Invite your friends to take CS10 next sem!

The Beauty and Joy of Computing

Calendar?

Slip days

Lecture #25 Summary & Farewell

UC Berkeley EECS Sr Lecturer SOE Dan Garcia

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?

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

Discussion this week is important – course feedback + summary

`g.co/projectglass`

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 pen{,cil}s, 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…

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!**

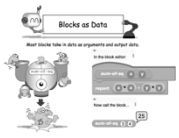
Taking advantage of Cal Opportunities

- **"The Godfather answers all of life's questions" – Heard in "You've got Mail"**
- **Why were we the #1 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!

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

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

- **CS Major / Minor**
  - You are here
- **CS61A**
  - In Python, one big idea every week. Awesome!
- **CS61B**
  - In Java, data structures, algorithms and software engineering (lite)
- **CS61C**
  - In C and MIPS, Great ideas in computer architecture (parallelism) … I teach this!

CS10

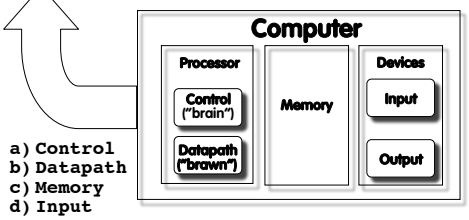
CS61A

CS61B

CS61C

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`

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)

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!