

Invite your friends to take CS10 next sem!

The Beauty and Joy of Computing



**UC Berkeley EECS
Sr Lecturer SOE
Dan Garcia**

Calendar?

Slip days

Lecture #25 Summary & Farewell



**UC Berkeley EECS
Lecturer
Gerald Friedland**

Lab this week is
Survey (0:20),
online final
(1:30)

Register
Iclicker,
then turn
in during
lab or dis

**BJC Art or
Poem**
Submit this at
final for extra
credit!

GOOGLE GLASSES, NEXT "IT"?

Google's "Project Glass" hopes to bring all services from Android to a display you carry with you on your glasses. Next big thing?

Discussion this week is important –
course feedback + summary



To be considered for Best in Class presentation, your video is due **Saturday!**

g.co/projectglass

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I must own & wear these glasses!!!

- a) Strongly disagree
- b) Mildly disagree
- c) Neutral
- d) Mildly agree
- e) Strongly agree





Administrivia: Become active!

- **With-Snap! Exam details**

- No exam handed out unless you've filled in both HKN + our survey
- No "study sheets" needed / allowed since you have access to Snap!

- **Final Exam details**

- Only bring pens, three 8.5"x11" handwritten sheets (writing on both sides).
- Leave backpacks, books, calculators, cells & pagers home!
- Everyone must take ALL of the final!
- Bring your "Beauty and Joy of Computing" Art/Poem for extra credit!

- **If you did well in CS10 and want to be on staff?**

- Usual path: **Lab Assistant** ⇒ **Reader** ⇒ **TA**
- Indicate on your final survey whether you're even remotely interested
- We strongly encourage anyone who gets an B or above in the class to follow this path...



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Clickers were worth the time spent

- a) **Strongly Agree**
- b) **Moderately agree**
- c) **Neutral**
- d) **Moderately disagree**
- e) **Strongly disagree**





Exciting Future Implications

- **In computing, need to revisit chronic unsolved problem**
 - Easy parallel programming
- **Implications for apps:**
 - HUGE Computing power available in cell phone, car
 - On-body health monitoring
 - Google + library of congress
- **As devices shrink...**
 - The need for great HCI (human-computer interfaces) critical as ever! (voice, gesture)
- Natural language processing?
- Interact by motion!
- 3D displays?
- Personal Robotics?
- Self-driving cars?
- 3D Printing?
- Optical/quantum computing?
- Personal air vehicle?
- Space travel?
- Computer displays in glasses?
- Flexible displays?
- Brain-machine interfaces?
- Energy!





Taking advantage of Cal Opportunities

- **“The Godfather answers all of life’s questions”**
 - Heard in “You’ve got Mail”
- **Why were we the #2 Univ in the WORLD?**
 - Research, reseach, research!
 - Whether you want to go to grad school or industry, you need someone to vouch for you!
 - ...as is the case with the Mob
- **Techniques**
 - Find out what you like, do lots of web research (read published papers), hit OH of Prof, show enthusiasm & initiative
- **<http://research.berkeley.edu/>**
- **<http://researchmatch.heroku.com/>**

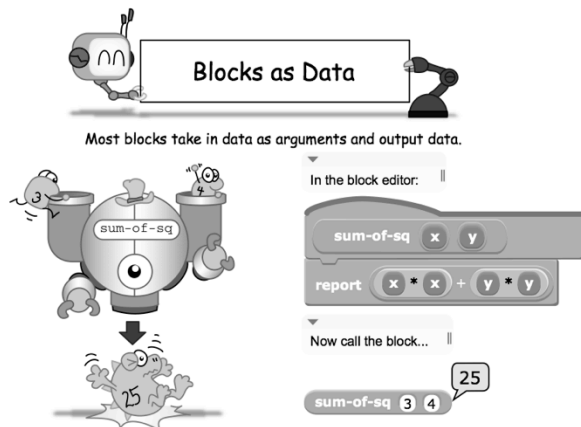
So said the 2004 ranking from the “Times Higher Education Supplement”



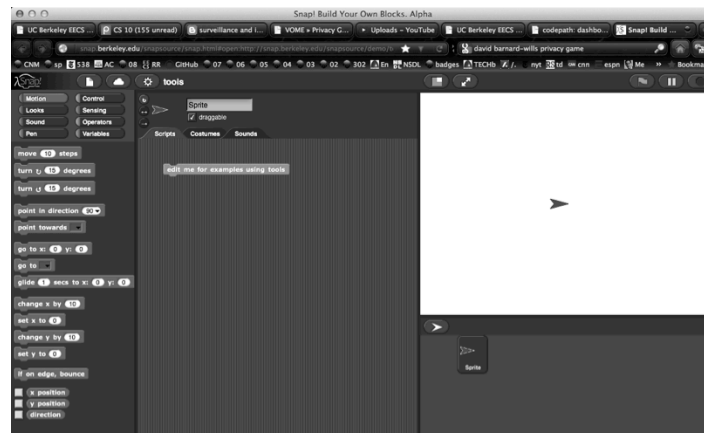


Dan and Gerald's Research Projects

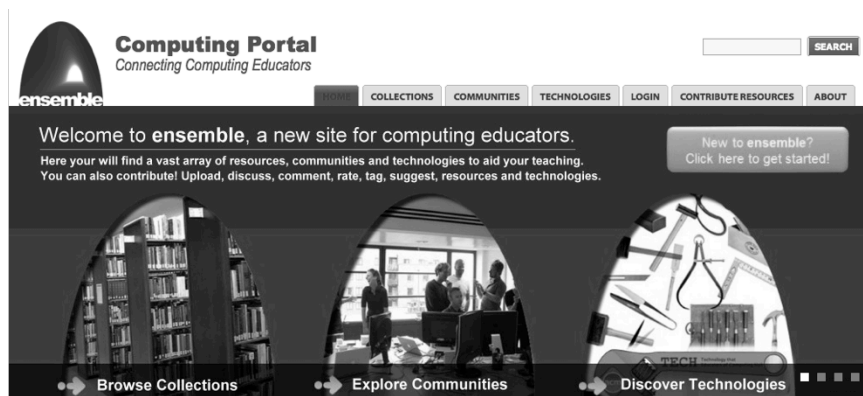
CS Illustrated



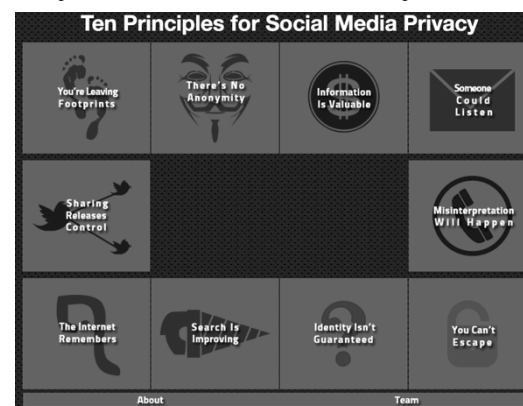
Improve CS10/Snap!



Ensemble



Improve Privacy Teaching



Sign up on the final survey if you're interested!

Garcia & Friedland



UC Berkeley "The Beauty and Joy of Computing" : Summary & Farewell (7)



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Opportunities Next Semester

- **CS61A (1st course in CS major)**
 - Structure and Interpretation of Computer Programs
- **CS9 series (learn a second language)**
 - I would recommend Python next, CS9H
- **GamesCrafters (Game Theory R & D)**
 - Develop SW, analysis on 2-person games of no chance. (e.g., go, chess, connect-4, nim, etc.)
 - Req: Game Theory / SW Interest
- **MS-DOS X (Mac Student Developers)**
 - Learn to program Macintoshes.
 - Req: Interest. Owning a mac helps, not required.
 - Taught as a DeCal by MS-DOS X veterans
- **UCBUGG (Recreational Graphics)**
 - Develop computer-generated images, animations.
 - Req: 3D interest
 - Taught as a DeCal by UCBUGG veterans



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Ok, I'm hooked! Where do I go next?

- **CS Major / Minor**

- You are here

CS10

- **CS61A**

- In Python, one big idea every week. Awesome!

CS61A

- **CS61B**

- In Java, data structures, algorithms and software engineering (lite)

CS61B

- **CS61C**

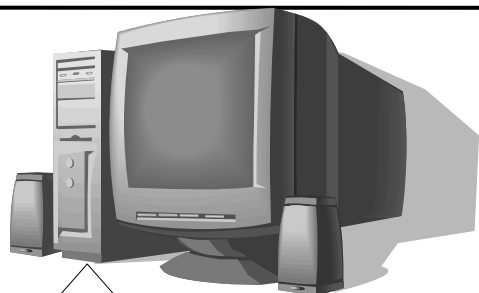
- In C and MIPS, Great ideas in computer architecture (parallelism) ... I teach this!

CS61C

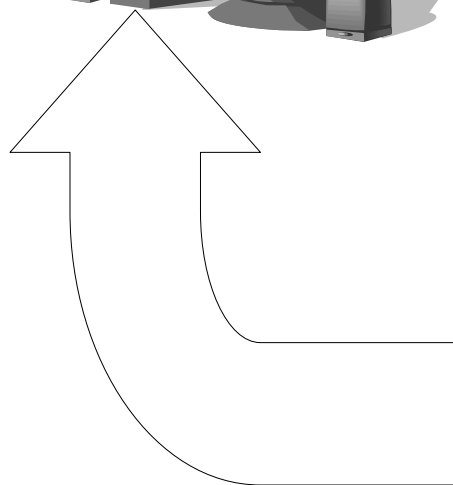


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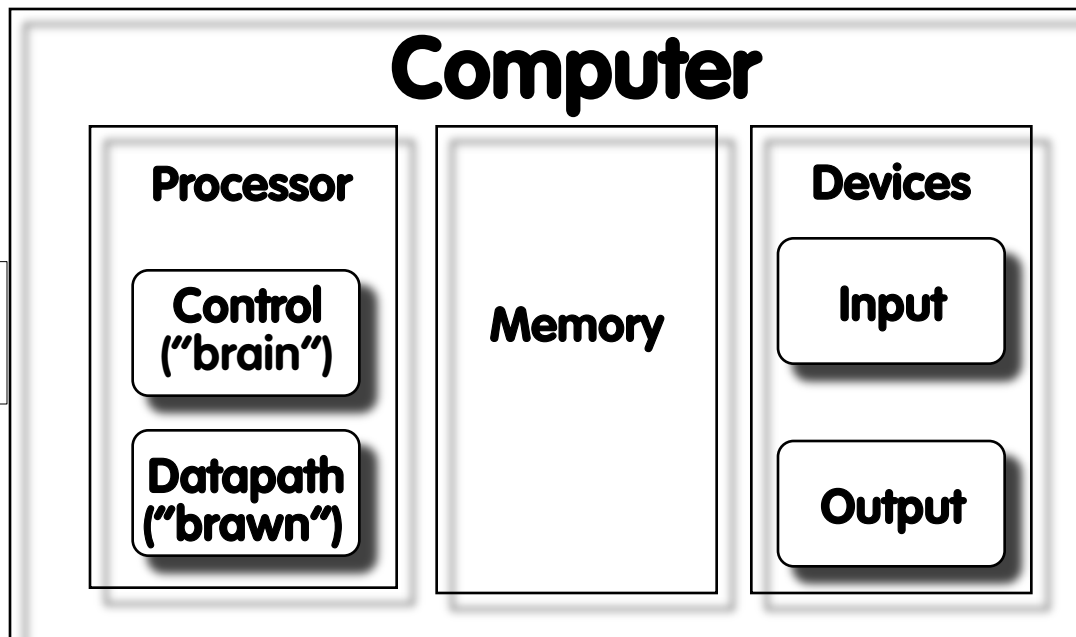
Review: 5 components of any Computer



In the future, what'll be the most important computer component?



- a) Control
- b) Datapath
- c) Memory
- d) Input
- e) Output



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Peer Instruction Opinion



- **“Forget cloning. Forget TVs on your wrist watch. The biggest invention of the next 100 years will be the ability to directly connect your brain to a machine, aka wet computing.” – Dan Garcia**
 - A macaque monkey at Duke University can already control a robotic arm with thought.
 - DARPA interested for mind-control robots & flying
 - Virtual Reality achieved with proper I/O interfacing...



Jose Carmena, UCB EECS Prof
Research: Brain-Machine Interface
www.eecs.berkeley.edu/~carmena/





Things to remember from CS10

- **Abstraction**

- The key idea underpinning all computer science
- ...and (in CS10) functions, HOFs

- **...From Blown to Bits**

- Technology has social implications (privacy, energy, copyright, etc); try to see the big picture
- It also often has unintended consequences!
- Things are never black or white, pure good or pure evil

- **...From “Program or Be Programmed”**

- Technology has an explicit and implicit agenda, understanding it is important.
- Learning to program is empowering (Steve Jobs’ video)



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Penultimate slide: Thanks to the staff!

- (see the course website for listing & photos)





The Future for Future Cal Alumni

- **What's The Future?**
- **New Millennium**
 - Always-on internet connectivity + internet of things!
 - AI breakthroughs
 - HCI breakthroughs
 - Post-PC Era (power is in cloud, interface in pocket)

**“The best way to predict the future is to invent it”
– Alan Kay**

The Future is up to you!

