CS 232 Computer Organization

Instruction Formats
- Defines the layout of bits in an instruction
- Includes opcode and (implicit or explicit) operand(s)
- Usually more than one instruction format in an instruction set

Instruction Length
- Affected by and affects
  - memory size
  - memory organization
  - CPU complexity
  - CPU speed
- If processor can execute instructions faster than it can fetch them, memory becomes a bottleneck. Solution one is cache memory. Solution two is shorter instructions.

Allocation of Bits
- Fixed instruction length tradeoff between the number of opcodes and the power of the addressing capability.
- Variable-length instruction is a refinement to this tradeoff. There is a minimum opcode length, but for some opcodes, additional operands may be specified by using additional bits in the instruction.