Women in Computing:
Good news, bad news, and what can be done (and is!)

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Pop quiz

Identify the field for the following women:

- Jane Goodall: biology
- Marie Curie: chemistry
- Rosalind Franklin: chemistry
- Margaret Mead: anthropology
- Rachel Carson: biology
- Barbara McClintock: genetics
- Lise Meitner: physics
- Emmy Noether: physics
- Sofia Kovaleskaya: mathematics

Now name a female computer scientist
What is Computer Science and why should you care?
Computer science is the systematic study of automating the processing of information.
When a user takes a photo, the app should check whether they're in a national park...

Sure, easy GIS lookup. Gimme a few hours.

...and check whether the photo is of a bird.

I'll need a research team and five years.

In CS, it can be hard to explain the difference between the easy and the virtually impossible.
1,000,000 more jobs than students by 2020

$500 billion opportunity

1.4 million computing jobs

Computing is a top college and career program jobs are at 20% national

71% of all new jobs in STEM are in computing

are in Computer Science

is in computer science

Applied to UW as Freshman

Computer Science & Engineering
Mechanical Engineering
BioEngineering
Aeronautics & Astronautics
Civil & Environmental Engineering
Electrical Engineering
Chemical Engineering
General Engineering
Materials Sci & Engr
Industrial Engineering
Technical Communication/HCDE
Good news
Ada Lovelace

1815 - 1852

• English mathematician
• Notes on Charles Babbage’s Analytical Engine recognized as the first automated algorithm

World’s first programmer
Bletchley Park

World War II

- UK Government Code & Cipher School
- Broke secret communications of the Axis Powers
- Home of the world’s first programmable computer

80% of the 12,000 workers were women
ENIAC Six (Top Secret Rosies)

Jean Bartik, Marlyn Meltzer, Kay Antonelli, Betty Holberton, Ruth Teitelbaum, Fran Spence
- Programmed one of the first general-purpose computers
- Trained themselves to program ENIAC based on its hardware diagram

Used to calculate the feasibility of a thermonuclear weapon
Hedy Lamarr

1914 - 2000
- American actress
- Co-invented frequency-hopping spread-spectrum to avoid jamming of radio-controlled torpedos in WWII

Critical technology in Bluetooth
Grace Murray Hopper

1906 - 1992

• American mathematician
• U.S. Navy Rear Admiral
  • Oldest active-duty commissioned officer in U.S. Navy history
• Invented the first compiler
• Popularized the term “bug”
• Pioneered for standards in computer systems

Translates code into machine language
It’s easier to ask forgiveness than it is to get permission.

Humans are allergic to change. They love to say, “We’ve always done it this way.” I try to fight that. That’s why I have a clock on my wall that runs counter-clockwise.

https://en.wikiquote.org/wiki/Grace_Hopper
Margaret Hamilton

1936 -

• American computer scientist and engineer
• Popularized “software engineering”
• Developed asynchronous software, priority scheduling, end-to-end testing, and human-in-the-loop decision capability

Her code saved the Apollo 11 landing
Radia Perlman

1951 -

- American computer scientist
- Developed a language to teach toddlers programming
- Invented spanning-tree protocols, techniques for routing when under attack

“Mother of the Internet”
Maria Klawe

1951 -
• Canadian computer scientist
• President of Harvey Mudd
  • CS department is 50% women
• Key contributions to computational geometry
• Studies gender in gaming
• Founder of Aphasia Project

Use computers for disability support
Jan Cuny

- American computer scientist
- NSF Program Officer
- Leading efforts of #cs4all

Highlighted in 2016 State of the Union Address
Honorable mentions

Many other influential technologists

- Marissa Mayer
- Sheryl Sandberg - Facebook COO
- Meg Whitman - eBay CEO
- Carly Fiorina - HP CEO
- Ginni Rometty - IBM CEO
- Anita Borg
- Lynn Conway
- Fran Allen
- Shafi Goldwasser
- Barbara Liskov
- Sister Mary Kenneth Keller
- Janie Tsao
- Jane Prey
- Susan Horwitz
- Susan Rodger
- Valerie Barr
- Adele Goldstine
- danah boyd
Bad news
Enrollment boom led to *de facto* pro-white-male quotas

Rise of hacker and geek status
Obstacles and debacles

False impressions ("The Pipeline Problem")
- Pop culture image of programmers as loners and hackers
  - Intro courses are misleading, reinforce stereotypes
- CS courses miss social context
- Overrepresentation of hacking
- Overrepresentation of gaming
- Overstated concerns of outsourcing
- Misunderstanding of what CS entails

ALL CS is cooperative teamwork
Obstacles and debacles
Obstacles and debacles

CODE
DEBUGGING THE GENDER GAP
Obstacles and debacles

Unwelcoming culture ("The Leaky Pipeline")

- Hackathons - Titstare
- Strip show at Black Hat
- RSA Conference “booth babes”
- Julie Ann Horvath’s departure
- Brogrammer culture
- Sarah Sharp vs. Linus Torvalds
- Tropes vs. Women
- #gamergate
Subcultures

Computer Science

Start-up

Hacking

Gaming
Obstacles and debacles

Targets of #gamergate harassment/threats

Not targets
Misleading hope

What can be done
What WE can do (and are!)

Change CS courses

• Combat sources of gender bias and stereotype threat
  • Pair programming; mixed-gender collaborations
  • Welcoming and supportive intro courses
• Emphasize computing for social good
• Encourage persistence and growth mindset
• Research experiences
What WE can do (and are!)

Advocate for women and persons of color in tech
- Listen without interrupting; avoid mansplaining
- Recognize *intersectional* problems and implicit bias
- Change motivation and rationale:
  - NO: Women deserve inclusion in field with great job opportunities
  - YES: Computing & tech should reflect the *plurality* of our world
- Use status to raise awareness
- Call out sexism, racism, and other bad social behavior
What YOU can do

Be a role model

• Learn to code and use computational thinking
  • Attend a Girl Develop It Meetup
• Encourage young girls to code
• Support #cs4all
  • Consider CS-related outreach career opportunities
• Talk about women in technology
• Cultivate privilege traitors
• Speak out*

*Easier said than done
What OTHERS are doing (and YOU could, too!)
Questions?
Resources

Where to go for more information

- National Council for Women & IT (http://www.ncwit.org/)
- ACM’s Women in Computing (ACM-W) (http://women.acm.org/)
- Anita Borg Institute (http://anitaborg.org/)
- Girls Who Code (http://girlswhocode.com/)
- Black Girls Code (http://blackgirlscode.com/)
- Girl Develop It (http://girldevelopit.com/)
- Code2040 (http://code2040.com/)
- Hour of Code and Code.org (http://code.org/)
- CODE: Debugging the Gender Gap (http://www.codedocumentary.com/)
- Learn to write Python code:
  - http://learnpython.org/