History of Computers

I. Mechanical Computers
   A. 1791: Charles Babbage: “Difference engine” to solve math tables
      “Analytical engine” for general purpose calculations
   B. Jacquard’s loom: used punch cards for instructions

II. Electro-Mechanical Computers
   A. 1880 Census: took 7 yrs. to tabulate results. Herman Hollerith won contest to count 1890 census results (took only 6 weeks). 1896: founded the “Tabulating Machine Company,” which merged w/2 others in 1924 to form International business Machines (IBM).
   B. Howard Aiken from Harvard got IBM’s top executive (Thomas Watson) to invest $1 million (in 1936), with which he built the Harvard Mark I.
      1. 8 ft. high & 55 ft. long
      2. noisy
      3. Aug. ‘45: Grace Murray Hopper found a 2 in. moth, thereafter calling glitches “bugs”
   C. Mauchly & Eckert (U. Penn.) built the ENIAC in 1941, modelled after Atanasoff ‘s (from Iowa State) ABC computer, from the 30’s. [Show pictures of ABC & ENIAC. The ENIAC had 18,000 vacuum tubes, 1,500 relays, in a room 20ft. by 40ft. It sounded like a train]

III. Modern Computer Generations
   A. First Generation: 1951-1958: The Vacuum Tube
      1. The first commercial computer (UNIVAC) delivered to Census Bureau
      2. Problem: heat and burnout of tubes, also programming using punchboards / switches
      3. Internal components built of vacuum tubes, and computer memory built of magnetic cores [see sample]
      4. punched cards used as supplementary storage.
      5. 1957: magnetic tape introduced [see piece of tape w/filings & magnifying glass]
      Internal components previously built with vacuum tubes replaced by transistors [see sample].
      1. Advantages of transistors: smaller, faster, more reliable, no warm-up needed
      2. Machine languages (0 & 1) -> symbolic languages (L for LOAD, rather than code)
      3. Symbolic languages -> High-level languages (FORTRAN ‘54, COBOL ‘59)
      Many transistors combined together into a very small space, forming an integrated circuit [see wafer, various chips]
      1. A Large circuit board was replaced by an integrated circuit half the size of a fingernail.
      2. IBM 360 “mainframe” computer: upward-compatible design
   D. Fourth Generation: 1971 - present: Microprocessor (& Microcomputers)
      A general-purpose processor on a chip; Evolutionary, not revolutionary change
      1. Widespread use: watches, calculators, irons, cars, personal computers, phones
      2. Mass production & further miniaturization meant 10’s of millions of transistors (& other electrical components) on a single integrated circuit [see Text Gallery 1]
   E. Fifth Generation: ? to ?: A.I., Language understanding, handwriting recognition, parallelism (multiple CPU’s in one computer)