Electrical Engineering and Computer Sciences

EECS 16A
Agenda

• Introductions
• Administrative details
• Overview of the material
• Introduction to technology ecosystem
Head TA

• Email: head-ta-ee16a@berkeley.edu

Email Olivia with:
  – Questions not for piazza
  – Conflicts
  – Emergencies
Introduce TAs

• Many are returning 16A staff members
Acknowledgement

Elad Alon, Anant Sahai, Ali Niknejad, Claire Tomlin, Gireeja Ranade, Vladimir Stojanovic, Babak Ayazifar, Michel Maharbiz, Laura Waller, Miki Lustig, Vivek Subramanian, Thomas Courtade and many more who helped to build this course!
And we have even more!

• Academic Interns…
  – Former 16A students just like you …

• The path to being on 16A staff
  – Do well in 16A
  – Be involved with the class
  – Become a lab assistant, reader/tutor
Course Policies

• Lecture, discussion, labs
• Illness policy
• Grading
• Class Participation
• HW Cycle
• Course Websites
• HW Parties and How to Succeed
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Every week:
4 lectures M - Th 930AM - 11AM
4 discussions
2 labs - at most one drop
Total: 16hr/week
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Homeworks due Sunday 11:59 PM
Self-grades due on Monday 11:59 PM
(except homework 8)
No extension, one drop
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Class website: www.ee16a.com
Piazza: www.piazza.com
Gradescope: Ask for code on Piazza
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Read notes - focus on understanding
Attend lectures, discussions, labs
Go to HW parties, OH
Do HW, collaborate
Content Introduction
I6A: Information Devices and Systems

• **Linear algebraic thinking and graphs (~3 wks)**
  - Imaging/Tomography and Google PageRank
  - Lab: Single-pixel imager

• **Linear circuits and design (~3 wks)**
  - Touchscreen
  - Lab: Home-made R and C touchscreens

• **Optimization (~2 wks)**
  - Positioning and Least-Squares
  - Lab: Acoustic localization “GPS”
## EECS Upper Divs: What 16AB feed

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Advancement In Engineering

1837

1866

1876
Mathematical Models For Problems

Ada Lovelace
1815 - 1852

Claude Shannon
1916 - 2001

Alan Turing
1912 - 1954
Advances in Computing Hardware

Margaret Hamilton, Lead NASA Software Engineer

Apollo 11 Flight Computer

The processor YOU will use in lab!
Advances in Computing Hardware


Phone in YOUR pocket
Advances in Communication Hardware

Nikola Tesla

Guglielmo Marconi

Radio c. 1950

Phone in YOUR pocket
Inside an iPad Air 2

- Physical world interaction: camera
- Energy: Battery
- Communication: Antenna
- "Brains": the main board
- Display / touch screen
- Physical world interaction: speakers
- User interface device: home button
Labs - Hardware and Software

Imaging Lab - Single Pixel Camera

Touch Screen Lab
Who We’re Training You to Be

2017
Medical Imaging ca. 1895

I don’t feel good…

Let’s cut you open…

The Anatomy Lesson of Dr. Nicolaes Tulp by Rembrandt Harmenszoon van Rijn

Need to find a way to see inside without “light”
Medical Imaging Today

X-Ray

CT

All of these were enabled/dramatically advanced by the mathematical and hardware design techniques you will learn in this class!
Imaging In General

Energy source → Subject → Energy detection

Imaging System
(electronics, control, computing, algorithms, visualization, ...)

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More EECS 16A/B

- Android
- Berkeley Tele-Monitoring
- Netflix
- Google

- Image of a self-driving car with a Google logo
- Image of a robotic arm performing a task