CSCE230: Computer Organization - Week 2

Chapter 3 – Instructions: Language of the Machine

From last week, you should
1. have a clear concept of load and store instruction.
2. understand different number systems (binary, hexadecimal, decimal)
3. be able to write some basic MIPS assembly programs
4. be able to identify all three types of integer instruction formats (R-type, I-type, J-type)

For this week, we will cover
1. MIPS instruction
   a. arithmetic operations require 3 values
   b. comments terminate at the end of the line
   c. operations are done to values stored in register-register or register-immediate
      o 32 x 32-bit register
      o register 0 = 0
      o 16-bit immediate value
      o MIPS convention use two character names following $ ($t0)
2. Design Principles
   a. simplicity favors regularity
   b. smaller is faster
   c. good design makes good compromise
   d. make common cases fast
3. Simple array example
4. Translating assembly instruction into a Machine instruction
5. Flow control instructions (beq and bne)
   a. example using if statement
   b. example using if-then-else
   c. loop example
   d. case statement example
6. Procedure calls
   a. passing arguments through register
      i. callee saves ($s0-$s7)
   b. passing arguments through the stack
7. Addressing mode
   a. immediate
   b. base-displacement
   c. PC-relative
   d. Pseudodirect addressing
   e. register addressing
8. Starting a program
9. array versus pointer