CS162

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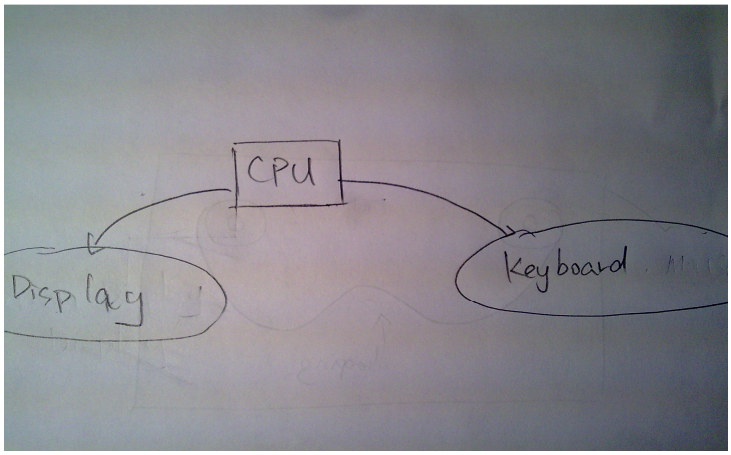
Lecture Notes

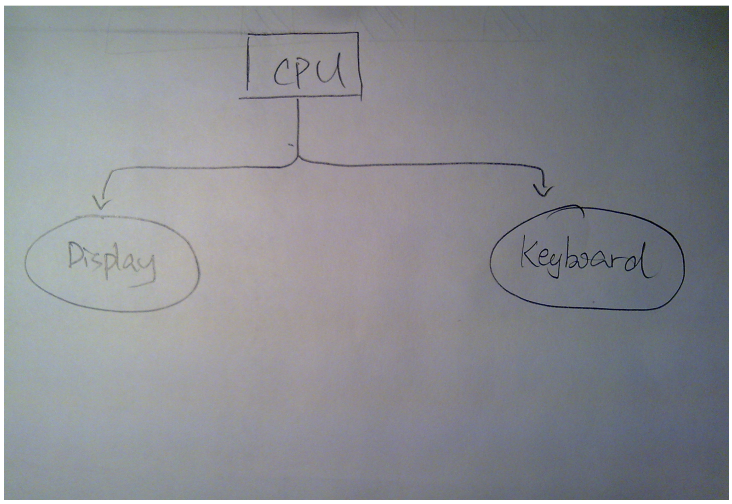
I/O Devices

- Terminal
  1. One character is sent at a time, one interrupt per character.
  2. Keyboard and display: independent in most systems

     Full Duples:



     Half Duples:



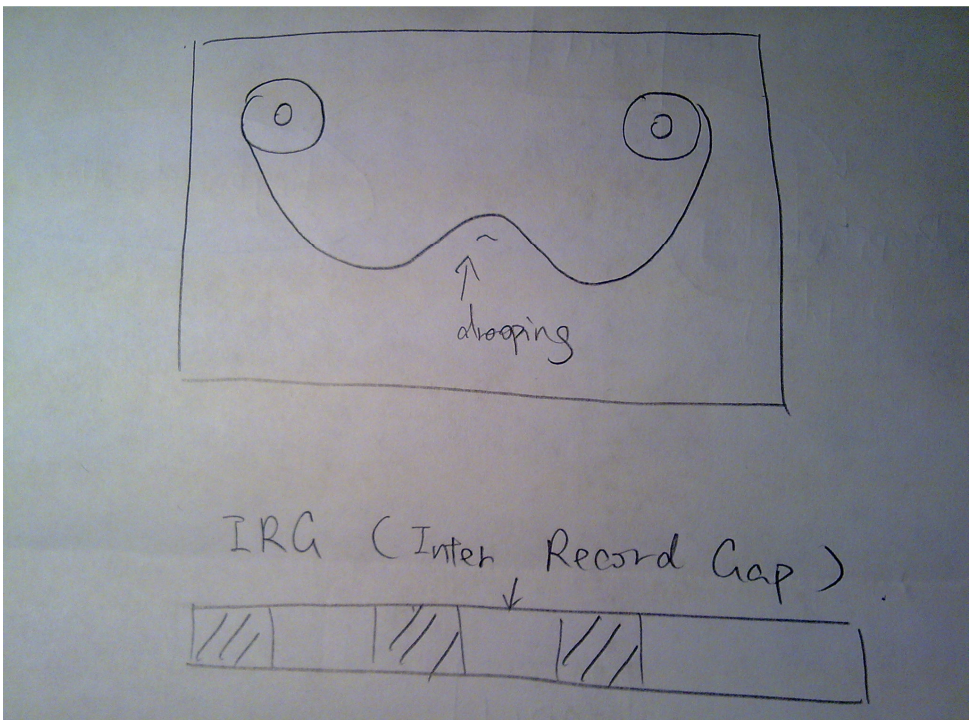
- Line Printer
  1. Fixed 132-character records
  2. Control function-first character of each line

3. High speed (2000lines per min)
4. Print chain

- Raster Printer: a laser or ink-jet printer
  1. Pixles: 300-1200 pixels per liner inch, 8 million pixels per page
  2. Lasers and xerographic printer
  3. Ink-jet printer: heat or pressure on the cartridge generates ink drop
  4. Problem in printer tech
     nology: paper jam.

- Displays
  1. CRT:
     - Phosphor coated screen
     - Electron beam is created by high voltage
     - Different pixels of each color -> different color
  2. Liquid Crystal(LCD):
     - pixel: liquid crystal
     - passive matrix: to select a pixel by column and row
     - backlight -> light
     - typical LCD power consumption: 2~5W
  3. Organic Light Emitting Diodes (OLED)
     - Current induces light emission
     - Efficient, no viewing angle limit
  4. Plasma
     - Vs. LCD: cheaper, better motion pictures; however, short lifetime, more power consumption
  5. Touch Screen: don’t’ require much precision

- Reel to Reel Tape



  - 9 tracks, ½" wide by 2400 feet long
  - Disadvantage: not addressable; read/write only in one direction
  - 800, 1600 or 6250 bytes per inch(dpi)
  - Newer IBM Cartridges:
    3MB/sec
    Expensive

- DEC Tape:
  - Advantages: random reads and writes, Addressable
  - Disadvantage: slow

- DLT Tape:
  - Linear tape system
  - Speed: 36MB/sec
  - 300GB big
  - Lifetime: 30 years
  - Errors: 1 bit in 10^17 correctable errors, 1 bit in 10^27 permanent errors

- Tape Summary:

- Incompatible formats.
- Cheap to store data vs. slow speed

- Hard Disck
  - Patters: 2 surfaces each, top and bottom
    Cylinder
    Tracks
    Sectors
  - Old drives used to use absolute positioning to find a track.
  - Today, with drives containing over 10k cylinders, heads use feedback to find the tracks. As they move toward the desired track, they read the track info as they go to determinehow much further it needs to move until it actually finds the track.
  - Unlike floppies, drive heads float over the platter like a glider. The spinning platter generate a vortex and the head rides on this vortex of air. This gap is generally in the order of micrometers. If the drive is jolted, the head may crash into the platter and may result in the loss of data.