



Lecture 7-1



Computer and Network Security

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Password Strength

<p>UNCOMMON (NON-GIBBERISH) BASE WORD</p> <p>ORDER UNKNOWN</p> <p>Tr0ub4dor &3</p> <p>CAPS? COMMON SUBSTITUTIONS NUMERAL PUNCTUATION</p> <p>(YOU CAN ADD A FEW MORE BITS TO ACCOUNT FOR THE FACT THAT THIS IS ONLY ONE OF A FEW COMMON FORMATS.)</p>	<p>~28 BITS OF ENTROPY</p> <p>$2^{28} = 3 \text{ DAYS AT } 1000 \text{ GUESSES/SEC}$</p> <p>(PLAUSIBLE ATTACK ON A WEAK REMOTE WEB SERVICE. YES, CRACKING A STOLEN HASH IS FASTER, BUT IT'S NOT WHAT THE AVERAGE USER SHOULD WORRY ABOUT.)</p> <p>DIFFICULTY TO GUESS: EASY</p>	<p>WAS IT TROMBONE? NO, TROUBADOR. AND ONE OF THE 0s WAS A ZERO?</p> <p>AND THERE WAS SOME SYMBOL...</p>  <p>DIFFICULTY TO REMEMBER: HARD</p>
<p>correct horse battery staple</p> <p>FOUR RANDOM COMMON WORDS</p>	<p>~44 BITS OF ENTROPY</p> <p>$2^{44} = 550 \text{ YEARS AT } 1000 \text{ GUESSES/SEC}$</p> <p>DIFFICULTY TO GUESS: HARD</p>	<p>THAT'S A BATTERY STAPLE.</p> <p>CORRECT!</p>  <p>DIFFICULTY TO REMEMBER: YOU'VE ALREADY MEMORIZED IT</p>

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.

Hackers

- Hacker (original meaning):
 - Explorer, risk-taker, technical virtuoso
 - Values free exchange of information; mistrusts authority; values technical skill; holds an optimistic view of technology
- Hacker (ultimate meaning):
 - Teenagers accessing corporate or government computers
 - Stealing and/or destroying confidential information
- What hasn't changed: hackers' public image



Ethics of Hacking

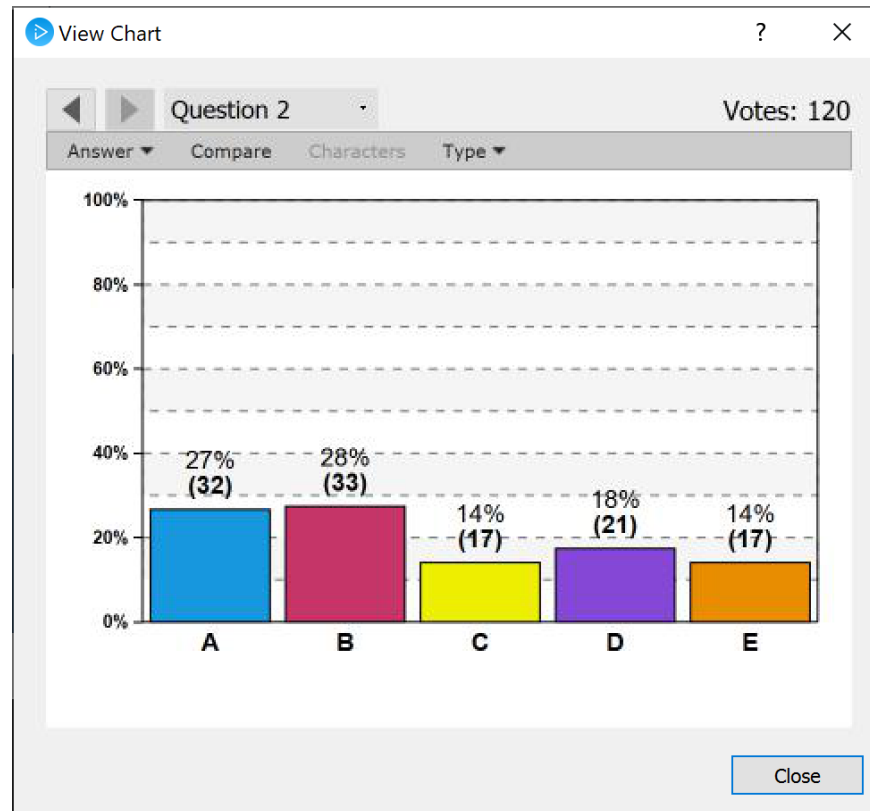
- Parallels between hackers/phreaks & MP3 downloaders
 - Establishment overvalues intellectual property
 - Use of technology as a “joy ride”
 - Breaking certain laws considered not that big a deal
 - (Guess what the police, RIAA thinks about these arguments?)
- *Have you ever hacked anything?*
- *Which, if any, forms of hacking do you consider ethical?*
- *Is it wrong to learn hacking or phreaking skills, if these skills are never put to use?*

Open Wifi, Sidejacking and Firesheep

- Open wifi: unencrypted radio broadcast
 - If the connection itself is not encrypted, anyone connected to the same access point can see all packets
 - Often login is encrypted, rest of session is not
- Sidejacking: capturing cookie used to maintain a session
 - If you're logged in to a site that uses such an open cookie, I get all of your access rights
- Firesheep
 - free Firefox plugin, makes sidejacking easy for average users
 - author's intention was to encourage websites to adopt better security practices
 - *What do you think of the ethics of his action?*

Computer and Network Security

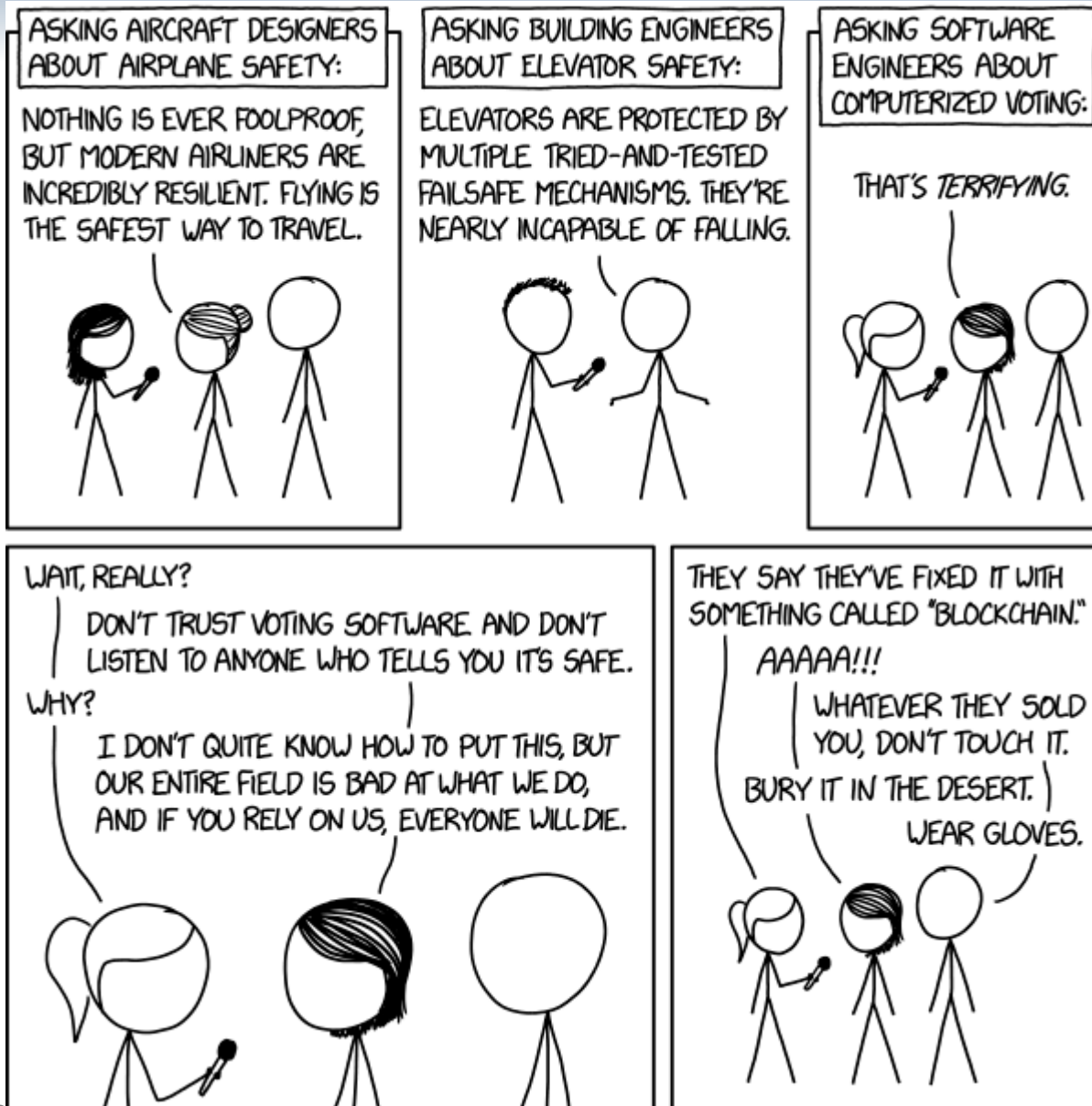
“Canadians should be able to vote online in federal, provincial and municipal elections.”



Online Voting

- Motivation:
 - More people would vote
 - Votes would be counted more quickly
 - Cost less money
 - Avoid disputed elections like Florida 2000
 - Eliminate ballot box tampering
 - Software can prevent accidental over-, under-voting
- Risks:
 - Gives unfair advantage to those with home computers
 - More difficult to preserve voter privacy
 - More opportunities for vote selling
 - Obvious target for a DDoS attack
 - Security of election depends on security of home computers
 - Susceptible to phony vote servers
 - No paper copies of ballots for auditing or recounts

A student contribution...



Electronic Money

- Financial transactions are increasingly moving online
- Advantages
 - easier transactions
 - easier access to credit
 - discourages black market economy
 - prevents businesses from having to carry cash floats
- Disadvantages
 - empowers a few corporations
 - less anonymity
 - security risks
- *Other advantages/disadvantages? What do you think?*

Blockchain

- Distributed ledgers offer an alternative approach to electronic money that works more like cash
- What is:
 - blockchain?
 - mining?
 - what stops someone from spending the same digital money twice?
 - what's an NFT
- But, the currency is incredibly volatile (and, not everyone even agrees that it makes sense to think of it as money)

What do you think? Should governments encourage blockchain-based currencies? Do you use them?