The Laptop
Jan. 20, 2009
Laptop, 1992

- Apple Macintosh Duo 230
  - 640x400 Monochrome Display
  - 33 MHz Processor
  - 8 MB RAM
  - 0.1 GB disk storage
  - 4.2 lbs
  - 24W charger
  - $2800
Laptop, 2008

Apple MacBook Pro

- 1440 x 900 Color display
- 2GHz Dual Processor
- Graphics Coprocessor
- 2000 MB RAM
- 160 GB disk storage
- 5.4 lbs
- 85W charger
- $2800
Traditional Laptops

• Continual improvement:
  - More computing power
  - More non-volatile storage

• Constant Price Floor

• Designed for Office Environments
Laptop, 2008

- OLPC XO
  - 1200 x 900 Color Display
  - 466 MHz Processor
  - Graphics Coprocessor
  - 256 MB RAM
  - 1 GB solid-state storage
  - Digital Camera
  - Wireless
  - 1.45 kg
  - 17W charger
Why an XO?

- Sunlight Readable Display
- Low Power
- Robustness
- No moving parts (Other than buttons)
- Simple to Repair
XO Display

- Sunlight readable (reflective/transmissive)
- 1200 x 900 monochrome
- Slightly less resolution in color
- Replaceable LED backlight
  - Low power, low cost, safe
  - At 50 C, difficult to reach 5 year lifetime
XO Low Power

- Battery performance strongly dependent on software activity!

- Available today:

- Charging battery:
  - Max draw of 17 Watts

- Not charging:
  - Less than 1 watt in sleep
  - Avg 4 – 7 watts while running w/ peaks up to 9W

- Hardware ready for suspend/resume
  - 40K cycles tested vs. 20 for normal laptop
  - About 4 hours of battery life during normal use
  - 24-48 hours of battery life in sleep mode
XO Robustness

• No disk drive!

• No fans!

• Sturdy case
  – ABS/PC bumpers
  – Steel plate in base

• 1.5 m drop test

• Water and dust proof keyboard

• 5 year lifetime
XO - Simple to repair

- Eight screws to replace display
- Single motherboard
Questions?
XO Low Power

- Independently powered subsystems:
  - Display
  - Wireless Net
- Fast suspend/ resume
  - tens milliSec.
- LED backlight