

# Unessay project ideas

Winter 2025 – CPSC 329

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Here is a list of a few unessay projects prior CPSC 329 students have been successful with in the past. If you select one of these topics, there is no need to get approval from me before you begin. There is also a fair bit of freedom in how you interpret these, so you still have room to put your own original spin on the projects. The list of what you need to submit is included with each of the projects below.

In all three cases, keep in mind that this project is worth 23% of your grade in the course. The level of effort and complexity in your final project should be reflective of this, relative to the expectations for a 300-level course. For example, creating a quiz interface with three questions won't be accepted for full marks, even though it technically fits one of the project descriptions below.

Note that most of these have some coding/IT aspect. If your group does not have anyone with this type of experience, let me know and we can discuss more options in person or over Piazza.

## 1 Password manager

For this project, you would create a password manager application to help you securely remember passwords for local use on your computer. Many different languages (Java, Python, etc.) have the capability to allow you to do this. This password manager would need to have the following functionality:

- Allow the user to log in to their own account by prompting for a username and a password.
- Provide a list of services (Outlook email, personal email, Instagram, Youtube, etc.) that the user has set up accounts for within the password manager.
- Allow the user to add, edit, and delete services and username/password pairs associated with those services.
- Securely store the saved credentials in an encrypted form on the local device using a secure encryption algorithm and password salting.
- Be designed in a way that the manager keeps password information even after the program or device is turned off.
- Have an attractive and user-friendly interface, ideally with some creativity in features or design.

- Be constructed with good quality and well-commented code.

For your submission, you will need to provide a video walkthrough demonstrating all of the functionality of your password manager. Obviously you should not use your real passwords in this demo. You will also need to submit the code for your password manager itself to the D2L dropbox for your project submission.

## 2 Cryptography tools

In this project, you would create an application from scratch with at least three distinct tools that would be useful in cryptography. This could be a website or a local application. Some examples of tools that you could implement are:

- Caesar cipher translator (encryption and decryption)
- Tool that plots frequency analysis of symbols in a text, either every letter or every  $k^{th}$  letter with an offset
- Encryption and decryption of other established ciphers (e.g. OTP, AES, DES)
- Tool that takes a string of text and duplicates or removes characters from a specified list
- Ability to display output of OTP in hex or binary, depending on the user's choice
- Tool that takes a string of text and rearranges it according to different transposition ciphers
- Demonstration of key agreement protocols such as Diffie-Hellman or RSA

You will also need to find a way to make your toolkit educational, so for each tool it could include a paragraph or two explaining what it does and how it can be applied to cryptography. We will also look for careful thought to design and user experience, as well as creativity in features or presentation.

For your submission, you will need to provide a video walkthrough demonstrating all of the functionality of your cryptography tools. You will also need to submit your code to the D2L dropbox. If you choose to host it as a web page (remember you get this for free as part of being a student), then make sure you include that link as part of your submission.

## 3 Educational game

Your goal for this project would be to create a game or quizzing interface designed to teach people about cybersecurity. This is one of the more free-form projects, so you have a lot of freedom with how you design this. You could make an interactive web page,

command-line adventure game, quiz interface, escape room, etc. as long as it is fun and educational. By default, your goal should be to teach cybersecurity-related vocabulary taught throughout CPSC 329, but if you want to pick a different area to explore just check with me in advance.

Some requirements for this are:

- Security content must play a somewhat significant role in your game. Keep in mind that this shouldn't be an excuse to just make a game without also giving attention to the CPSC 329 component.
- Making something like a quiz game is totally fine. However, the simpler the interface is, the more expectation we will have for effort in the number and quality of the quiz questions.
- You will be marked on the quality/correctness of your educational content, so make sure you set up some fact checkers to make sure there are no mistakes here.
- Marks will also be allocated to creativity, ease of use, effectiveness of the educational component, and how fun the game is to play.

For your submission, provide a video walkthrough demonstrating the functionality of your game. Make sure to include both win and lose scenarios. You'll also need to submit your code to the D2L dropbox. If you host your game or quiz through a web page, then make sure you include that link as part of your submission. If you have quiz-type questions as part of your game, please also submit a full list of these **separately** as a PDF with question/answer pairs. This saves us having to play your game way too many times to make sure we've triggered all possible security content.