16.482 / 16.561: Computer Architecture and Design
Fall 2014

Lecture 1: Key Questions
September 4, 2014

1. What information is required to translate a high-level statement such as `X[i]=i*2;` to assembly language?

2. Describe how a processor executes a typical instruction.

3. What are three locations in which operands are stored? Which is preferable, and why?

4. Describe the characteristics of a RISC architecture.

5. Describe each of the addressing modes listed below:

- Immediate

- Register direct

- Register indirect

- Base + displacement

- PC-relative

6. Describe the different mnemonics used for MIPS integer registers.

7. Describe the MIPS data transfer instructions.

8. Describe what it means for data to be aligned.

9. Compare and contrast big-endian and little-endian data.

10. Say memory holds the word 0xABCD1234, starting at address 0x1000, $t0 holds the value
0x1000, and $s0 holds 0xDEADBEEF. What are the results of the following instructions?

- lh $t1, 2($t0)

- lb $t2, 1($t0)

- lbu $t3, 0($t0)

- sh $s0, 0($t0)

- sb $s0, 3($t0)

11. Describe the MIPS arithmetic and logical instructions.

12. Say $t0 = 0x00000001, $t1 = 0x00000004, $t2 = 0xFFFFFFFF. What are the results of the following instructions?

- sub $t3, $t1, $t0

- addi $t4, $t1, 0xFFFF

- andi $t5, $t2, 0xFFFF

- sll $t6, $t0, 5

- slt $t7, $t0, $t1

- lui $t8, 0x1234

13. Describe the different classes of MIPS branch instructions.

14. Explain the use of pseudoinstructions in MIPS assembly.

15. Describe the different jump instructions in MIPS.