# Lecture 28: Computer Security

Brian Hou
August 9, 2016

Many slides are adapted from CS 161 (Computer Security)

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- Check your grades! Details on Piazza, regrades close 8/10

# Roadmap

- Introduction
- Functions
- Data
- Mutability
- Objects
- Interpretation
- Paradigms
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  - To go beyond CS 61A and see examples of what comes next
  - To wrap up CS 61A!

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  - Injection Attacks

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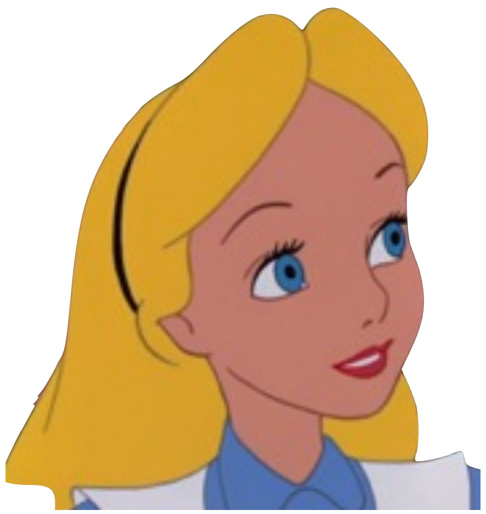

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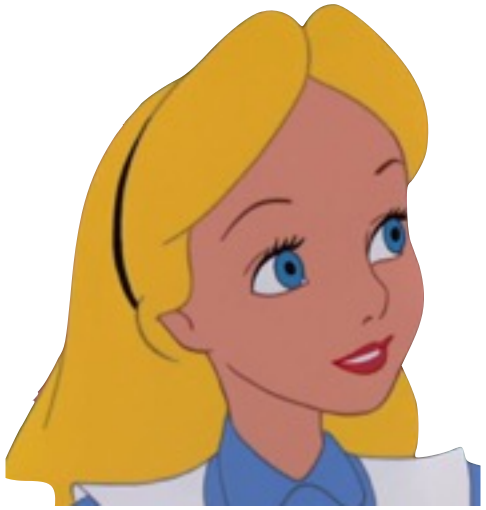

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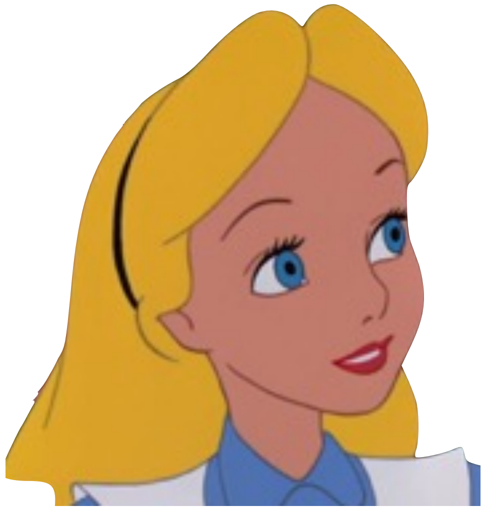

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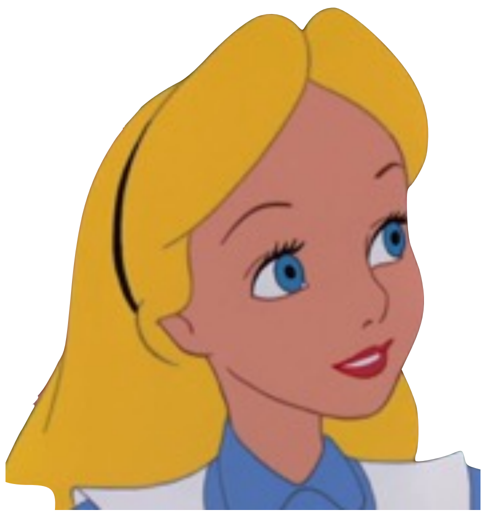

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The Adversary
(Eve or Mallory)

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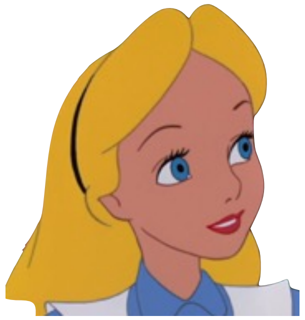

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- Implemented a progressive substitution cipher (e.g. different shift for each letter of the message)

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- Main idea: It is feasible to find three large numbers **e**, **d**, and **n** such that $(m^e)^d = m \pmod{n}$

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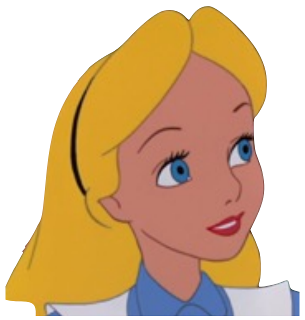

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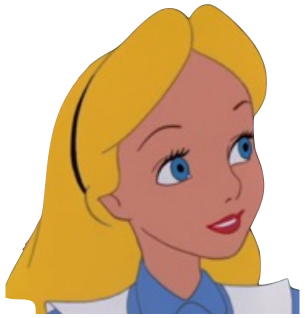

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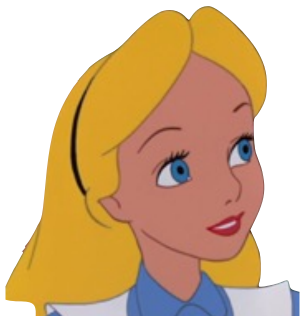

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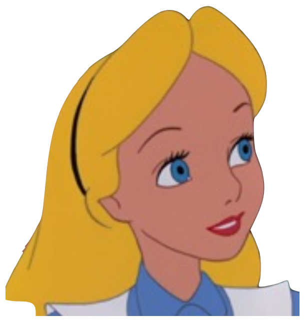

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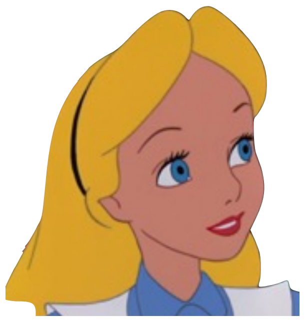

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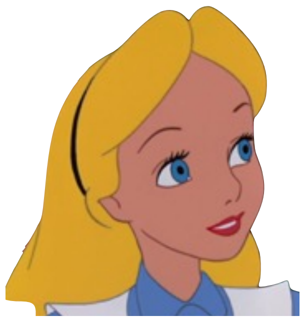

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- The security of RSA relies on factoring being difficult

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    - Factoring a 1024-bit RSA modulus would be 1000x harder, but could happen in the next decade (2019 is coming up!)

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  - But their most recent breakthrough was factoring 21, so...

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  - SSL/TLS (the "S" in "HTTPS", how to connect securely to Facebook, etc.)

# Break!

# Injection Attacks

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- Impersonation (of users to servers, or vice versa)

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- CS 261 and CS 276 are the graduate-level security and cryptography classes