Good Passwords, Bad Passwords, and How to See the Difference

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Caveat Auditor

- this talk contains opinions
- my opinions
- not the university's
- nor do I claim to be an expert
- ... so expect some imprecision and errors

What's the problem?

Why use passwords?

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- protect accounts

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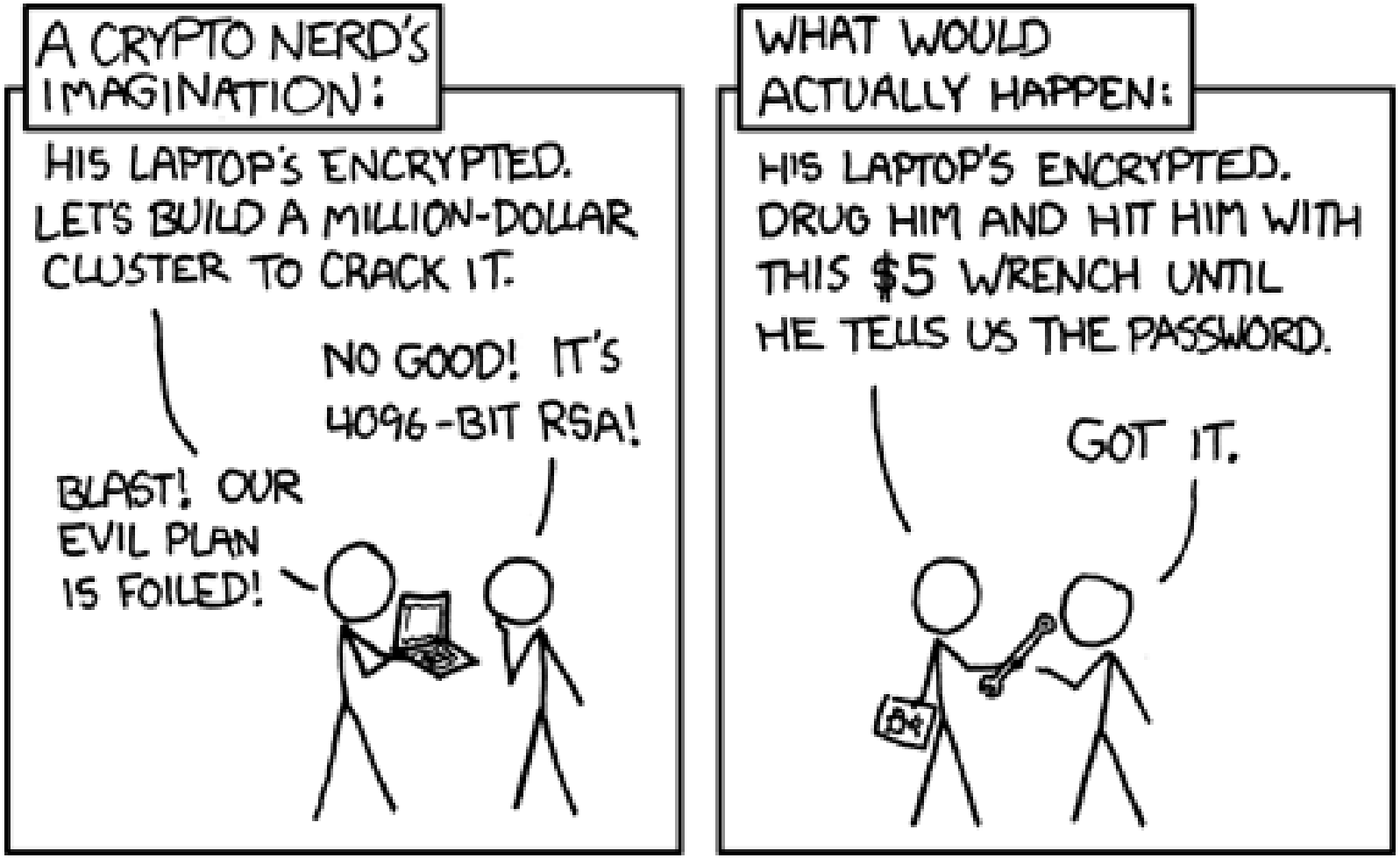
- protect accounts (so that I can't use them)
- protect against
  - your ex?
  - your coworkers?
  - police?
  - nation state attackers?

What's the problem?



https://www.xkcd.com/538/

What's the problem?

Why use passwords?

- protect accounts (so that I can't use them)
- protect against
  - your ex?
  - your coworkers?
  - police?
  - nation state attackers?

This talk

- people who know you well
- computers guessing very quickly
- not: people willing to hurt you
- not: attackers with other access

Bad Passwords

Only I myself know how the password is chosen!

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- The town I live in
- My birthplace, a special character, and two numerals
- "onetwothreefourfivesixseveneight"
- "4122941112162051457751 8"

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Security by obscurity

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Security by obscurity

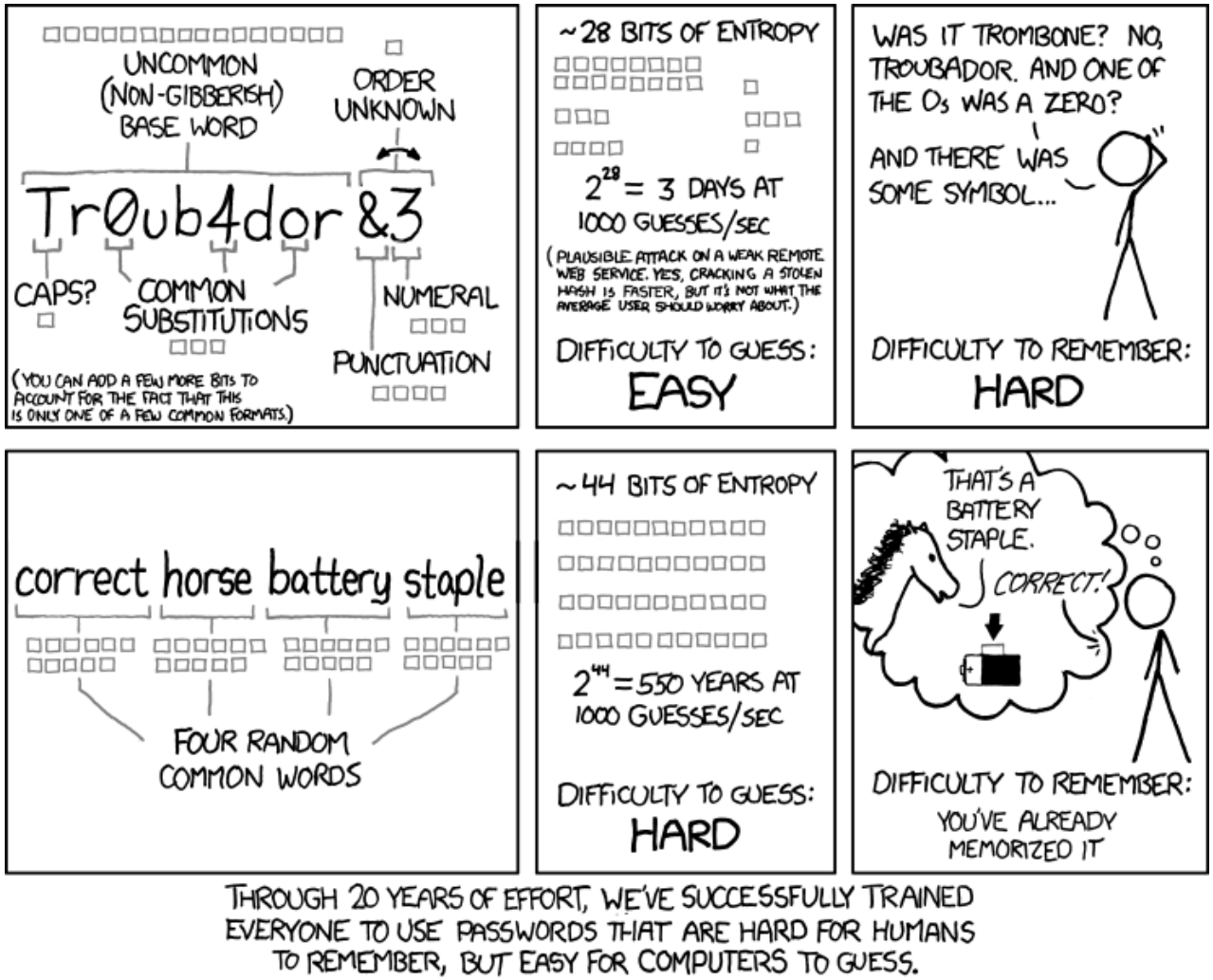
- When someone knows how you construct your password it is trivial to guess it
- Therefore the password should be chosen **randomly**

Choosing Passwords

How to choose good passwords?

- (audience suggestions)

Choosing Passwords



https://www.xkcd.com/936/

Good Passwords

Gold Standard

- I tell you **exactly** how I choose my password
- You still cannot guess it before we're all dead

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Entropy means using randomness

- have a random number generator

Good Passwords

Gold Standard

- I tell you **exactly** how I choose my password
- You still cannot guess it before we're all dead

Entropy means using randomness

- have a random number generator
- use it until you have a secure password

Good Passwords

Please bear with me it's just an example

- 1

Good Passwords

Please bear with me it's just an example

- 15

Good Passwords

Please bear with me it's just an example

- 151

Good Passwords

Please bear with me it's just an example

- 1512

Good Passwords

Please bear with me it's just an example

- 15124

Good Passwords

Please bear with me it's just an example

- 151245

Good Passwords

Please bear with me it's just an example

- 1512452

Good Passwords

Please bear with me it's just an example

- 15124524

Good Passwords

Please bear with me it's just an example

- 151245241

Good Passwords

Please bear with me it's just an example

- 1512452415

Good Passwords

Please bear with me it's just an example

- 1512452415263112214316331622221641

Remembering Passwords

Now we have a good password

- can't remember that many numbers in order
- slow to type

Remembering Passwords

Now we have a good password

- can't remember that many numbers in order
- slow to type

Diceware

- transform numbers into words
- much easier to remember
- still equally hard to guess

Diceware

Process

- roll die five times
- write down results (in order)
- look up word in wordlist
- repeat until desired number of words

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Example

- 15124 52415

Diceware

Process

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Example

- 15124 52415
- carrot rotunda

Diceware

Process

- roll die five times
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Example

- 15124 52415
- carrot rotunda
- 21146 11646 13351 56154

Diceware

Process

- roll die five times
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- look up word in wordlist
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Example

- 15124 52415
- carrot rotunda
- 21146 11646 13351 56154
- correct animal battery staple

Diceware

Process

- roll die five times
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- repeat until desired number of words

Example

- 15124 52415
- carrot rotunda
- 21146 11646 13351 56154
- correct animal battery staple
- 11512 45241 52631 12214 31633 16222 21641

Diceware

Process

- roll die five times
- write down results (in order)
- look up word in wordlist
- repeat until desired number of words

Example

- 15124 52415
- carrot rotunda
- 21146 11646 13351 56154
- correct animal battery staple
- 11512 45241 52631 12214 31633 16222 21641
- ambiguity premium sampling apostle gallstone clumsily cursor

Diceware

How secure is it?

Diceware

How secure is it?(roughly)

dice rolls	10 numerals	26 letters	52 case-sensitive	88 with symbols	diceware
5	4	3	2	2	**1** word
10	8	5	5	4	**2** words
15	12	8	7	6	**3** words
20	16	11	9	8	**4** words
25	19	14	11	10	**5** words
30	23	16	14	12	**6** words
35	27	19	16	14	**7** words
40	31	22	18	16	**8** words

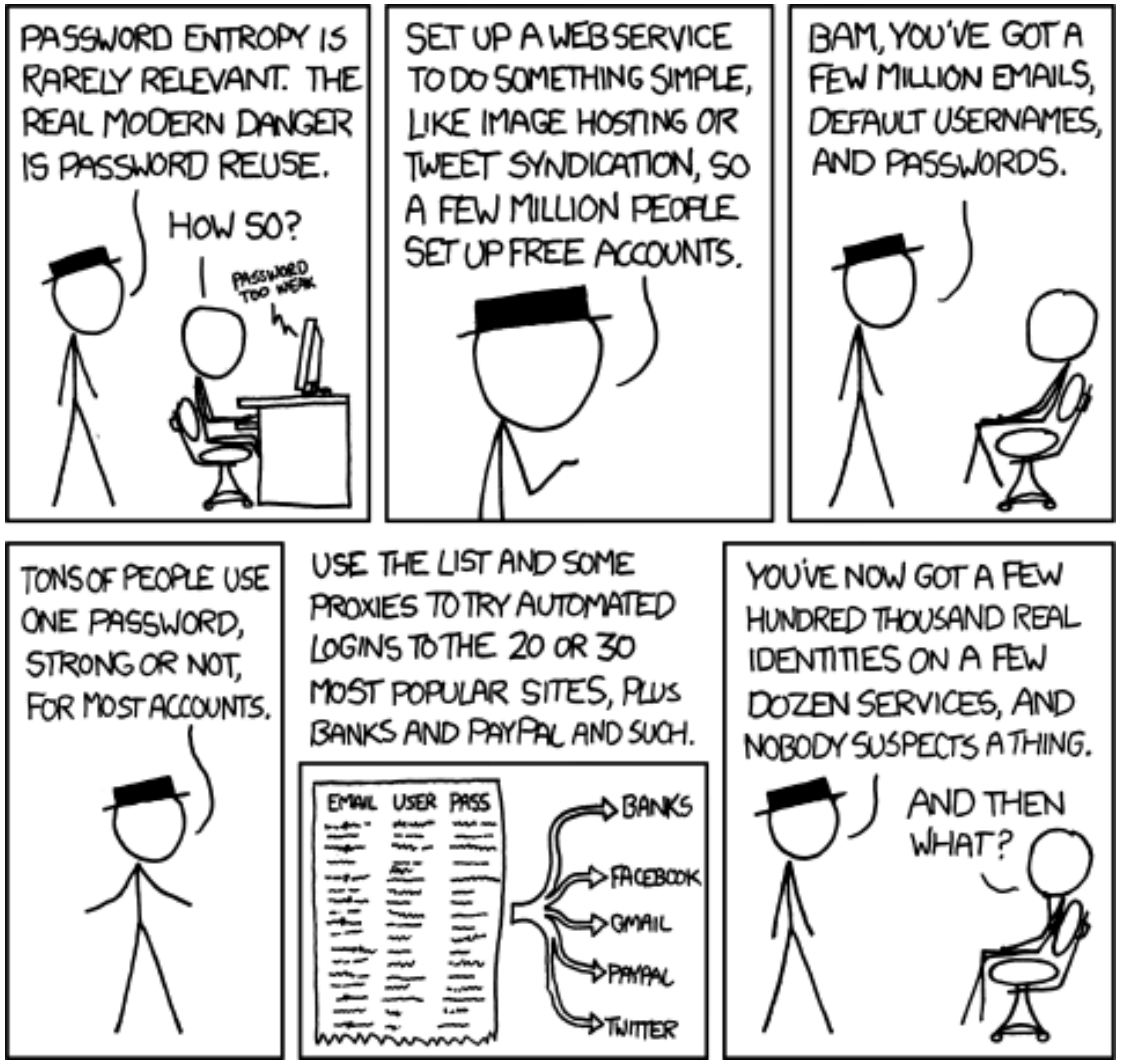
Diceware

https://www.eff.org/dice
https://www.eff.org/files/2016/07/18/eff_large_wordlist.txt
https://en.wikipedia.org/wiki/Password_strength
https://haveibeenpwned.com/

Questions?

https://www.xkcd.com/1256/

Use Different Passwords



https://www.xkcd.com/792/

Use Different Passwords

Remember all these passwords?

- **always** use a different password
- you only need one memorable password
- store the others in a password manager