## 2 Key Principles of Machine Design

1. Instructions are represented as numbers and, as such, are indistinguishable from data
2. Programs are stored in alterable memory (that can be read or written to) just like data.

## MIPS stuffs

* MIPS has 32 registers
  + From 0-31
* Program counters
* High & low
* Special
* 3 instruction formats: all 32 bits wide
* Simplicity Favors Regularity
  + all bits are the same size
  + opcode is always the 1st six bits
* Smaller is faster
  + Limited instruction set
  + Limited number of registers in the register file
  + Limited number of addressing modes
* Make the common case fast
  + Arithmetic operands from the register file (load-store machine)
  + Allow instructions to contain immediate operands
* Good design demands good compromises
  + 3 instruction formats
* For MIPS, the byte length is 4 *???*
* Zero is saved as a read only register as $zero