Computer Science 50
Introduction to Computer Science I

Harvard College

Walkthrough 2

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Problem Set 2
Standard Edition

- Old Man song
  - Repetition… design decisions galore
- Caesar cipher encrypter
  - Command line arguments
  - Arrays
- Vigenère cipher encrypter
  - Arrays of arrays

Problem Set 2
Hacker Edition

- Cracking a weak DES password

- Various attacks

  - Dictionary

    - Combinations of dictionary words

    - Alterations of dictionary words

  - Brute force

    - Trying all possible permutations

    - Are there more intelligent ways?

Old Man's Song

The Lyrics

This old man, he played **one**

He played knick-knack **on my thumb**

Knick-knack paddywhack, give your dog a bone

This old man came rolling home

This old man, he played **two**

He played knick-knack **on my shoe**

Knick-knack paddywhack, give your dog a bone

This old man came rolling home

Design and Style
Design

- What is good design?

- Questions:
    - Is my code straightforward to read?
    - Am I wasting CPU cycles unnecessarily?
    - Is my code more complicated than it need be?
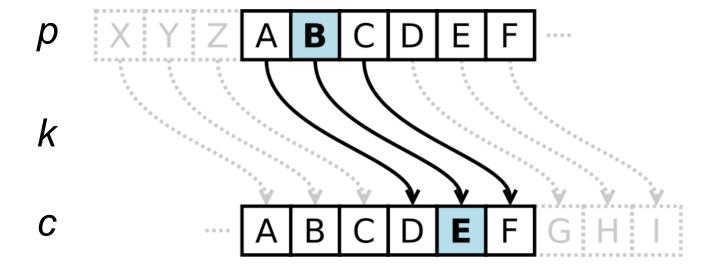
Design and Style
Style

- What is good style?

- Questions:
  - Is my code well commented?
  - Is my code "pretty-printed"?
    - Consistent indentation
    - Lines no longer than 80 characters

Design and Style

Style

```
/*
 * Greets the user
 * Takes one argument, the name.
 * Returns user's supposed favorite number.
 */
int greetUser(string name)
{
    printf("o hai, %s! lolz\n", name);
    if (strcmp(name, "David") == 0)
        return 42;
    else
        return 2008;
}
```

Caesar Cipher

$$c_i = (p_i + k) \% 26$$

Vigenère Cipher

$$c_i = (p_i + k_i) \% 26$$

p H E L L O ,   W O R L D

  + + + + +   + + + + +

k F O O B A   R F O O B

  ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

c M S Z M O ,   N T F Z E

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