the file is located (or add the path to the file in the command):

- `git commit <nameOfFile> -m ‘Your notes about commit here’`
- `git push`

Alternatively, you can use the following commands to add multiple files from your repository:

- `git add -A`
- `git commit -m ‘Your notes about commit here’`
- `git push`

## Assignment Specifications

You are to work in groups of no more than four (4) people to create some interesting Python demonstration of the concept in discrete structures that could easily be a practical in our course. For your class project you will develop code in Python3 to demonstrate the implementation of your idea in your work.

This is an opportunity for you to showcase what you learned in this course, without following a specific assignment. Of course, you can not claim the work of anyone else or your own previous work as a solution for this project, but you can certainly use your knowledge and experience as a backbone to invent your own code and discussion for this project. Provided that you properly cite the work of another, you may also download an open source project, for example from GitHub, and then extend it in some way to illustrate some concept that could fit into our course.

Plagiarism is strictly forbidden. Please see the discussion of the honor code in your student handbook to learn more about what plagiarism is and how to cite your references properly. If you decide to extend something previously completed or to recreate the work that someone else has already done, your extension must be significant. In that case you must also ensure you give proper attribution to previous work through the comments in your programs and description in your README.md file. In other words, the problem that you choose should not just be a copy of one of the lab or practical assignments, or the class exercises, or the programs in the book or online with slight modifications. Your project must be extensive enough to qualify as a project, but not too extensive so that you can not finish it by the due date. Pick something realistic and preferably useful and fun, and something that you are interested in! You may use anything and everything we have learned in class, and research additional topics if needed.

## Timeline: Deliverables

1. **ALREADY DONE! Main Idea and Supporting Articles** **Deadline:** by lab-time 6<sup>th</sup> November:

Outline the main idea and then cite and discuss each of the supporting articles that you have selected to develop your project. For each **Please be sure that you justify why your project idea will be of interest to your Discrete Structures course.**

2. **Presentation** 4<sup>th</sup>-6<sup>th</sup> December (Wednesday and Friday), during the class, practical and the lab sessions: By the presentation session, you should have finished or be nearly finished with your implementation (code), and have run some tests to be sure that it runs smoothly and without error. In the presentation, you should describe the overview of the concept, and provide motivation of your project. Then discuss your project's theoretical or mathematical framework, Python3 code and then give a demonstration of your implementation.

In your slides, please use diagrams and a few bullet points rather than long sentences and equations. The goal of the presentation is to convey the important high-level ideas and give intuition rather than be a formal specification of everything you did. Prepare for 3 to 5 minute presentation. **A show of code:** During this presentation, you will demonstrate your code to showcase the concept that you have explored in your research. Design at least 7 slides, including a slide with the title of your project and group members' names and other slides to describe the concept and the implementation by code. Every member of the group needs to contribute to the presentation talk. At the end of the presentation give a demonstration of your project. The talk and demonstration will last no more than ten minutes.

3. **Final Report, Final Programs and Output** **Deadline:** 10<sup>th</sup> December, 2019 by mid-night: Your final report should highlight the key contributions of your work and consist of at least four or five pages to outline the project and code. The report should include a discussion of why the chosen topic is important to Discrete structures and to discuss how to use the code that you wrote for the implementation. The written material should be precise, formal, appropriately formatted, grammatically correct, informative, and interesting. In summary, your report should include:

- The motivation for your project. Why is the application you chose important/useful?
- Detailed description of the work you completed for this project. Without giving a snapshot of the code you wrote, provide technical description of what you implemented and how you implemented it. In particular include software requirements and software design for your project.
- UML diagrams or a flowchart showing your project's software design (i.e., how classes are interacting with each other). To see an example of including an image in the Markdown document, please see "Mastering Markdown" GitHub guide found at <https://guides.github.com/features/mastering-markdown/>.
- A description of how to use the associated code to demonstrate the project's deliverable.
- Description of your results, as necessary. Make graphs, tables, snapshots of your output, or anything else that can help me understand your results.

- Conclusion. Give a short overview of your project and its results. Describe what you learned, what were the biggest challenges and the biggest rewards.
- If you worked in a team, you should also include a paragraph that describes the team work and the contribution of each team member.

Your Python3 code should be well documented, including extensive comments. All of our regularly used naming and styling conventions should be utilized.

Please let the instructor know of any questions that you or your group may have. Please use email or make office-hour appointment slots if you would like to discuss an issue.