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







Computer Science

COS 125, SUMMER 2024

course resources

► teaser

OMPUTER CIENCE

An Interdisciplinary Approach

<u>R O B E R T S E D G E W I C K</u> KEVIN WÁYNE

https://introcs.cs.princeton.edu

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ROBERT SEDGEWICK | KEVIN WAYNE

- the power of technology
- course mechanics





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 information
conditionals	control the flow of a program
loops	repetition
arrays	processing huge amounts of data
ethics	using our tools responsibly
input and output	text, graphics, sound
functions	building larger programs



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the power of technology

► teaser

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Technology transforms society

Example



What can we do with it?



COURSERA Schan Academy



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

Technology transforms society



Impact on society

- More channels to interact with technology and information
- Trouble with people who stutter or code-switch between languages

ell me your funniest joke?	
er?	

- Large efficiency gains
- Vertiginous change
- Bad jokes



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the power of technology



	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



	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



This is a supportive environment to ask questions and make mistakes



Marcel Dall'Agnol



Kevin Negy



	Objective	When	Where	Who
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Labs	Work on assignments with support from course staff	F 10:30am-1:00pm	Jadwin 343	Eric and Quentin

	Hello, World – HelloWorld.java			
🔳 Project 👻 😤 🗮 🗢	-lelloWorld java 🔀			
🔻 🖿 hello [COS 126] sources	/x ************************************	****		
e HelloWorld	* Name: Ada Lovelace			
🗧 lego.png	* NetID: alovelace			
readme.txt	* Precept: P00			
External Libraries				
	* Partner Name: Dorothy Johnson Vaughan			
	 Partner NetID: djvaughan 			
	★ Partner Precept: P38			
	* Description: Prints 'Hello, World' to the terminal	. window.		
	 By tradition, this is everyone's first 	t program.		
	 Prof. Brian Kernighan initiated this 	tradition in 1974.		
	***********	***************************************		
15				
	public class HelloWorld {			
	<pre>public static void main(String[] args) {</pre>			
	System.out.println("Hello, World");			
	}			
	}			



Eric Jung



Quentin Hicks



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Programming Assignments	Illustrate a programming or CS concept	Due Sundays at 2pm	Website	You solve the problem from scratch, on your own computer

Intro: quiz 1

iClicker (required). To earn participation credit:

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

Which is the cutest plushie?













https://www.iclicker.com/





С.

D.



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	7 Lecture	8 Precept	9 Lecture	10 Precept	11 Lab Quiz (due 6pm)	12
13 Assignment (due 2pm)	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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Textbook

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







Course website.

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

Booksite.

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



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



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



More resources

Ed online discussion forum.

- Course announcements.
- Asynchronous questions.
 - Mark posts private when necessary.
 - ▶ Please use Ed, not email.

Office hours.

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

Classmates.

- Discuss ideas.
- Partner on programming assignments.



https://edstem.org/us/courses/79537





Even more resources



purpose
Java IDE
Assignment submissions
Quizzes
Check grades
Final exam feedback

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."

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





Collaboration Policy

	your partner
discuss concepts with	yes
acknowledge collaboration with	yes
show your code/solutions to	yes
view any code/solutions of	yes
copy any code/solutions of	yes

course staff	COS 125 alums	classmates	Al Chatbots	Other
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
yes	yes	no	no	no
no	no	no	no	no
no	no	no	no	no

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The art...

the science...

Display images

and the programming!

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







The art... the science...

Display images

Make your computer do math

and the programming!

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





The art... the science...

Display images

Make your computer do math

and the programming!

~/cos125/performance> java Factors
111111111111111
2071723 536322235



The art...

the science...

- Display images
- Create filters

Make your computer do math

and the programming!

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







The art... the science...

- Display images
- Create filters
- Play music

Make your computer do math

and the programming!

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



The art... the science...

- Display images
- Create filters
- Play music

• 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 <</pre> contrapunctus.txt





The art...

the science...

- Display images
- Create filters
- Play music

- 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 <</pre> 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 1983-09-27,01in,Shanahan,white,M,963576.68



Images, sound and math

The art...

the science...

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

- 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



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