1. Review of where we’ve been
   a. Started with discussion of Mac vs. PC
   b. Looked inside old PC to see the parts
      i. CPU
      ii. RAM
      iii. Disk
      iv. Motherboard
      v. Connections
   c. Talked about sizes of things
   d. Talked about difference between analog disks (spinning platter) and digital disks (solid state memory)
   e. Wires carry signals
      i. Can be 1 or 0; called bits
      ii. Group of 8 bits is a byte
   f. Changes over time
      i. More transistors on an integrated circuit
      ii. Fewer parts overall
      iii. Cheaper, faster, better
   g. Digital representations
      i. Conversion among binary, decimal and hexadecimal
      ii. Place notation
      iii. How many digits, bits, ... to represent ...
      iv. Using bytes to represent
         1. Sounds – sample and compress
         2. Images – RGB values
         3. Text – ASCII is giving way to Unicode
         4. Movies == Sounds + Images
      v. Talked about the growth in the amount of information
   h. Challenges and opportunities of digital representations
      i. Architecture of the CPU and RAM
         i. ALU
         ii. Accumulator
         iii. Memory
         iv. Finite state control
            1. Fetch/execute cycle
      j. Toy language to let us program
         i. Instruction set
         ii. Sample programs
         iii. Flowcharting as a way to understand more complicated programs
   k. Von Neumann architecture
      i. RAM includes both instructions and data
   l. Inside the finite state machine
      i. Building a finite state machine
         1. Alphabet
2. States
   
   3. Transitions
   
   ii. Worked some examples

m. Inside the ALU
   
   i. Truth tables to represent a computation
   
   ii. Basic building blocks – AND, OR, NOT
   
   iii. Advanced building blocks – XOR, NAND, NOR
   
   iv. One bit half adder
   
   v. One bit full adder
   
   vi. Growing it to get to a carry-ripple adder
   
   vii. How gates are drawn

n. Building the circuitry
   
   i. Transistors
   
   ii. Realizing transistors from materials – silicon, conductors, insulators
   
   iii. Many chips on a wafer; dice into individual chips
   
   iv. Wires keep getting thinner
   
   v. Moore’s Law