

Syllabus and Algorithms

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15-110 Fall 2019

Staff



Kelly Rivers



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36 Teaching Assistants!

Syllabus

Resources

<https://www.cs.cmu.edu/~110/>

Gradescope

Piazza

OH Queue

Syllabus

Fast Facts

Website: lists all office hours, schedules, resource links

Grade Scale: 90-100 A, 80-89 B, ...

Grading: Homeworks (6), Check-ins (8), Exams (3), Class Participation

Review the rest on your own!

To Do:

Read the Syllabus thoroughly

Load Python3 and Pyzo ASAP to get started with us on Wednesday

Ask questions as needed!

Computer Science

Video: Computer Science is Changing Everything -
<https://www.youtube.com/watch?v=QvyTEx1wyOY>

Computer Science is understanding and analyzing steps to solve problems
(**algorithms**) and how to represent them (**abstraction**)
We use code and computers as a tool to accomplish these

Computers/computing are impacting entire fields of study
medicine, retail/shopping, safety, politics, friendships, so many things

Activity



Making a Peanut Butter and Jelly Sandwich

1. Open bag of bread
2. Reach hand in and take out 2 slices of bread
3. Place each slice on a plate
4. Open jar of peanut butter
5. Pickup knife and stick sharp side of knife into open jar
6. Use knife to scoop out peanut butter
7. Wipe and spread peanut butter on one slice of bread
8. Repeat 5, 6, 7 until slice of bread is covered in peanut butter. Close jar
9. Open jar of jelly
10. Pickup knife and stick sharp side of knife into open jar
11. Use knife to scoop out jelly
12. Wipe and spread jelly on other (non-PB) slice of bread
13. Repeat 10, 11, 12 until the slice of bread is covered in jelly. Close jar.
14. Put the peanut butter side of one slice of bread on the jelly side of the other.
15. Pick up and eat sandwich.

Algorithms

A precise rule (or set of rules) specifying how to solve some problem.

It should specify what is needed (input) to solve the problem, and what the solution looks like (output)

Examples:

Recipes

Tax Codes

Board Game Rules

Sewing patterns

We can use numbered lists, flow charts, and computer code to represent them

Good Algorithms

A good algorithm should

produce the correct outputs for any set of legal inputs.

execute efficiently (few steps when possible) and be specific.

be designed in such a way that others will be able to **understand it**

and modify it to specify solutions to additional problems.

Algorithm Example – Calculating Age

Input: Birthday (month, day, year) , Current day (month, day, year)

1) Subtract birth year from current year

2) If birthdate (month/day) comes after current date (month/day): subtract 1

Algorithm Example – Calculating Age

Input: Birthday (month, day, year) , Current day (month, day, year)

1) Subtract birth year from current year

2) If birthdate (month/day) comes after current date (month/day): subtract 1

Try some examples with today's date:

July 12, 1999

September 21, 2018

December 1, 2003

Does it work for all legal inputs?

Is it specific?

Do you understand it and could you modify it?

Algorithm Example – Make Change in the Fewest Coins

Suppose you had quarters, dimes, nickels, and pennies

I ask you for a certain number of cents in change

How do you give me the change in the fewest number of coins?

Unit 1

Monday – Algorithms

Wednesday – Programming Basics

Friday – Computer Organization

Wednesday – Data Representation

Friday – Programming Functions

Announcements

- Waitlist – Keep coming to class. We'll work with you to find space
- Homework 1 Check-in due on Monday 9/2 noon
- Homework 1 is due Monday at 9/9 noon!

Start Early!