CS10
The Beauty & Joy of Computing
Fall 2016

(https://bjc.berkeley.edu/)

Quick Links

SNAP *(HTTPS://SNAP.BERKELEY.EDU/RUN/)*
Piazza (https://piazza.com/berkeley/fall2016/cs10/home)
Labs (http://beautyjoy.github.io/bjc-r/course/cs10_fa16.html)
bCourses (https://bcourses.berkeley.edu/courses/1453061)
Past Webcasts (http://webcast.berkeley.edu/playlist#c,s,Fall_2014,-XXv-cvA_iCajFbSJ4q3ApmKtT7RL3wQ)
Course Policies (/fa16/assign.html?https://docs.google.com/document/d/1_kzwNa8LgYe5rab53XlZPiw32YID2Esv6qbU6l5gnWY/pub)

Lab Check-Off Questions (/fa16/labquestions/)
Check Your Slip Days (/fa16/slipdays/)
Practice Exams (/fa16/resources/exams/)

Updates

Please check this section for important updates!

- λ Quest: Wednesday, September 21 during Lecture
- λ Midterm Part I: Monday, October 31 during Lecture
- λ Midterm Part II: Wednesday, November 2 during Lecture
- λ Final: Tuesday, December 13 7 - 10pm in TBD
- λ August 13, 2016: Website is now up! Welcome to CS10!
- λ August 24, 2016: Calendar updated for the Fall 2016 semester. Welcome to CS10!

λ August 29, 2016: Calendar updated with many due dates for upcoming assignments. Correct specs for each assignment will be updated with announcement on Piazza.

Overview

Fall 2009 students pair programming (https://en.wikipedia.org/wiki/Pair_programming) in Scratch.

CS10: *The Beauty and Joy of Computing*, is an exciting new course offered by the UC Berkeley EECS Department (https://www.eecs.berkeley.edu/). Computing has changed the world in profound ways. It has opened up wonderful new ways for people to connect, design, research, play, create, and express themselves. However, just using a computer is only a small part of the picture. The real transformative and empowering experience comes when one learns how to program the computer, to translate ideas into code. This course will teach students how to do exactly that, using *Snap!* (https://snap.berkeley.edu/run) (based on Scratch (https://www.scratch.mit.edu)), one of the friendliest programming languages ever invented. It's purely graphical, which means programming involves simply dragging blocks around, and building bigger blocks out of smaller blocks.

Our labs are held in the Apple Orchard, which is not only the newest lab on campus with the fastest machines, but also has the most natural light!

But this course is far more than just learning to program. We'll focus on some of the "Big Ideas" of computing, such as abstraction, design, recursion, concurrency, simulations, and the limits of computation. We'll show some beautiful applications of computing that have changed the world, talk about the history of computing, and where it will go in the future. Throughout the course, relevance will be emphasized: relevance to the student and to society. As an example, the final project will be completely of the students' choosing, on a topic most interesting to them. The overarching theme is to expose students to the beauty and joy of computing. This course is designed for computing non-majors, although interested majors are certainly welcome to take the class as well! We are especially excited about bringing computing (through this course) to traditionally under-represented groups in computing, i.e., women and ethnic minorities.

Some context: in the Fall of 2009, we piloted a 2-unit version of this course as the freshman/sophomore seminar CS39N: The Beauty and Joy of Computing (https://inst.eecs.berkeley.edu/~cs10/fa09/) to 20 students. It was such a success (https://innovations.coe.berkeley.edu/vol3-issue10-dec09/beauty-and-joy-of-computing) that we decided to move ahead to make this course our new computing course for non-majors, replacing the venerable CS3L (https://inst.eecs.berkeley.edu/%7Ecs3l/) and CS3S

(https://inst.eecs.berkeley.edu/%7Eselfpace/class/cs3s) . Since then, this has been one of the most popular courses in EECS. Don't believe us? See for yourself! (https://hkn.eecs.berkeley.edu/coursesurveys/course/CS/10) We're continuing to grow the course as word spreads to more students. We're continually replacing the weakest parts of the curriculum and hope you'll enjoy!

We will be using Pair Programming, described best by Laurie Williams, a computer science professor at North Carolina State University: "Two programmers working side-by-side, collaborating on the same design, algorithm, code or test. One programmer, the driver, has control of the keyboard/mouse and actively implements the program. The other programmer, the observer, continuously observes the work of the driver to identify tactical (syntactic, spelling, etc.) defects and also thinks strategically about the direction of the work. On demand, the two programmers can brainstorm any challenging problem. Because the two programmers periodically switch roles, they work together as equals to develop software."

Assignment Calendar

Semester Schedule (subject to change)

Reading Assignments Key:

- **Blue** readings are required,
- **Green** readings are required-but-challenging (understand the "big idea" concepts, rather than the technical details),
- ***Red*** *(or italicized, for those of you not good with the color red)* readings are optional but recommended. Note that these readings are *NOT* tested.

Week	Dates	Readings (Sa/Su)
1	8-22 to 8-26	No Readings
2	8-29 to 9-2	λ Prof. Harvey's Intro to Abstraction (assign.html?//docs.google.com/document/d/1PZJ_LYYWRYu12cTbBKF9IyY4BqBibgisBoQn9BpY/pub) λ Learning to Code! (http://www.youtube.com/watch?v=dU1xS07N-FA) *λ Is Abstraction the Key to Computing? (https://bcourses.berkeley.edu/courses/1453061/files/folder/Readings?preview=59744797)*

Week	Dates	Readings (Sa/Su)
		λ Scratch: Programming for All (https://bcourses.berkeley.edu/courses/1453061/files/folder/Readings?preview=59744796)
3	9-5 to 9-9	λ The Story of Alan Turing & His Machine (https://youtu.be/CQhrMmbiaM0) λ BtB Chapter 1 (/fa16/resources/readings/btb/chapter1.pdf)
4	9-12 to 9-16	λ What is an Algorithm (book excerpts)? (https://bcourses.berkeley.edu/courses/1453061/files/folder/Readings?preview=60735934) λ How Algorithms Shape Our World (http://www.ted.com/talks/kevin_slavin_how_algorithms_shape_our_world.html) λ Algorithms Are Great and All, But They Can Also Ruin Lives (http://www.wired.com/2014/11/algorithms-great-can-also-ruin-lives/) λ Hacker News Comments on "Algorithms Are Great and All..." (https://news.ycombinator.com/item?id=8630311) *λ The 10 Algorithms That Dominate Our World (http://io9.com/the-10-algorithms-t dominate-our-world-1580110464)* *λ The real 10 algorithms that dominate our world (https://medium.com/@_marcos_otero/the-real-10-algorithms-that-dominate-ou world-e95fa9f16c04)*
5	9-19 to 9-23	No Readings for this Week - Study for the Quest!
6	9-26 to 9-30	λ BtB Chapter 5 (http://www.bitsbook.com/wp-content/uploads/2008/12/chapter5.p λ Alan Kay: Doing with Images Makes Symbols - 4:04 to 9:20 (https://archive.org/details/AlanKeyD1987)
7	10-3 to 10-7	λ The End of Moore's Law (http://www.nytimes.com/2015/09/27/technology/small faster-cheaper-over-the-future-of-computer-chips.html?_r=0) λ eWEEK at 30: Multicore CPUs Keep Chip Makers in Step With Moore's Law (https://docs.google.com/document/d/1FC-

Week	Dates	Readings (Sa/Su)
8	10-10 to 10-14	λ BtB chapter 2, pg. 19-29, 36-42 (http://www.bitsbook.com/wp-content/uploads/2008/12/chapter2.pdf) λ Humans Need Not Apply - Video (https://www.youtube.com/watch?v=7Pq-S557XQU) *λ Rest of BtB chapter 2 (http://www.bitsbook.com/wp-content/uploads/2008/12/chapter2.pdf)*
9	10-17 to 10-21	λ As We May Think (http://www.theatlantic.com/magazine/archive/1945/07/as-w may-think/303881/)
10	10-24 to 10-28	λ TED: What is the Internet? (https://www.ted.com/talks/andrew_blum_what_is_the_internet_really?language= λ BtB pg. 295-304, 309 (https://drive.google.com/file/d/0B3vESj3HTRTkbVo1dTV5SUp4T0U/view?usp=sharing) *λ What is the Internet? (https://www.youtube.com/watch?v=UlJku_CSyNg)* *λ BtB pg. 305-316 (https://drive.google.com/file/d/0B3vESj3HTRTkbVo1dTV5SUp4T0U/view?usp=sharing)*
11	10-31 to 11-4	No Readings for this Week - Study for the Midterm!
12	11-7 to 11-11	λ Why Python is a Great First Language (http://blog.trinket.io/why-python/) *λ The GNU Manifesto Turns Thirty (http://www.newyorker.com/business/currency/the-gnu-manifesto-turns-thirty)* *λ Python vs. COBOL (parody) (https://medium.com/@oceankidbilly/python-vs-r-v cobol-which-is-best-for-data-science-7b2979c6a000)*

Week	Dates	Readings (Sa/Su)
		cobol-which-is-best-for-data-science-7b29796ba000)
13	11-14 to 11-18	λ Addicted to Apps (http://www.nytimes.com/2013/08/25/sunday-review/addicted-apps.html?_r=0) *λ CS8 lecture 1 (https://www.youtube.com/watch?v=69hHbVza7XI&t=27m49s)*
14	11-21 to 11-25	λ A World Without Work (http://www.theatlantic.com/magazine/archive/2015/07/world-without-work/39529 λ Gladwell vs. Shirky: A Year Later, Scoring the Debate Over Social-Media Revolutions (http://www.wired.com/2011/12/gladwell-vs-shirky/) *λ P vs. NP and the Computational Complexity Zoo - Video (https://youtu.be/YX40hbAHx3s)*
15	11-28 to 12-2	λ BtB Chapter 6 (http://www.bitsbook.com/wp-content/uploads/2008/12/chapter6.p λ Present Shock -- When Everything Happened Now (https://www.youtube.com/watch?v=_z2oFCR-0pc&feature=youtu.be) *λ A Quantum Leap in Computing? (http://www.newyorker.com/tech/elements/a quantum-leap-in-computing)*
16	12-5 to 12-9	No Reading.
17	12-12 to 12-16	No Reading.

Week	Dates	Readings (Sa/Su)

Weekly Schedule

This calendar displays the class schedule for the *current* week. Click on any event to see the building location on a map.

Aug 21 — 27, 2016

	Mon 8/22	Tue 8/23	Wed 8/24	
9am				

9am	Mon 8/22	Tue 8/23	Wed 8/24	(https://
10am				
11am				(https://
12pm				
1pm				(https://
2pm				
3pm			Lecture Pauley Ballroom (https://www.berkeley.edu/map?	(https://
4pm			Lab 11 200 SD - Jobel (https://www.berkeley.edu/map?sutardja)	
5pm				200 S (https://
6pm			Lab 12 200 SD - Erik (https://www.berkeley.edu/map?sutardja)	
7pm				
8pm				
9pm				

Staff

Instructors

(/resources/images/DanGarciaUCBFaculty2004.jpg)

Teaching Professor Dan Garcia (http://www.cs.berkeley.edu/~ddgarcia/) (bio (/fa16/bios/DanBio))

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Teaching Assistants

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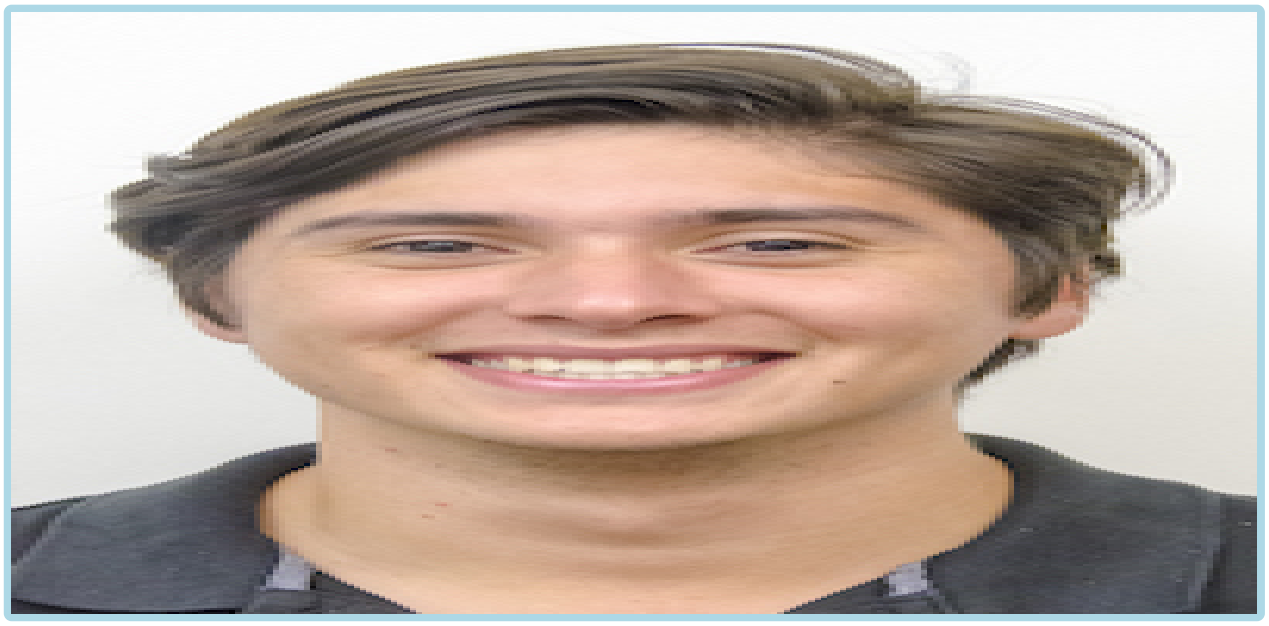

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TA Erik Dahlquist

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(/resources/images/Su15/LaraMcConnaughey.jpg)

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(/resources/images/Fa16/MeghnaDasgupta.jpg)

TA Meghna Dasgupta

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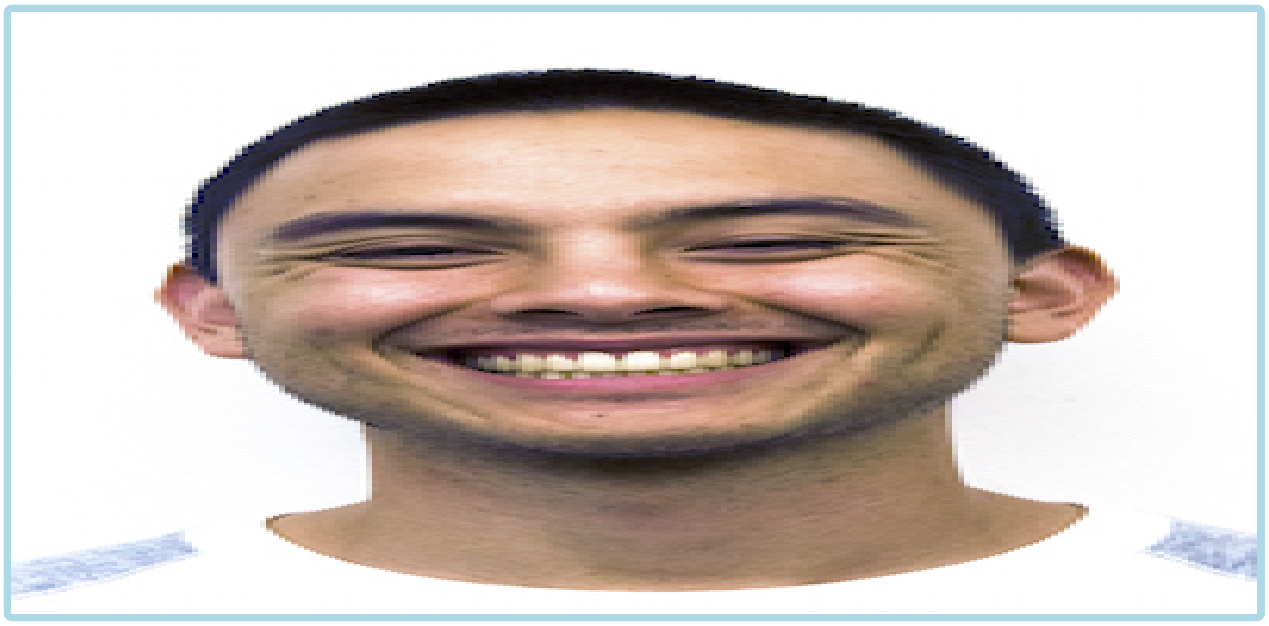

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Staff Photo: TA Yifat Amir (/resources/images/Fa16/YifatAmir.JPG)
TA Yifat Amir (https://www.linkedin.com/in/yifat-amir-45633584) (bio (/fa16/bios/YifatBio))
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Readers

(/resources/images/Fa16/AddisonHowe.JPG)
Reader Addison Howe

(/resources/images/Fa16/HectorAguilar.jpg)

Reader Hector Aguilar

(/resources/images/Fa16/MatthewSchwartz.JPG)

Reader Matthew Schwartz

(/resources/images/Fa16/NoahJacobs.jpg)

Reader Noah Jacobs

(/resources/images/Fa16/SamStarks.jpg)

Reader Samuel Starks

Grading

Grade Breakdown

For the most part, we would prefer to teach this course *without* grades. What a wonderful concept, learning for learning sake! However, even though we can't change the "system" overnight, we can create grading policies that support learning as much as possible. The various course activities will contribute to your grade as follows:

Activity	Points	Percent of Total Grade
Weekly Reading Quizzes	20	4%
Lab Check-Offs	30	6%
Homework 1 (Word Guessing)	10	2%
Homework 2 (Encryptify)	20	4%
Homework 3 (2048)	30	6%
Midterm Project	75	15%
Innovation Blog	40	8%
Final Programming Project	75	15%
Quest	25	5%
Midterm	75	15%
Final Exam	100	20%
Total Points	**500**	**100%**

- For Reading Quizzes, each quiz will be worth 2 points, and your highest 10 scores will count.
- For Lab Check-Offs, each will be worth 2 points each, and your highest 15 scores will count.

How We'll Calculate Your Grade

Your letter grade will be determined by total course points, as shown in the table below. Incomplete grades will be granted only for dire medical or personal emergencies that cause you to miss the final exam, and only if your work up to that point is satisfactory.

Points	Grade
485-500	A+
460-484	A
450-459	A-
440-449	B+
420-439	B

400-419	B-
375-399	C+
360-374	C
350-359	C-
300-349	D
< 299	F

- Point Ranges are inclusive.
- All final scores will be rounded to the nearest whole number.

Resources

- Blown to Bits (http://www.bitsbook.com/)
- Debugging Rules! (https://www.debuggingrules.com/)
- UC Berkeley (https://www.berkeley.edu)
- College of Engineering (https://coe.berkeley.edu/)
- EECS Department Page (https://www.eecs.berkeley.edu/)
- (OLD) Solutions to Lab Exercises (../fa13/lab/solutions.html)
