



Password Managers

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• Password managers: Security and convenience

- Store all your passwords for all your sites and accounts in one place
- Can access your account from any device
- Account syncs every time you add a new password



1Password

Premium \$36/year, unlimited passwords

01

LastPass

\$36/year, free version, unlimited passwords

03

Dashlane

\$60/year, free version, unlimited passwords

02

Bitwarden

\$10/year, free version, unlimited passwords

04

RoboForm

\$24/year,

05

EnPass

\$12/year

06

Should we trust these managers?

- Master password is 256 bit encrypted. Considered to be essentially unbreakable
- Popular managers are open source (available on GitHub)
- “Zero knowledge” policies



- What does 256 bit mean?



Brute force attacking 256 bit encryption...



Computing Power	Time to brute force break 256 bit
High end PC	27,337,893,038,406,611,194,430,009,974, 922,940,323,611,067,429,756,962,487,49 3,203 years. 27 trillion trillion trillion trillion trillion years
Fastest supercomputers	27,337,893,038,406,611,194,430,009,974, 922,940,323,611,067,429,756,962,487 years. 27,337,893 trillion trillion trillion trillion years
2 billion high end PCs	13,668,946,519,203,305,597,215,004,987 ,461,470,161,805,533,714,878,481 years 13,689 trillion trillion trillion trillion years

But...are they safe?

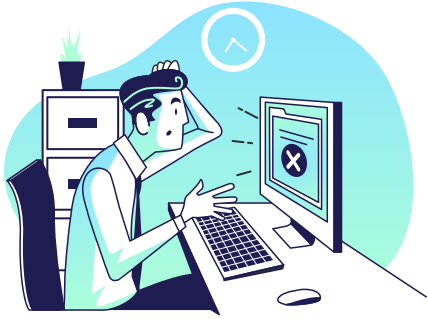
Hacking user
information should
therefore be impossible!
However...



The ugly truth- Password managers aren't perfect!



PROBLEM VS. POSSIBLE SOLUTION



Problem

Password managers might
not be 100% safe



Possible Solution

Replicate the functionality of
a password manager locally

Generate and Safely Store Secure Passwords

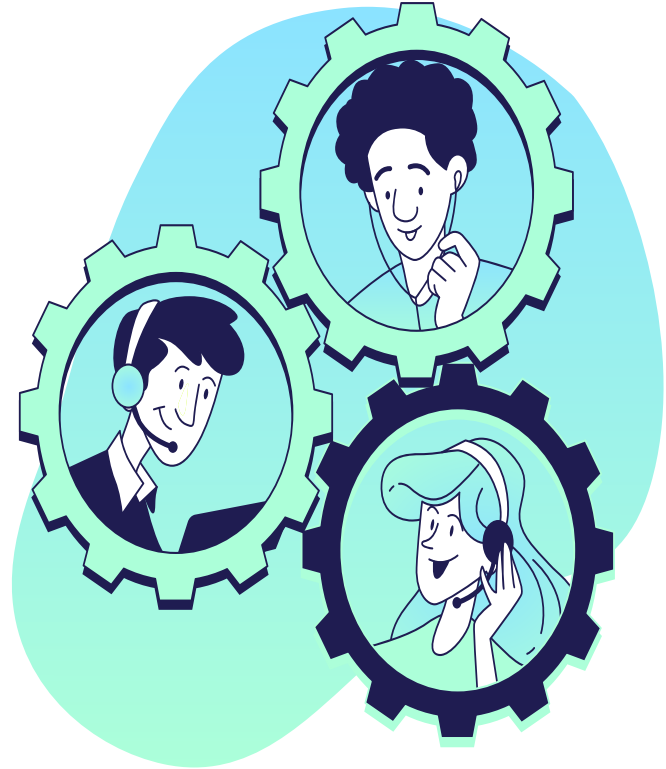
Secure Password Generators

Version 1: Passwords only
([linked](#))

Version 2: Websites, Passwords, & recovery
([linked](#))

Storing Passwords

Passwords can be stored using password protected PDF, text document, or disk image
([video linked](#))



DRAWBACKS



No Cloud-Sync Option

Passwords only saved locally on device, may be more secure, but is less convenient

Not as user-friendly

Setup and maintenance requires above average tech skills and time to maintain

**How can we
apply this in the
classroom?**



Unit plan: Algorithms, passwords, encryption

- Students build a password generator while learning about concepts like algorithms, encryption, and algorithm efficiency
- [Link to unit plan folder](#)

