

COMPUTER SCIENCE 125

The Art and Science of Computer Programming

Summer 2025



Marcel Dall'Agnol



Kevin Negy



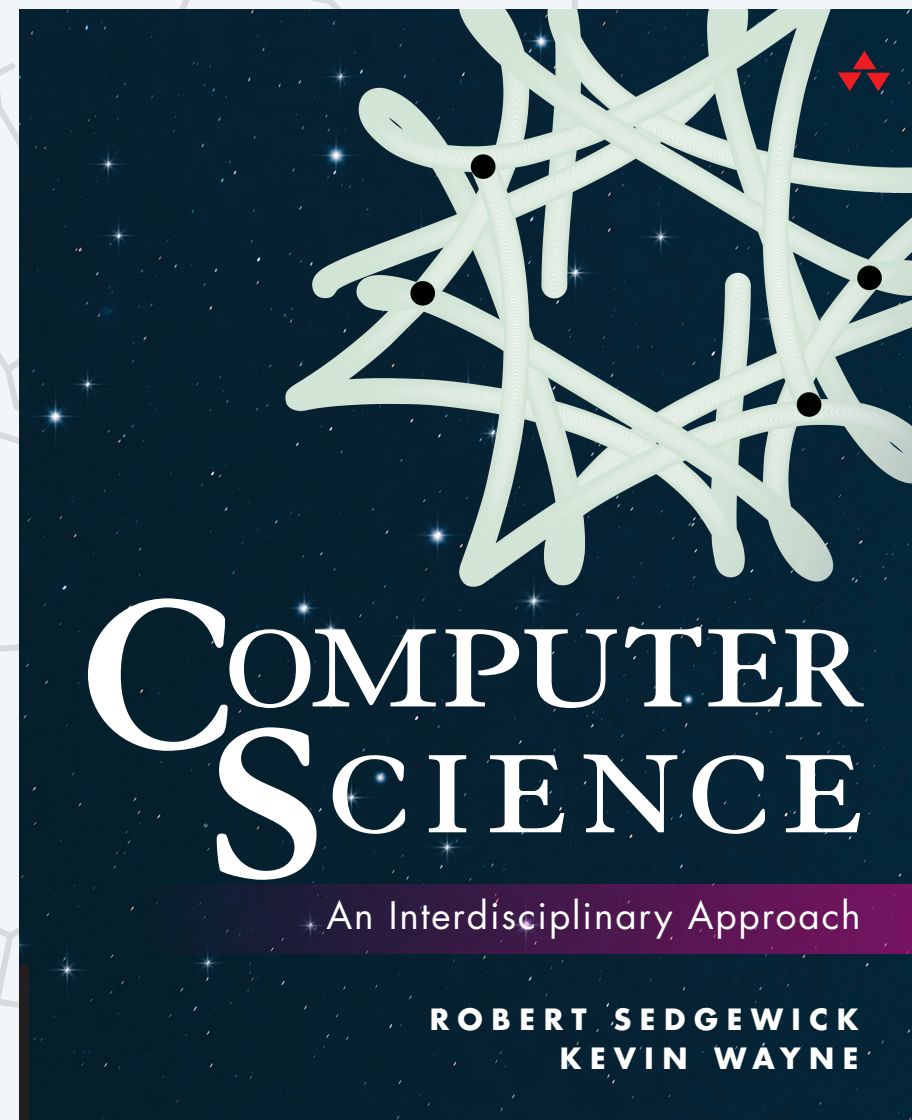
Eric Jung



Quentin Hicks



<https://www.cs.princeton.edu/~cos125>



<https://introc.cs.princeton.edu>

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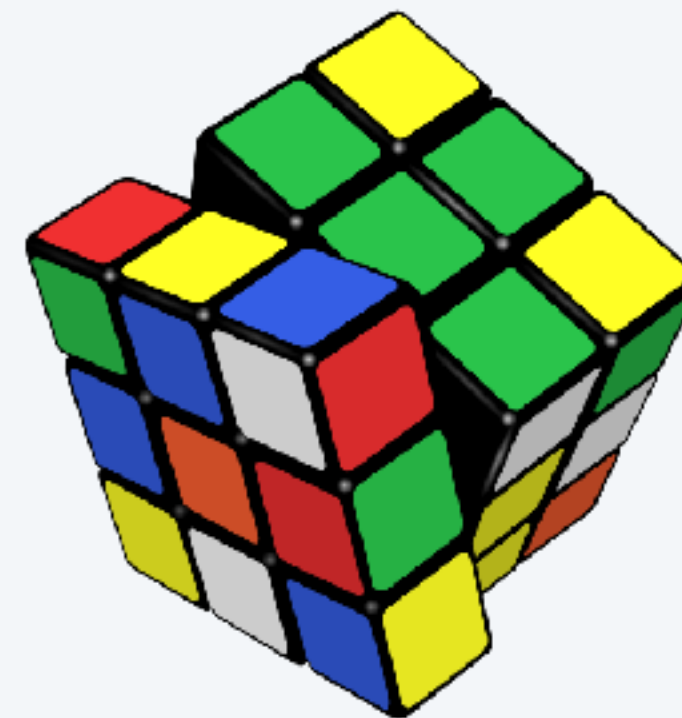
- ▶ *the power of technology*
- ▶ *course mechanics*
- ▶ *course resources*
- ▶ *teaser*

You want to know Computer Science

CS develops problem-solving skills. You can translate these skills to other disciplines.

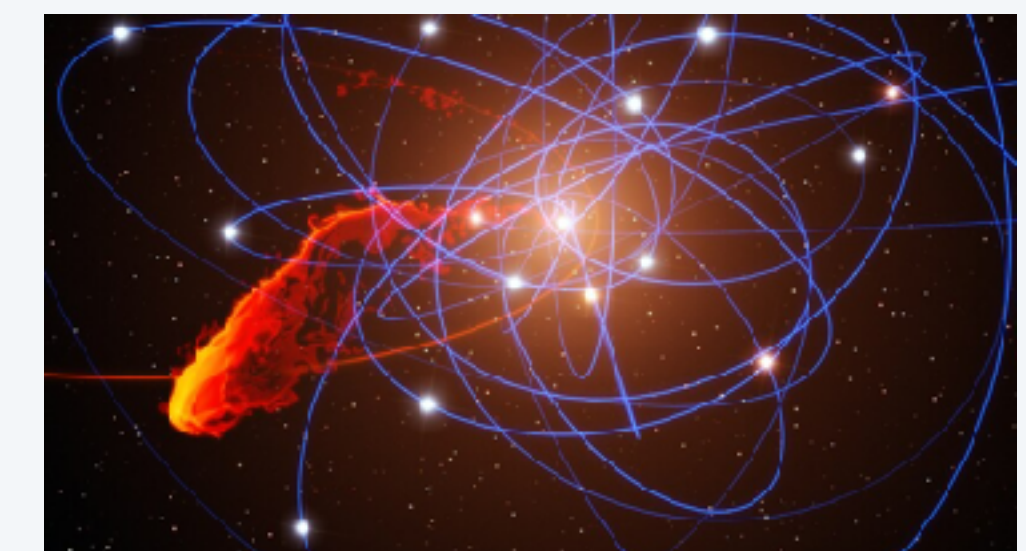
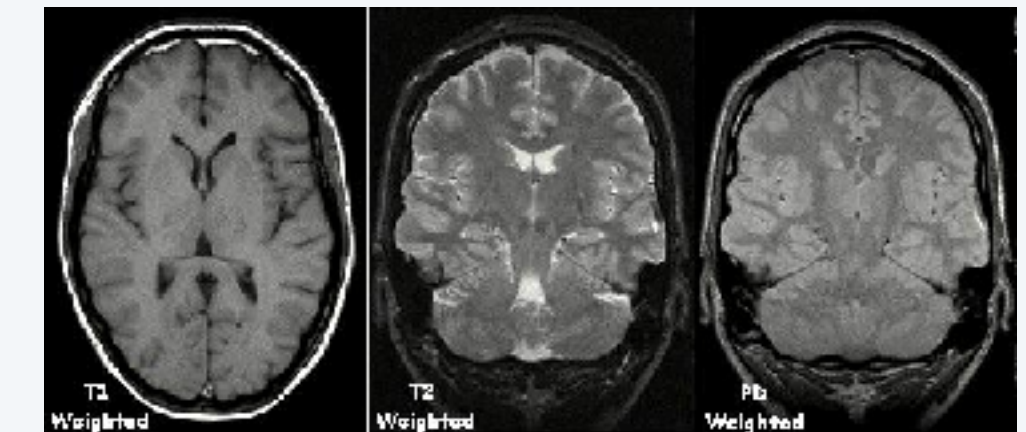
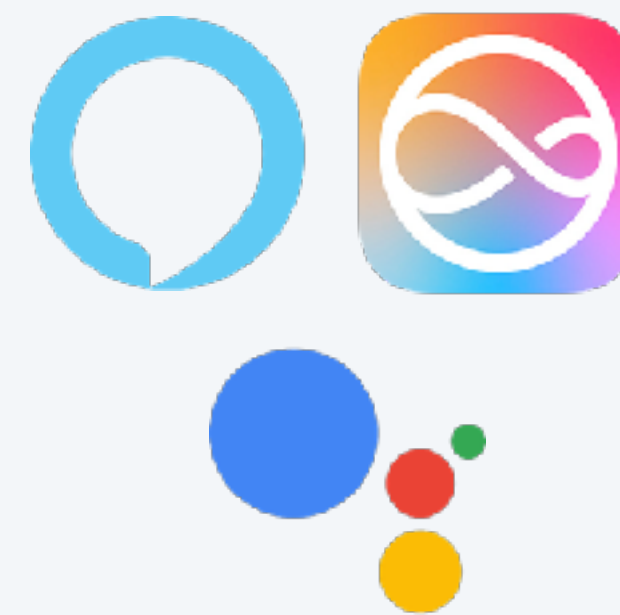
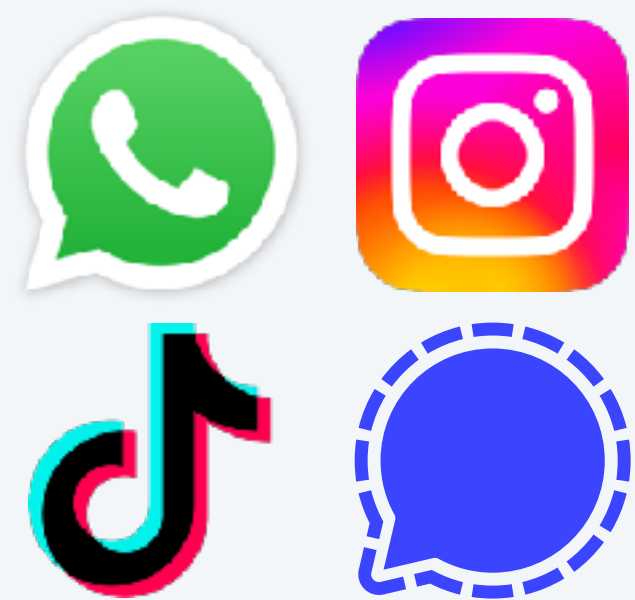


Creativity



Reasoning

Computing changes the world.



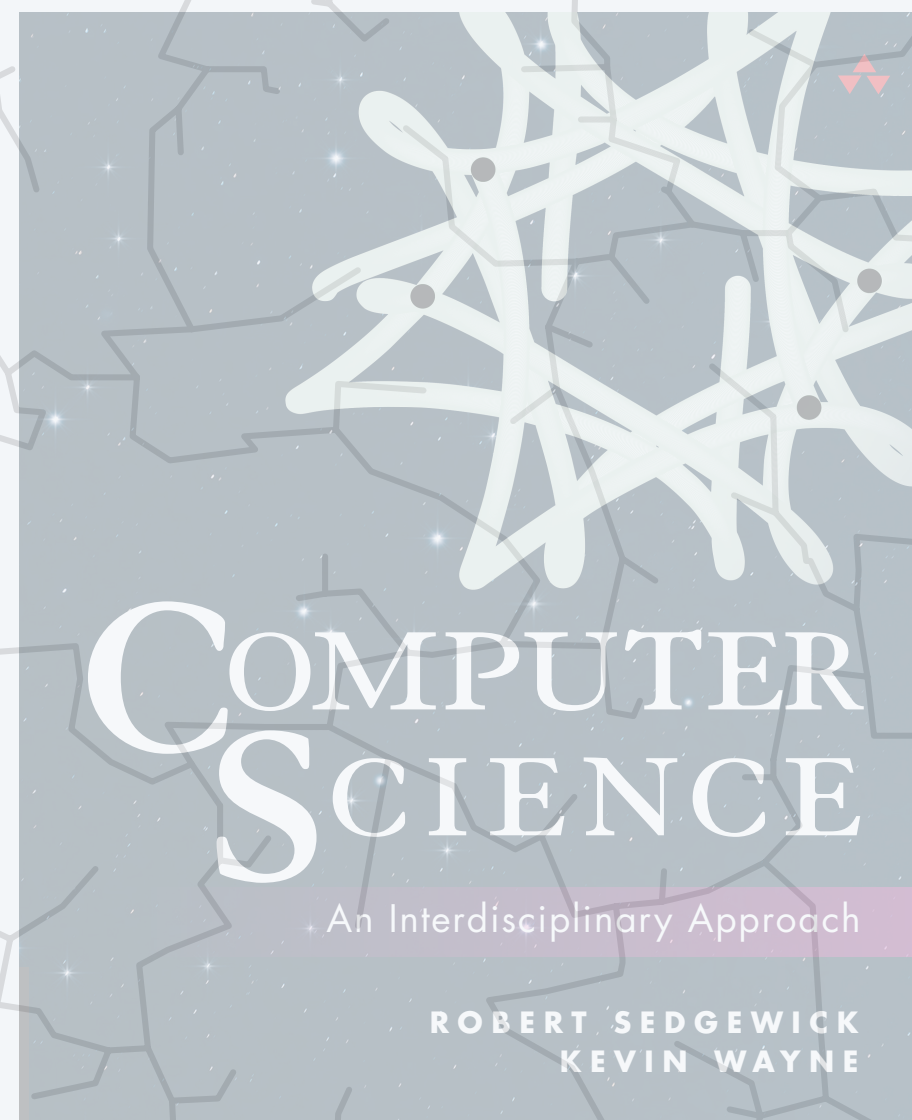
COS 125 course objectives

Goal 1. Identify computational problems and the strategies used to solve them.

Goal 2. Reason about the steps required to solve such problems.

Goal 3. Write and debug code that implements the solution to computational problems.

topic	purpose
data types	store and manipulate information
conditionals	control the flow of a program
loops	repetition
arrays	processing lots of data
ethics	using our tools responsibly
input and output	text, graphics, sound
functions	building larger programs



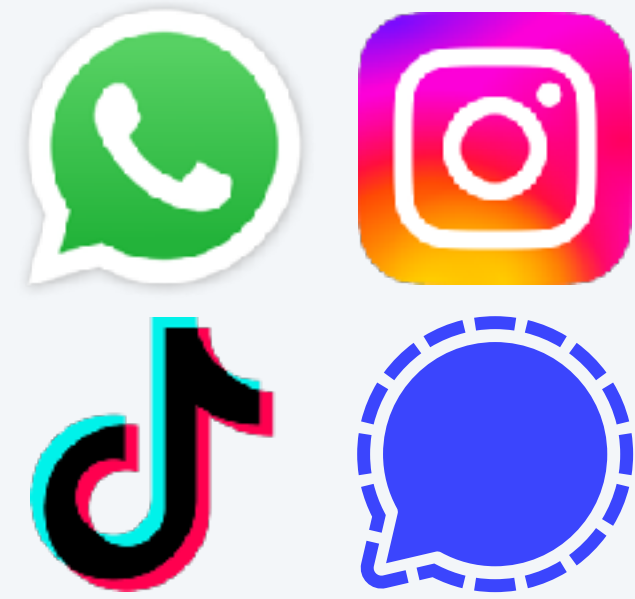
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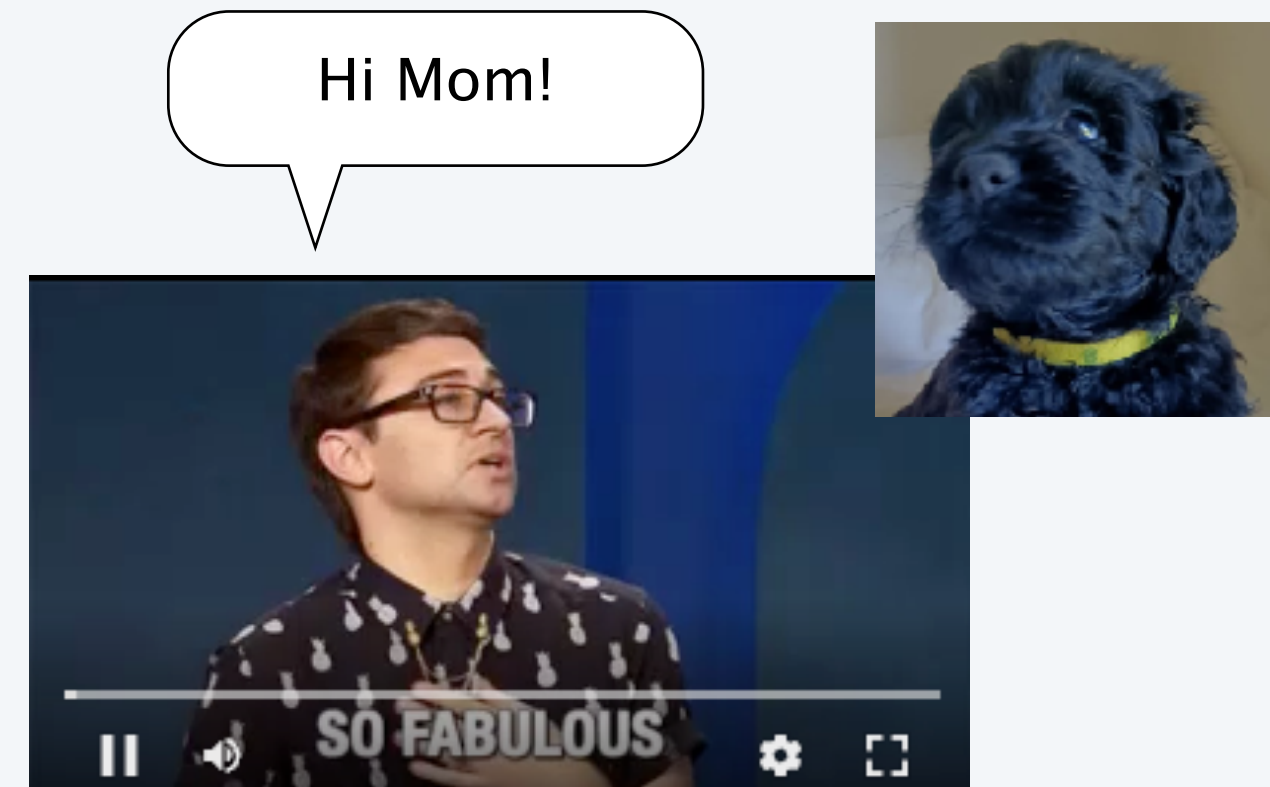
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Technology transforms society

Example

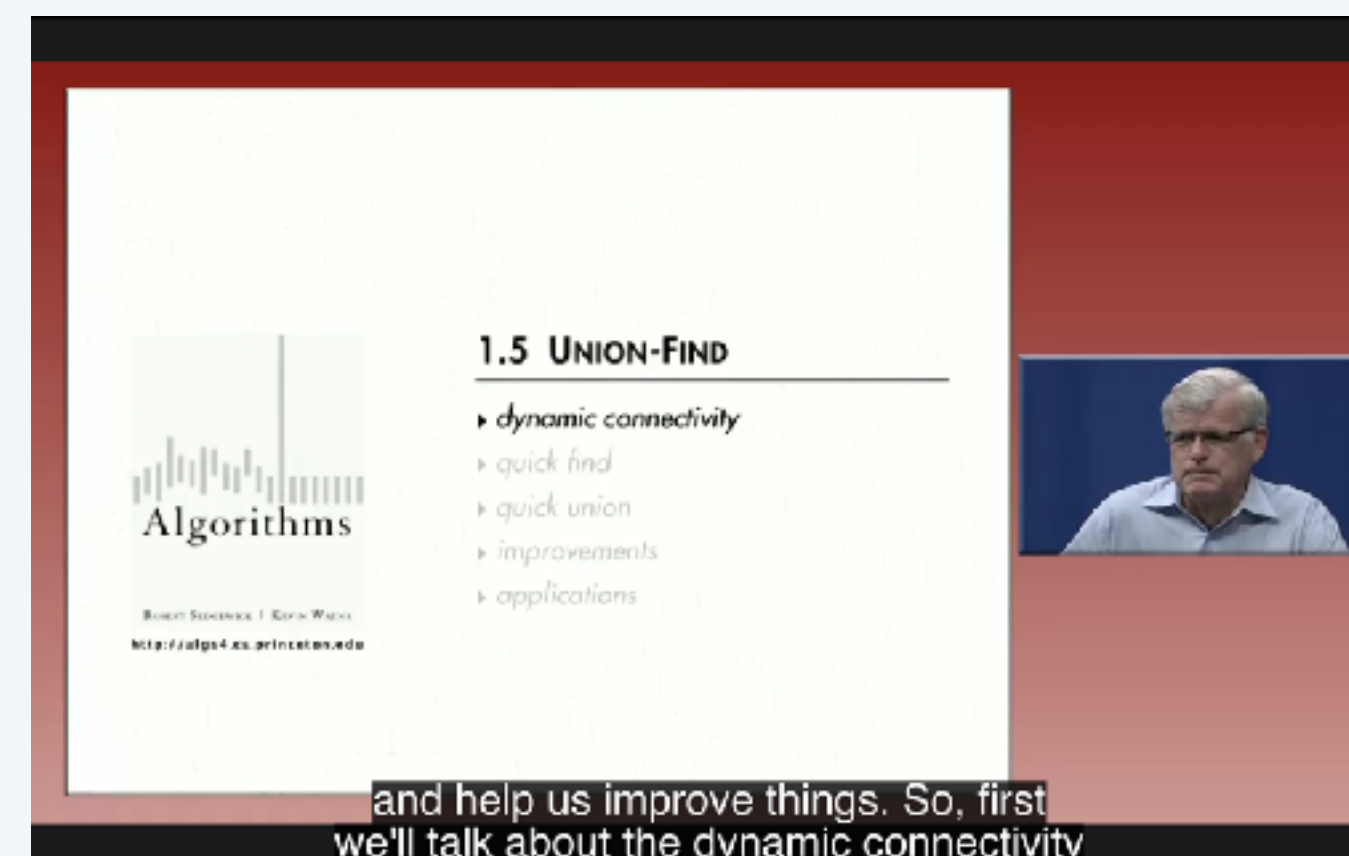


What can we do with it?

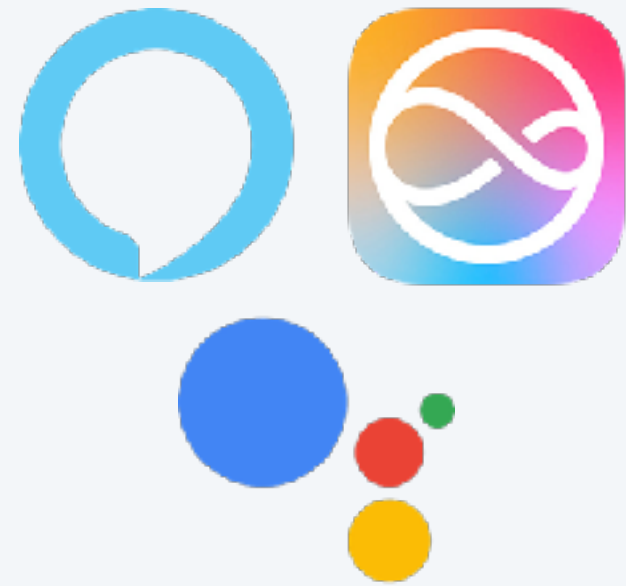


Impact on society

- ▶ Connects distant friends
 - ▶ Amplifies voices
 - ▶ Mobilizes groups
 - ▶ **Endless distraction**
 - ▶ **Exposure to unattainable ideals**
-
- ▶ Higher education at scale
 - ▶ Lifelong learning
 - ▶ **Few offerings in other languages**
 - ▶ **Poor retention rates**



Example



What can we do with it?

Alexa, please set a timer for 10 minutes.

Siri, what's the weather forecast for tomorrow?

Hey Google, please turn on the lights.



Can you tell me your funniest joke?

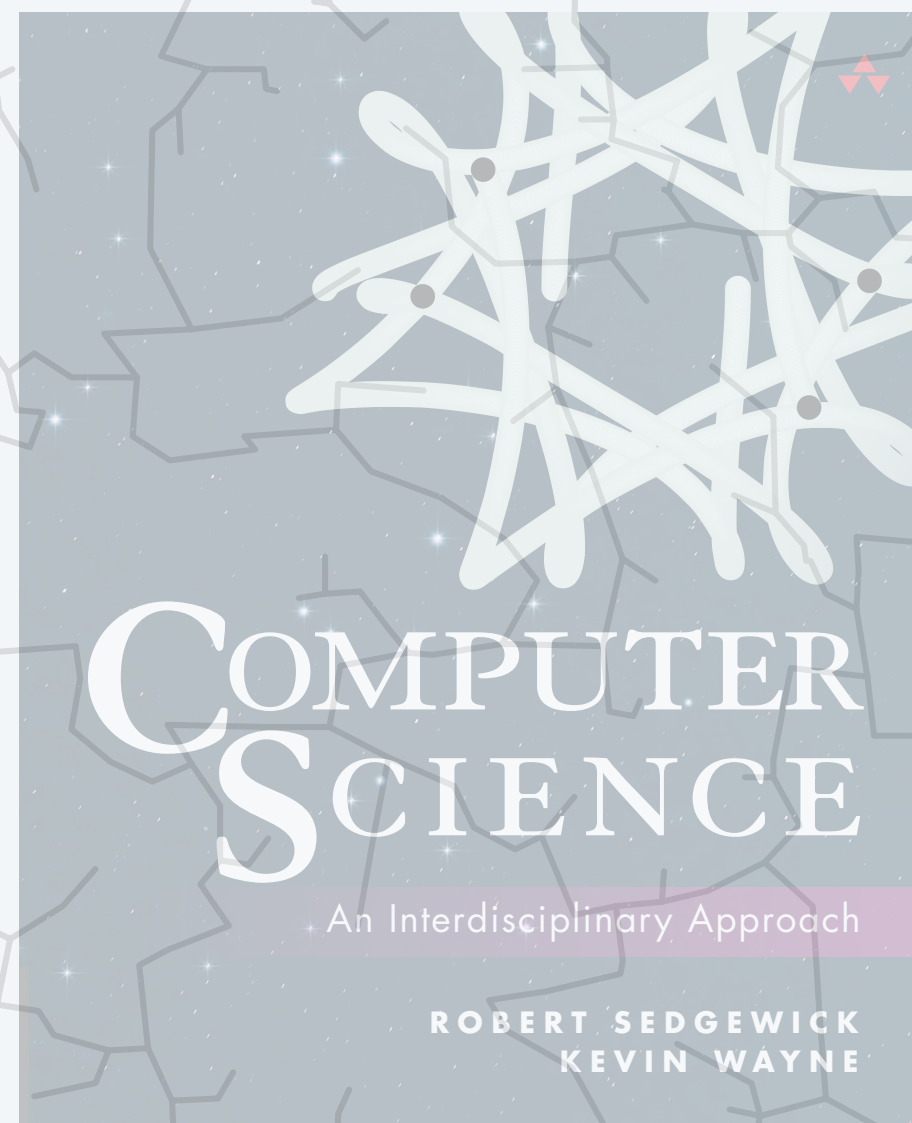
Sure! Here's one of my favorites:

Why don't skeletons fight each other?

Because they don't have the *guts*! 😄

Impact on society

- ▶ More channels to interact with technology and information
- ▶ **Trouble with people who stutter or code-switch between languages**
- ▶ Large efficiency gains
- ▶ **Vertiginous change**
- ▶ **Disincentivizes critical thinking**
- ▶ **Bad jokes**



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- ▶ *the power of technology*
- ▶ **course mechanics**
- ▶ *course resources*
- ▶ *teaser*

Course elements

	Objective	When	Where	Who
Lectures	Introduce new material	MW 1:30–2:50pm	Jadwin 343	Marcel or Kevin



We encourage you to participate!



Marcel Dall'Agnol



Kevin Negy

Course elements

	Objective	When	Where	Who
Lectures	Introduce new material	MW 1:30–2:50pm	Jadwin 343	Marcel or Kevin
Precepts	Active learning, discussions, problem solving	TTh 1:30–2:50pm	Jadwin 343	Marcel or Kevin + Eric and Quentin



This is a supportive environment to ask questions
and make mistakes



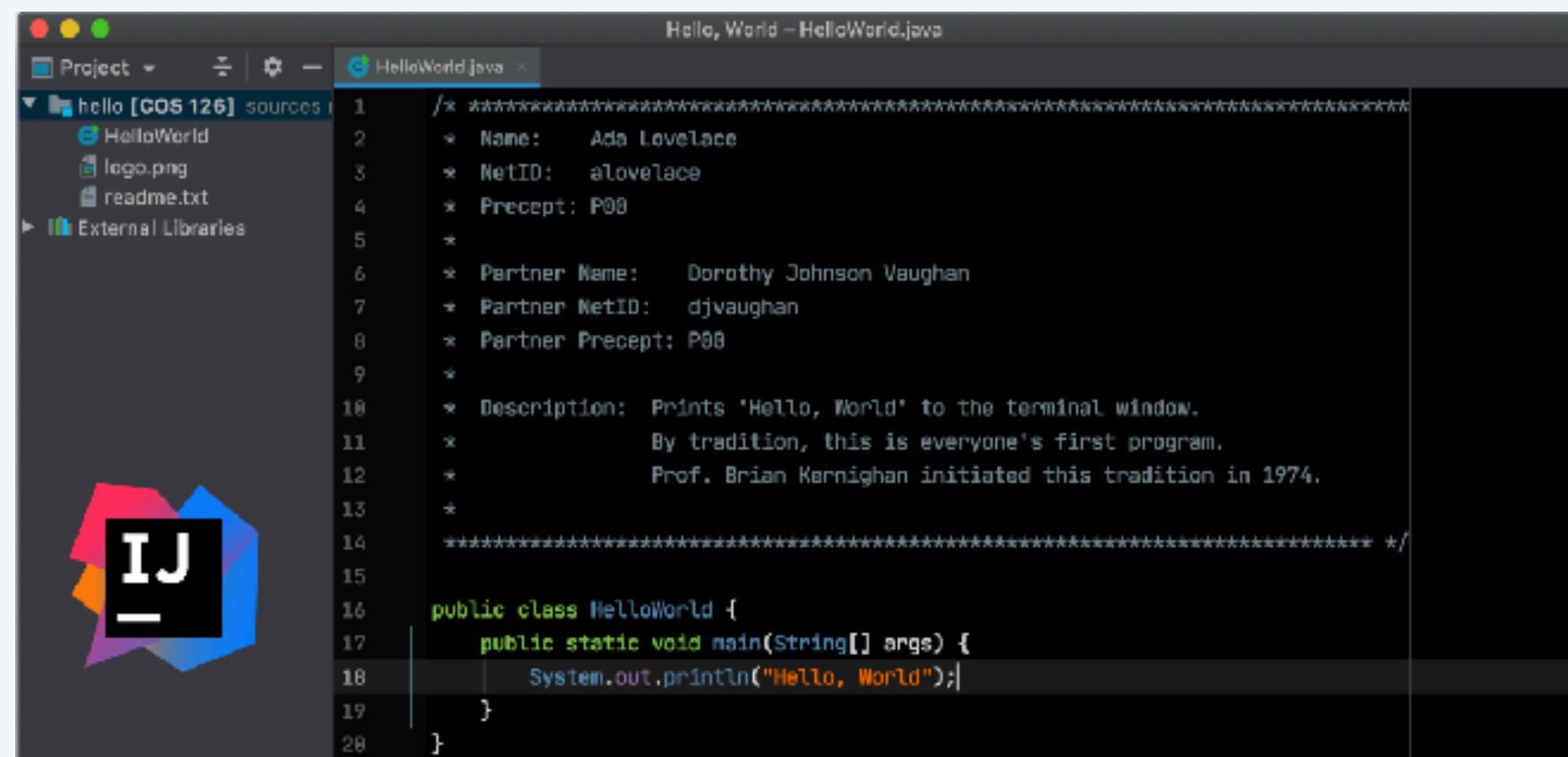
Eric Jung



Quentin Hicks

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Labs	Work on assignments with support from course staff	F 10:30am–1:00pm	Jadwin 343	Eric and Quentin



```
1  /* ***** */
2  * Name:   Ada Lovelace
3  * NetID:  alovelace
4  * Precept: P00
5  *
6  * Partner Name: Dorothy Johnson Vaughan
7  * Partner NetID: djvaughan
8  * Partner Precept: P00
9  *
10 * Description: Prints 'Hello, World' to the terminal window.
11 *              By tradition, this is everyone's first program.
12 *              Prof. Brian Kernighan initiated this tradition in 1974.
13 *
14 * ***** */
15
16 public class HelloWorld {
17     public static void main(String[] args) {
18         System.out.println("Hello, World");
19     }
20 }
```



Eric Jung



Quentin Hicks

Course elements

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Labs	Work on assignments with support from course staff	F 10:30am–1:00pm	Jadwin 343	Eric and Quentin
Quizzes	Practice the concepts discussed in class	Due Fridays at 6pm	Website	You solve the problems on your own
Programming Assignments	Illustrate and practice a CS concept	Due Sundays at 2pm	Website	You solve the problem from scratch, on your own computer

iClicker (required). To earn participation credit:

- ▶ Create iClicker Cloud account.
- ▶ Answer multiple choice questions during lecture.



<https://www.iclicker.com/>

Which is the cutest plushie?



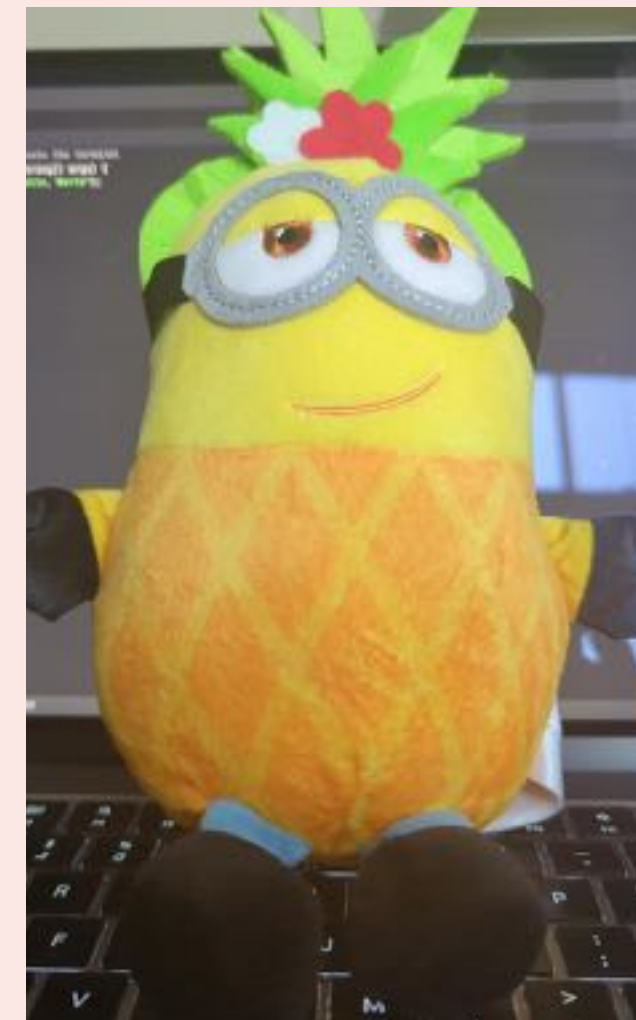
A.



B.



C.



D.

Grading

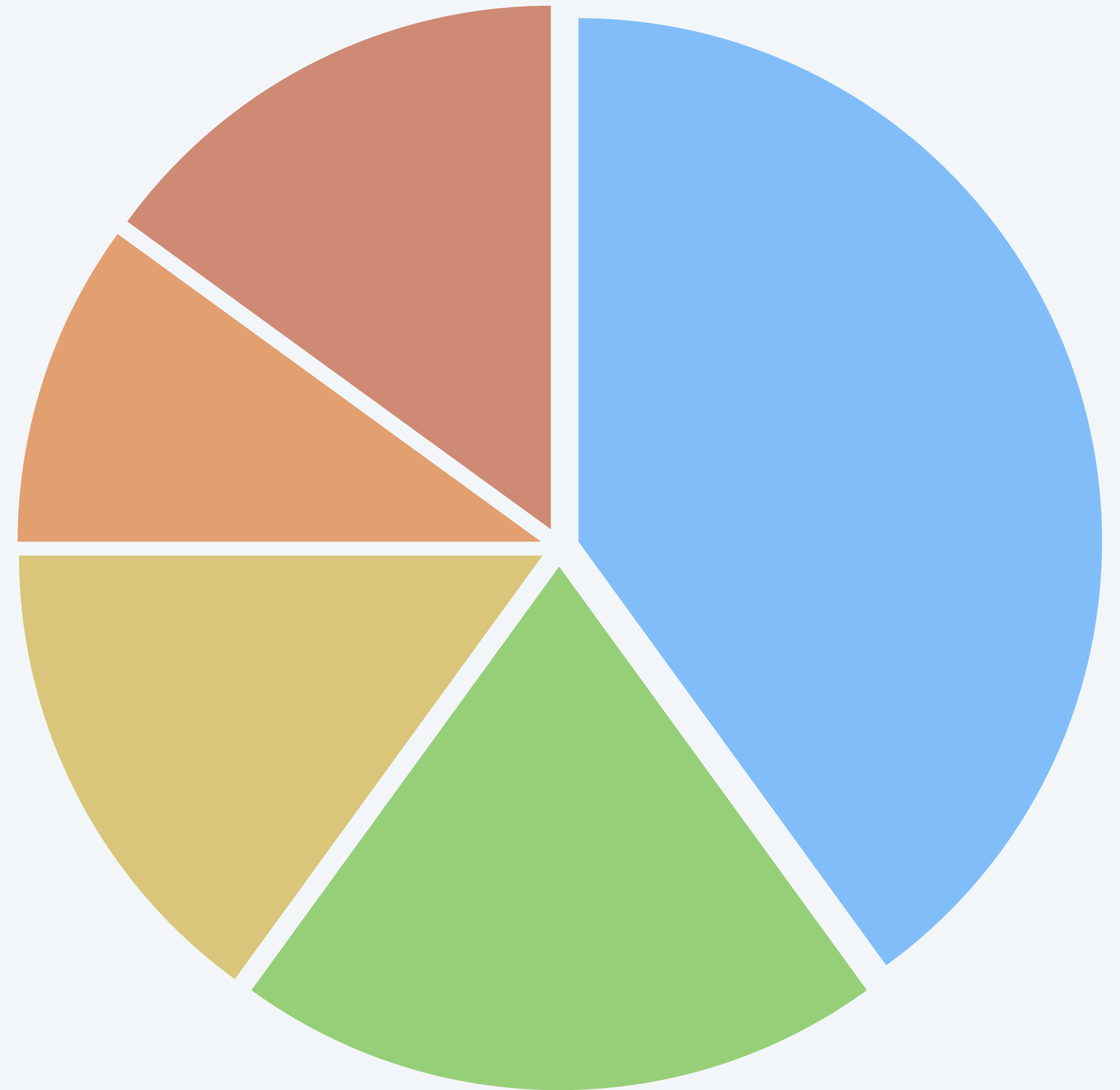
Programming Assignments (40%). Six of them, assigned weekly.

Quizzes (15%). Six of them, assigned weekly.

Midterm Exam (15%). In-class, on July 18th.

Final Exam (20%). In-class, on Aug 14th.


Participation (10%). Attendance (lectures and precepts).

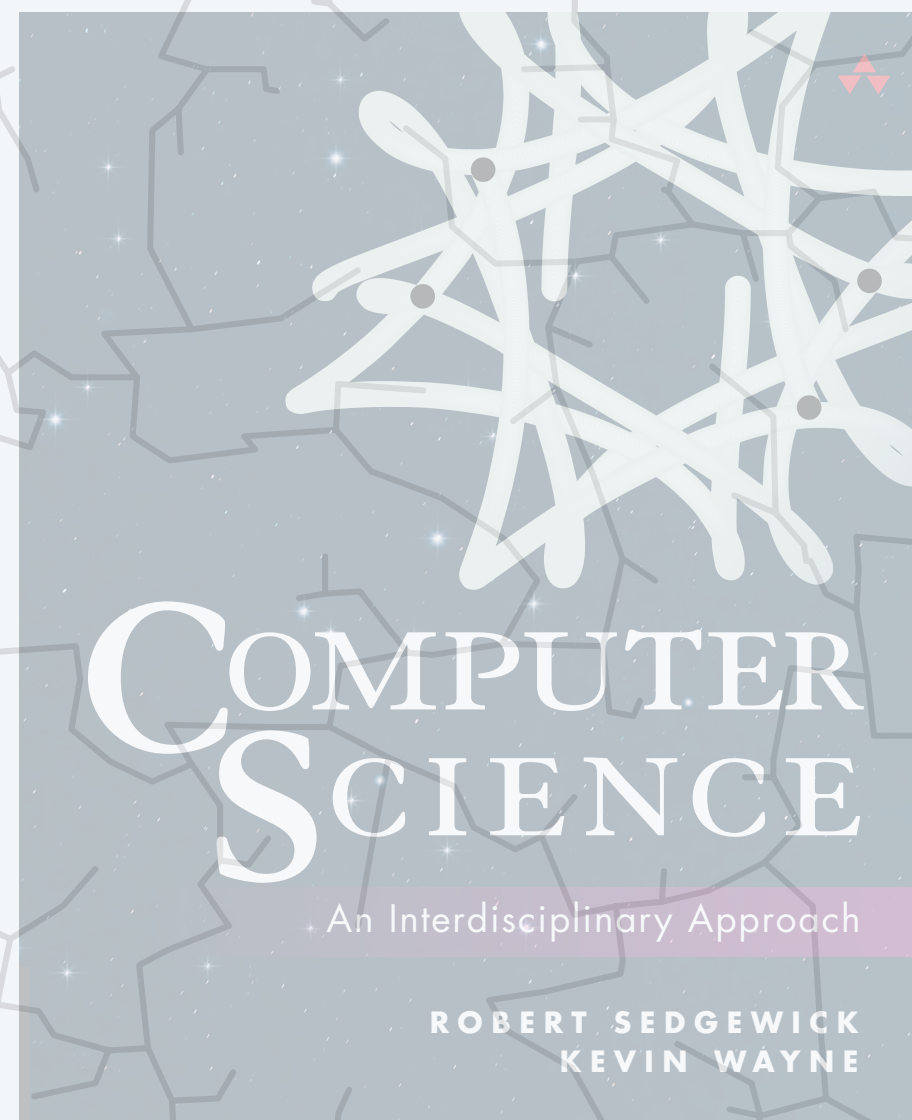


A typical week (except this one)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	1	2	3	4	5
6	Lecture 7	Precept 8	Lecture 9	Precept 10	Lab Quiz (due 6pm) 11	12
Assignment (due 2pm) 13	14	15	16	17	18	19

This (exceptional) week

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	1 Lecture	2 Precept	3 Lab Quiz (due 6pm)	4 	5
6 Assignment (due 2pm)	7 Lecture	8 Precept	9 Lecture	10 Precept	11 Lab Quiz (due 6pm)	12
13 Assignment (due 2pm)	14	15	16	17	18	19



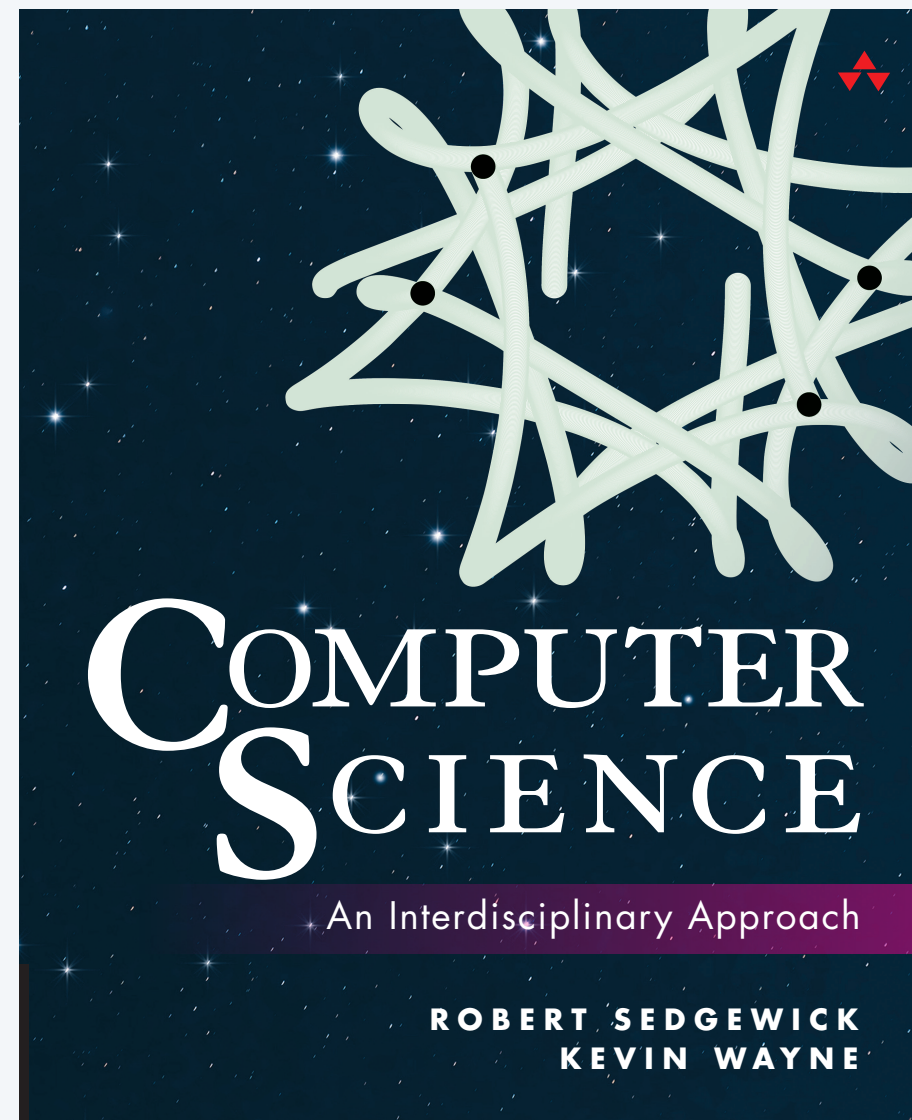
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- ▶ *the power of technology*
- ▶ *course mechanics*
- ▶ ***course resources***
- ▶ *teaser*

Textbook

Readings. *Computer Science: An Interdisciplinary Approach* by R. Sedgewick and K. Wayne, Addison–Wesley Professional, 2016.



ISBN 978-0134076423

Web resources

Course website.

- ▶ Syllabus and course policies (please read).
- ▶ Lecture slides.
- ▶ Precept worksheets and projects.
- ▶ Quizzes and programming assignments.



<https://www.cs.princeton.edu/~cos125>

Booksite.

- ▶ Download code from book.
- ▶ Brief summary of content.



<https://introcs.cs.princeton.edu/java/home/>

More resources

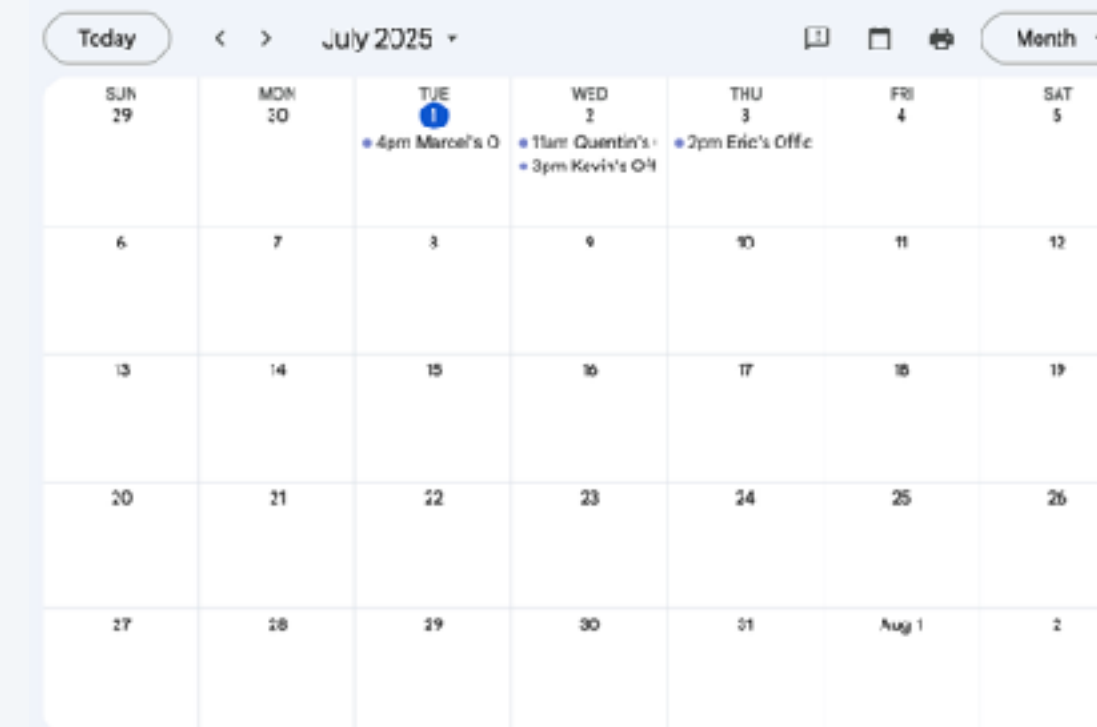
Ed discussion forum.

- ▶ Course announcements.
- ▶ Asynchronous questions. (Please avoid email.)
 - ▶ Mark private when necessary.



Office hours.

- ▶ One-on-one discussion with staff. Ask us anything!
- ▶ See course website for schedule.




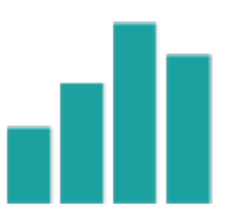



Classmates.

- ▶ Discuss ideas.
- ▶ Partner on programming assignments.



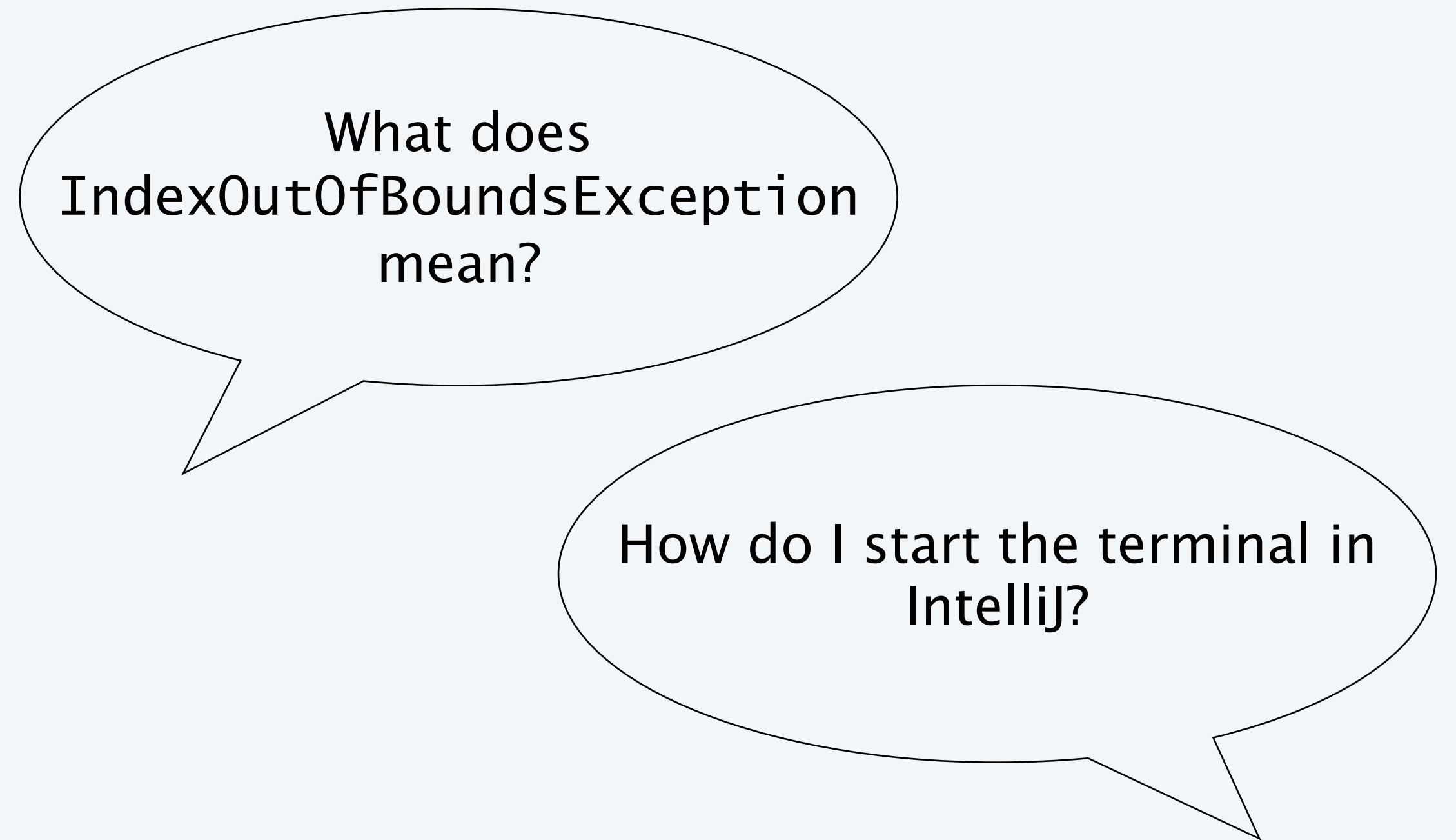
Even more resources

resource	purpose
 IntelliJ	Java IDE
 TigerFile	Assignment submissions
 PrairieLearn	Quizzes
 Gradescope	Final exam feedback
 Canvas	Check grades

Collaboration Policy

Executive Summary.

- ▶ **Do** discuss concepts with others.
- ▶ **Do** acknowledge any collaboration with others.
- ▶ **Do** partner with a classmate (when appropriate).
- ▶ **Do not** see/copy code, **including from AI chatbots**.
- ▶ **Do not** share solutions to quiz questions.



“This programming assignment represents my own work in accordance with University regulations.”

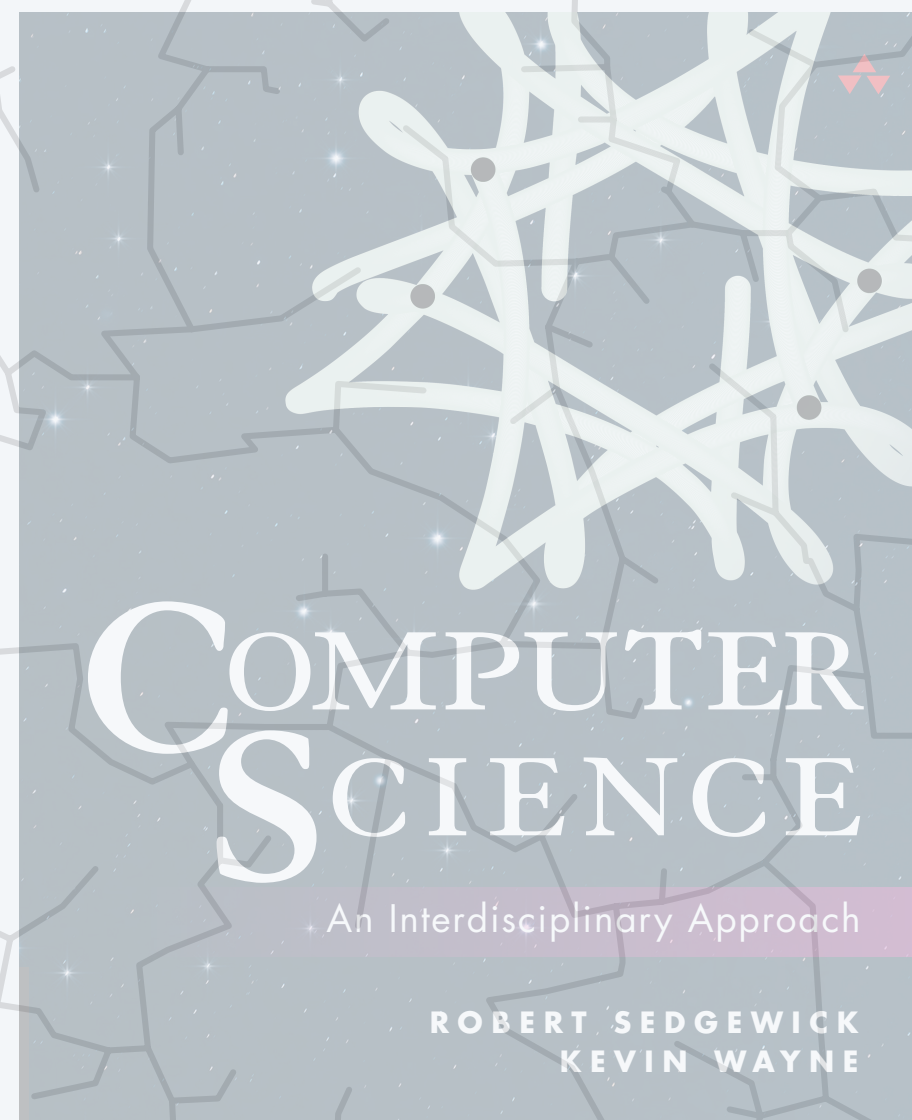
← assignments

"I pledge my honor that I have not violated the Honor Code during this examination."

← exams

Collaboration Policy

	your partner	course staff	COS 125 alums	classmates	AI Chatbots	Other
discuss concepts with...	yes	yes	yes	yes	yes	yes
acknowledge collaboration with...	yes	yes	yes	yes	yes	yes
show your code/solutions to...	yes	yes	yes	no	no	no
view any code/solutions of...	yes	no	no	no	no	no
copy any code/solutions of...	yes	no	no	no	no	no



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- ▶ *the power of technology*
- ▶ *course mechanics*
- ▶ *course resources*
- ▶ ***teaser***

The art...

- ▶ Display images

the science...

and the programming!

```
~/cos125/hello> java-introcs ShowHello  
greeting_images/Swahili-Roy-Kariuki.png
```



Images, sound and math

The art...

- ▶ Display images

the science...

- ▶ Make your computer do math

and the programming!

```
~/cos125/conditionals> java-introcs  
FahrenheitToCelsius 8  
8 Fahrenheit = -13 Celsius
```

Images, sound and math

The art...

- ▶ Display images

the science...

- ▶ Make your computer do math

and the programming!

```
~/cos125/performance> java Factors  
11111111111111111111  
2071723 536322235
```

Images, sound and math

The art...

- ▶ Display images
- ▶ Create filters

the science...

- ▶ Make your computer do math

and the programming!

```
~/cos125/loops> java-introcs SepiaFilter  
JohnsonArch.jpg
```



Images, sound and math

The art...

- ▶ Display images
- ▶ Create filters
- ▶ Play music

the science...

- ▶ Make your computer do math

and the programming!

```
~/cos125/arrays> java-introcs Superpose  
TwinkleMelody.wav TwinkleHarmony.wav
```

The art...

- ▶ Display images
- ▶ Create filters
- ▶ Play music

the science...

- ▶ Make your computer do math

and the programming!

```
~/cos125/io> java-introcs Transpose 0 piano  
100 < twinkle.txt  
~/cos125/io> java-introcs Transpose 12  
violin 180 < twinkle.txt  
~/cos125/io> java-introcs Fugue violin 100 <  
contrapunctus.txt
```

The art...

- ▶ Display images
- ▶ Create filters
- ▶ Play music

the science...

- ▶ Make your computer do math
- ▶ Play detective with large datasets
- ▶ Ponder the implications of your newfound powers

and the programming!

```
~/cos125/io> java-introcs Anonymize SSN <
patients_small.csv
BIRTHDATE,FIRST,LAST,RACE,GENDER,EXPENSES
1980-12-04,Doyle,Johns,white,M,1008922.16
2011-09-03,Timmy,Pfannerstil,white,M,25391.9
2011-04-25,Monica,Nikolaus,white,F,136549.01
1949-01-31,Michele,Murphy,hawaiian,F,20158.5
1969-10-08,Ellen,Parker,black,F,1670546.89
1982-08-28,Cruz,Okuneva,white,F,1564013.09
1959-03-23,Mika,Daugherty,white,F,2002214.73
2010-12-15,Silvia,Pichardo,other,F,34871.86
1983-09-27,Olin,Shanahan,white,M,963576.68
```

Images, sound and math

The art...

- ▶ Display images
- ▶ Create filters
- ▶ Play music
- ▶ Synthesize sound

the science...

- ▶ Make your computer do math
- ▶ Play detective with large datasets
- ▶ Ponder the implications of your newfound powers

and the programming!

```
~/cos125/functions> java-introcs  
MySound.java
```

Credits

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<i>FSI picture</i>	<u>Freshman Scholars Institute</u>	

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<i>PrairieLearn</i>	<u>prairielearn.com, text removed</u>	
<i>4th of July hat</i>	<u>Adobe Stock</u>	<u>education license</u>
<i>Hello World in Swahili</i>	<u>Roy Kariuki</u>	<u>public domain</u>
<i>Johnson Arch</i>	<u>Danielle Alio Capparella</u>	by photographer