



Computer Science 50

Introduction to Computer Science I

Harvard College

Walkthrough 2

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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:
 - Comments
 - Is it clear what I am doing at each major step?
 - Variable names
 - Is it clear what each variable represents?
 - Prettiness
 - Is no line longer than 80 characters?
 - Did I indent uniformly?

Problem Set 2

Standard Edition

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

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

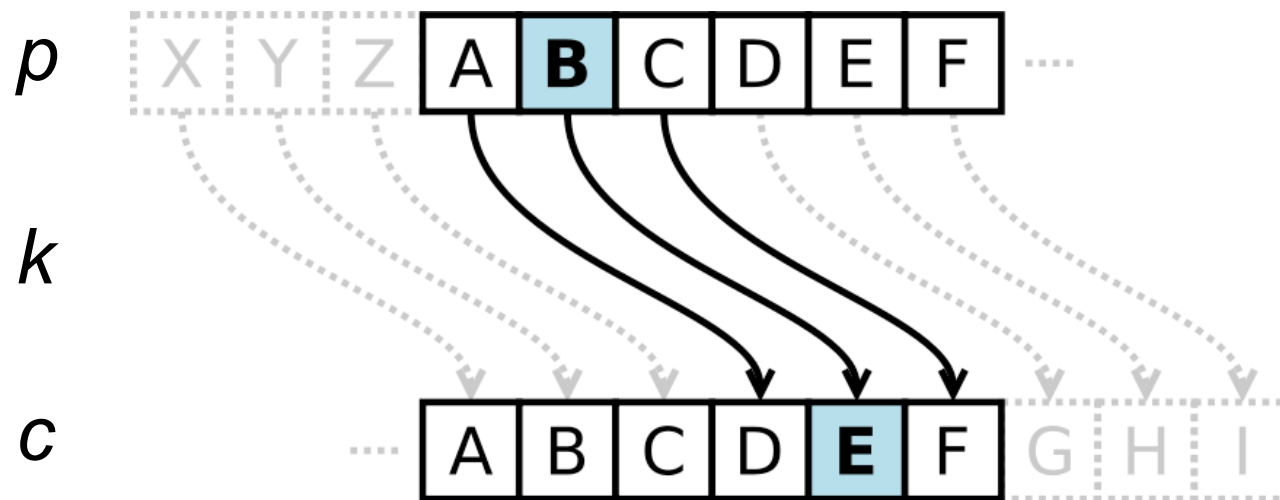
This old man, he played **two**
He played knick-knack **on my shoe**
Knick-knack paddywhack, give your dog a bone
This old man came rolling home

oldman.c – several ways

- printf the entire song
 - bad design
- loop
 - good design
 - what kind?
- how do we store changing parts?
 - array
 - function + conditions
 - other ways?

Caesar Cipher

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



Command Line Arguments

- argc
 - when is it 1?
 - when is it 2?
- argv[]
 - argv[0]
 - argv[1]

caesar.c

- $c_i = (p_i + k) \% 26$
 - what is p?
 - what is k?
 - what is % 26?
 - what is c?

Tools

- isdigit
- atoi
- GetString()
- strlen
- loop
- conditions
- ascii
- printf

Challenges

- how do we preserve case?
- how do we leave spaces unchanged?

Vigenère Cipher

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

<i>p</i>	H	E	L	L	O	,	W	O	R	L	D
	+	+	+	+	+		+	+	+	+	+
<i>k</i>	F	O	O	B	A		R	F	O	O	B
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
<i>c</i>	M	S	Z	M	O	,	N	T	F	Z	E

Differences

- key is alphabetical
 - use isalpha instead of isdigit
- find key's numerical value
- must know when to advance key
 - not on spaces
- must worry about wrapping around key

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