In the next 4 yrs, time-lapse movies will show the construction of the new CITRIS building. Very cool.

www.cs.berkeley.edu/~ddgarcia/tl/
Cool Stuff...the videos before lecture

• SIGGRAPH Electronic Theatre
  www.siggraph.org/publications/video-review/SVR.html
  • $40/video for ACM Members

• SIGGRAPH Conference in LA!
  • 2004-07-31 ⇒ 2004-08-04
    www.siggraph.org/s2005/
Review

• Benchmarks
  • Attempt to predict performance
  • Updated every few years
  • Measure everything from simulation of desktop graphics programs to battery life

• Megahertz Myth
  • MHz ≠ performance, it’s just one factor

• It’s non-trivial to try to help people in developing countries with technology

• Viruses/worms have damaging potential the likes of which we can only imagine.
Microsoft Research response to worms

Their Vision: Shielding Before Patching

• Protect the time window between vulnerability disclosure and patch application.

• Shields: *vulnerability-specific, exploit-generic* network filters. Currently focus on end-host based shields.

• Patch is the ultimate fix of the vulnerability
  • Shield is removed upon patch application
Overview of Shield Usage

- Shield framework lies above the transport layer.
- Shields are disseminated and (automatically) installed before public vulnerability disclosure.
Administrivia (1/2) : Final Exam & Review

Final Exam: Tue 2004-12-14, 12:30-3:30pm
230 Hearst

Only bring two 8.5”x11” handwritten pieces of paper. Leave your backpacks, books, calculators, cells & pagers home!

Final Exam Review
• 2004-12-12 @ 2pm in 10 Evans
• Bring questions!
Administrivia (2/2) : Join us!

- If you did well in CS3 or 61{A,B,C} (A- or above) and want to be on staff?
  - Usual path: Lab assistant $\Rightarrow$ Reader $\Rightarrow$ TA
  - Fill in form outside 367 Soda before first week of semester…
  - I (Dan) strongly encourage anyone who gets an A- or above in the class to follow this path… I’ll be teaching 61C all of 2005!
CS61C: So what's in it for me? (1st lecture)

Learn some of the big ideas in CS & engineering:

- 5 Classic components of a Computer
- Principle of abstraction, systems built as layers
- Data can be anything (integers, floating point, characters): a program determines what it is
- Stored program concept: instructions just data
- Compilation v. interpretation thru system layers
- Principle of Locality, exploited via a memory hierarchy (cache)
- Greater performance by exploiting parallelism (pipelining)
- Principles/Pitfalls of Performance Measurement
Rapid Change AND Little Change

- Continued Rapid Improvement in Computing
  - 2X every 1.5 years (10X/5yrs, 1000X/15yrs)
  - Processor speed, Memory size: Moore’s Law as enabler (2X transistors/chip/1.5 yrs); Disk capacity too (not Moore’s Law)
  - Caches, Pipelining, Branch Prediction, ...

- 5 classic components of all computers
  1. Control
  2. Datapath
  3. Memory
  4. Input
  5. Output

} Processor (or CPU)
What’s this stuff good for? (1/3)

LASIK Eye Surgery

• Allows for computer-controlled custom corneal surgery

• It’s not there yet (imho)

• The potential is there for adaptive optics and hyperacuity (> 20/20)

Complications: http://www.surgicaleyes.org/
What’s this stuff good for? (2/3)
What’s this stuff good for? (3/3)

• Toto, #1 Toilet maker in Japan, charges $4,000 for high-tech toilets.
  • Microprocessor-control
  • Heated seat
  • Bidet (temp & pressure)
  • Hot air, perfume
  • Rear-end washer
  • Noisemaker to mask sounds
  • Clock, Remote control
  • Auto-urinalysis, contacts your doctor

http://www.theplumber.com/japan.html
Taking advantage of Cal Opportunities

“The Godfather answers all of life’s questions”
– Heard in “You’ve got Mail”

• Why are we the #2 Univ in the WORLD?
  • Research, research, 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/
Opportunities with me Spring 2005

• **GamesCrafters**
  - We are developing SW, analysis on small 2-person games of no chance. (e.g., achi, connect-4, dots-and-boxes, etc.)
  - Req: A- in CS61C, Game Theory Interest

• **MS-DOS X** (Mac Student Developers)
  - Help students develop apps for OS X. No requirements (other than Mac, interest)

• **UCBUGG** (Recreational Graphics)
  - Develop computer-generated images and animations. Req: 3D experience, portfolio
**Peer Instruction**

**Strong or Weak AI?**

**Strong AI:** Machines that act intelligently have real, conscious minds...sentience

**Weak AI:** Machines can be made to act as if they were intelligent.

---

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

<table>
<thead>
<tr>
<th>Computer</th>
<th>Memory</th>
<th>Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>(where programs, data live when running)</td>
<td>Input</td>
</tr>
<tr>
<td>Control (&quot;brain&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Datapath (&quot;brawn&quot;)</td>
<td></td>
<td>Output</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Strong AI</th>
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<tbody>
<tr>
<td>1: Control</td>
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<tr>
<td>2: Datapath</td>
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<tr>
<td>3: Memory</td>
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<tr>
<td>4: Input</td>
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<td>5: Output</td>
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<table>
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<tr>
<th>Weak AI</th>
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<tr>
<td>6: Control</td>
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<tr>
<td>7: Datapath</td>
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<td>8: Memory</td>
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<tr>
<td>9: Input</td>
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<tr>
<td>0: Output</td>
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</table>
“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.” – Dan Garcia

• A macaque monkey at Duke University can already control a robotic arm with thought.

• DARPA is extremely interested in the technology for mind-control robots & flying

• Virtual Reality could be achieved with proper I/O interfacing…

www.popsci.com/popsci/medicine/article/0,12543,576464,00.html
Penultimate slide: Thanks to the staff!

- **TAs**
  - José María González (Head TA)
  - Andy Carle (Head TA)
  - Paul Burstein
  - Steven Kusalo
  - Andrew Schultz
  - Slav Petrov

- **Readers**
  - Andrew Farmer
  - Michael Le
  - Benjamin Mellblom
  - Mark Whitney
The Future for Future Cal Alumni

• What’s The Future?

• New Millennium
  • Internet, Wireless, Nanotechnology, ...
  • Rapid Changes in Technology
  • World’s (2nd) Best Education
  • Never Give Up!

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

The Future is up to you!