1. Intel 8080, 1971, developed by Intel

2. MOS Technology - 6502
   Zilog - Z80

3. 8051 introduced - 1980
   Predecessor - 8748
   Introduced - 1976

4. RAM
   ROM - contains contents when powered-off, nonvolatile

#5 program counter; memory address of next instruction

6. on address bus: contents of program counter
   on data bus: data (the instruction opcode) is read from RAM
   goes from CPU to address bus; to RAM; from RAM to data bus to CPU)

7. 2^{18} = 262144 bits = 32768 bytes

8. 16-bit means there are 16 lines on the data bus

9. online - available to CPU w/o human intervention upon
   request of program
   archival - holds data rarely needed & require manual
   loading onto system

10. optical disks such as CD-ROMs & WORM technology

11. design peripheral devices w/ humans in mind; the goal being the safe, comfortable, & efficient mating of characteristics of people w/ machines they use

12. Input: joystick, mouse, microphone
Output: light pen, loudspeaker

13. Input/Output subroutines
directly manipulate the hardware of the system

14. actuator - outputs (motors, relays)
sensors - monitoring devices for inputs (photo transistors, thermistors)

15. The control program stored permanently in ROM firmware is used more in microcontroller systems because it is to costly to have the IC interface w/ other storage devices

16. Microcontrollers have instruction sets catering to control of inputs & outputs

17. PC speakers
computer mouse
CD-ROM drive
Stereo
cordless telephone
VCR
digital coffee maker