1. Summary
   1. It would take the CPU 52 nanoseconds to compute this equation. It could be optimized in the following way: d = (a – b)^2
   2. The ISA is what runs the underlying microarchitecture. The ISA decodes the instructions it receives from memory, and passes those instructions on to the microarchitecture to do the process. It’s impossible to have an ISA without a corresponding microarchitecture, because the ISA would have nothing to do with the instructions it receives.
   3. Another system that uses abstractions could be a vehicle. At the high end, a user (the driver) simply has to press the accelerator to go faster. At the low level, the engine interprets this action and feeds more gas into the pistons, increasing the RPMs the engine is running at. In turn, this turns the driveshaft and runs the wheels at a higher rate. The user doesn’t have to worry about this low level behavior because the high level abstractions cover it for them. This is only one example in a car, but the rest of the functions of a car work the same way.
   4. The input devices to my computer would be a USB keyboard, built-in webcam, and microphone. The output devices could be the display and the speakers. Memory would be the RAM and the hard drive. The processor falls under the control and datapath categories.
   5. Computer architects hit a “power wall” which diminished the rate of power improvement from a rate of about 1.5/year to only 1.2/year. This caused them to start focusing on increasing the number of cores on a microprocessor. One design consideration is that programs should try to synchronize all of a computer’s cores so they finish working on the task at the same time. Another consideration is that the cores shouldn’t have to communicate with each other much to finish their task.
2. Number Representations
   1. 50310 = 21556 = 6189
   2. CprE 381 = 01000011 01110000 01110010 01000101 00100000 00110011 00111000 00110001  
        
      CprE 381 = 43 70 72 45 20 33 38 31
   3. It takes 6 bits to represent the 48 letters of the Greek alphabet.
   4. Both guys are wrong, Harry’s example is proved wrong with the number 600, and David is wrong because it takes an uneven number of 1s to get 6000.