Faculty of Computers and Artificial Intelligence

CS222: Computer Architecture

Assignment no 08:

Chapter 6: Architecture

Note: You can check the exercises after the Chapter. In our assignment, we are using the 2nd Edition of "Digital Design and Computer Architecture" By David and Sarah Harris.

Exercise 6.1 <u>**Give three examples**</u> from the MIPS architecture of each of the architecture design principles: (1) simplicity favors regularity; (2) make the common case fast; (3) smaller is faster; and (4) good design demands good compromises. <u>**Explain**</u> how each of your examples exhibits the design principle.

Exercise 6.3 Consider memory storage of a 32-bit word stored at memory word 42 in a byte-addressable memory.

(a) What is the <u>**byte address**</u> of memory word 42?

(b) What are the <u>**byte addresses**</u> that memory word 42 spans?

(c) <u>**Draw**</u> the number 0xFF223344 stored at word 42 in both big-endian and little-endian machines. Your drawing should be similar to Figure 6.4. Clearly label the byte address corresponding to each data byte value.

Exercise 6.6 Write the following strings using ASCII encoding. Write your final answers in hexadecimal.
(a) SOS
(b) Cool!
(c) (your own name)

Exercise 6.10 <u>**Convert**</u> the following MIPS assembly code into machine language. Write the instructions in hexadecimal.
add $t0, $s0, $s1
lw $t0, 0x20($t7)
addi $s0, $0, −10

Exercise 6.11 <u>**Convert**</u> the following MIPS assembly code into machine language. Write the instructions in hexadecimal.
addi $s0, $0, 73
sw $t1, −7($t2)
sub $t1, $s7, $s2