

CE-1921 - Dr. Durant - Quiz 1
Spring 2018, Week 1

1. **Define** instruction.
2. **State** the bit width of every ARM instruction.
3. **Define** source operands.
4. What is an **advantage** of a RISC architecture relative to a CISC architecture?
5. **Contrast** system architecture and micro-architecture.
6. **Define** instruction set.
7. **Describe** the difference between assembly language and machine language.
8. **Explain** how the compiler and assembler work together.
9. **List** two of the four modern architectural design rules.
10. How would it impact the **machine language** if the number of registers in **ARM** were extended from 16 to 32?

- ① a single operation on a general purpose CPU datapath, such as add, move, load, branch
- ② 32 bits = 4 bytes
- ③ The values read per an instruction. On RISC, they come from registers (the load operation is the only memory read op; its source operand are used to calculate the memory address) & immediates. CISC also can access memory as source operands.
- ④ less to do on any instruction → faster clock
fewer instructions → shorter encoding
simpler hardware
- ⑤ system arch.: combine CPU w/ external components to make system
micro: organization within CPU: ALUs, datapath, decoders, memory/cache manager, ...
- ⑥ all the instructions / basic operations supported by an architecture a CPU
- ⑦ asm is high level & human-readable. machine is in binary & used by HW
- ⑧ high level language (eg, C) $\xrightarrow{\text{compiler}}$ asm. code $\xrightarrow{\text{assembler}}$ machine code
- ⑨ (i) make common case fast (ii) small is fast (iii) regularity → simplicity (iv) design tradeoffs
- ⑩ need 5b/reg instead of 4b/reg to encode. → gives up a feature or need > 32b.