CS 231
Computer Organization

I. Basic Organizational Structure

"Levels" is the organizing principle of the course.

"How a computer works" can be understood at different levels of detail.

We will take a *bottom-up* approach, from the digital level to the programming level.

(*But…* we will begin with an overview.)

Von Neumann model of computing:

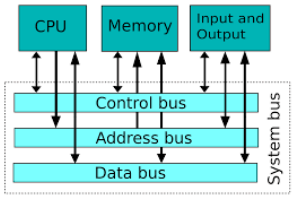
- A program is stored in memory (along with data)
- There is a single processor to do basic operations

Three main types of components:

1. Central Processing Unit (CPU)
2. Memory (main memory)
3. Input/Output (I/O)

Bus – collection of parallel wires connecting components

- Early personal computers had a single bus
  - Typically 50 – 100 wires



Bus – collection of parallel wires connecting components

- Modern PC's and servers have a more complicated bus structure (primarily because there is more I/O)
- Think of this as bus lines radiating outward from a bus controller

What kind of information is transmitted on the bus?

- Data
- Address (memory location)
- Control

Question: How do you classify hard drives?

- Functionally they are memory
- They are handled internally as I/O

Views of original IBM-PC motherboard

- http://csrc.lse.ac.uk/history/Motherboards.htm
- http://commons.wikimedia.org/wiki/File:IBM_PC_Motherboard_%281981%29.jpg