Creating Strong Passwords
What is a weak password?
## What is a weak password?

<table>
<thead>
<tr>
<th>123456</th>
<th>qwerty</th>
<th>123123</th>
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<th>buster</th>
</tr>
</thead>
<tbody>
<tr>
<td>password</td>
<td>iloveyou</td>
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<td>daniel</td>
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<th>Type</th>
<th>Pattern</th>
<th>Length</th>
<th>Weakness</th>
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What is a weak password?

- Short
- Dictionary words
- Something with a personal connection to the user
- Common terms (movie titles, sports team names, etc)
What is a weak password?

We often pick passwords that are personally relevant to us, which allow them to be guessed by learning our interests or personal histories (some of which can be found online).
What is a weak password?

People are fairly predictable when it comes to choosing passwords
What is a weak password?

We have a tendency to make predictable variations of the same password
What is a weak password?

We have a tendency to make predictable variations of the same password

MyDogIsAwesome
What is a weak password?

We have a tendency to make predictable variations of the same password

MyDogIsAwesome1
What is a weak password?

We have a tendency to make predictable variations of the same password

MyDogIs@wesome1
What is a weak password?

We have a tendency to make predictable variations of the same password

MyDogIs@weSome1
What is a weak password?

We tend to use the same or similar passwords across multiple sites
What is a weak password?

The shorter the password, the easier it is for a computer to guess it.
';--have i been pwned?

Check if you have an account that has been compromised in a data breach
What is a strong password?
What is a strong password?

Long
What is a strong password?

Long

Unique
What is a strong password?

Long
Unique
Random
What is a strong password?

Long

At least 16 characters

Contains numbers, symbols, upper, lower, spaces
What is a strong password?

Long

- At least 16 characters
- Contains numbers, symbols, upper, lower, spaces

MyDogIsAwesome
What is a strong password?

**Long**

- At least 16 characters
- Contains numbers, symbols, upper, lower, spaces

**MyDogIsAwesome**
What is a strong password?

Long

At least 16 characters

Contains numbers, symbols, upper, lower, spaces

#MyDogIsAwesome#
What is a strong password?

Long

At least 16 characters

Contains numbers, symbols, upper, lower, spaces

#MyD0g1sAwes0me#
What is a strong password?

Long

- At least 16 characters
- Contains numbers, symbols, upper, lower, spaces

#MyD 0g1 sAwe s0me#
What is a strong password?

MyDogIsAwesome

#MyD 0g1 sAwe s0me#
What is a strong password?

MyDogIsAwesome

(16 Thousand Years to Guess)

#MyD 0g1 sAwe s0me#
What is a strong password?

MyDogIsAwesome

(16 Thousand Years to Guess)

#MyD 0g1 sAwe s0me#

(36 Quintillion Years to Guess)
What is a strong password?

#MyD 0g1 sAwe s0me#

(36 Quintillion Years to Guess)

(According to howsecureismypassword.net)
What is a strong password?

Unique

- Free of repetition and pre-defined sequences
- Unique PW for every service that you use
  - If you reuse passwords and one gets hacked, all of them get hacked!
What is a strong password?

**Unique**

Password managers

- LastPass
- 1Password
- Dashlane
What is a strong password?

Unique

Password managers

- Creates a random, secure password for each account you have
- Passwords are accessed via one password you create
What is a strong password?

Unique

Password managers

- Still need to remember 1 main PW
- Breaches can happen!
What is a strong password?

Unique

LastPass:

- free to use
- Firefox/Chrome extensions
- mobile version = $1 per month
What is a strong password?

Unique

Alternative is writing unique passwords down on paper, which some security experts recommend

Secure, unless:

1. Someone finds the paper/notebook
2. You lose it
What is a strong password?

Passwords vs. Passphrases
What is a strong password?

Passwords vs. Passphrases
UNECONMON
(NON-GIBBERISH)
BASE WORD

Tr0ub4dor & 3

C0S? COMMON
SUBSTITUTIONS

NUMERAL
PUNCTUATION

YOU CAN ADD A FEW MORE BITS TO
DISCOUNT FOR THE FACT THAT THIS
IS ONLY ONE OF A FEW COMMON Formats)

~28 BIT S OF ENTROPY

$2^{28} = 3 \text{ DAYS AT} \ 1000 \text{ GUESS ES/SEC}

(PLAUSIBLE ATTACK ON A WEAK REMOTE
WEB SERVICE YES, CRACKING A STOLEN
HARSH IS FASTER, BUT IT'S NOT WHAT THE
AVERAGE USER SHOULD WORRY ABOUT.)

DIFFICULTY TO GUESS:
EASY

WAS IT TROMBONE? NO,
TRUBADOR, AND ONE OF
THE O's WAS A ZER0?

AND THERE WAS
SOME SYMBOI...

DIFFICULTY TO REMEMBER:
HARD

correct horse battery staple

FOUR RANDOM
COMMON WORDS

~ 44 BIT S OF ENTROPY

$2^{44} = 550 \text{ YEARS AT} \ 1000 \text{ GUESS ES/SEC}

DIFFICULTY TO GUESS:
HARD

THAT'S A
BATTERY
STAPLE.

CORRECT?

DIFFICULTY TO REMEMBER:
YOU'VE ALREADY
MEMORIZED IT

THROUGH 20 YEARS OF EFFORT, WE'VE SUCCESSFULLY TRAINED
EVERYONE TO USE PASSWORDS THAT ARE HARD FOR HUMANS
TO REMEMBER, BUT EASY FOR COMPUTERS TO GUESS.
What is a strong password?

Random
What is a strong password?

**Random**

Humans are generally bad at creating random passwords, as our minds like to work in patterns.
What is a strong password?

Random

Creating random passwords/phrases can be done best when external sources are used, such as random words in a book.
What is a strong password?

Random

Creating random passwords/phrases can be done best when external sources are used, such as random words in a book.

Technique 1: Randomly select 5-6 words from a book to create a passphrase.
What is a strong password?

Random

Creating random passwords/phrases can be done best when external sources are used, such as random words in a book.

Technique 2: Diceware Password Creation

Example: https://www.rempe.us/diceware/#eff
What is a strong password?

Random

Memorize this random passphrase and then use it as your main password in your password manager.
Best Practices

Level 1:

Use different passwords for all services
Best Practices

Level 1:

Use different passwords for all services

Level 2:

Use a password manager to create random passwords
Best Practices

Level 1:

Use different passwords for all services

Level 2:

Use a password manager to create random passwords

Level 3:

Secure your password manager with a randomly created passphrase of 5-6 words
Sources

https://sec.eff.org/topics/passwords


https://www.cnet.com/how-to/how-to-master-the-art-of-passwords/


https://theintercept.com/2015/03/26/passphrases-can-memorize-attackers-cant-guess/