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**Department of Computer Science and Engineering**

**FINAL EXAMINATION FALL 2013**

**CSE 340: Computer Architecture**

**Total Marks: 60 Time Allowed: 2.00 Hours**

* Answer any **Five (5)** questions out of the given **Six (6)** questions.
* Figure in bracket [] next to each question indicates marks for that question.

## Question No. 1

1. Define Embedded computer and ABI, Mobile computing. [4.5 marks]
2. What do you mean by Datapath, Memory hierarchy and Multi processor systems? Explain with appropriate figures. [4.5 marks]
3. Compare RISC and CISE architecture? [3 marks]

###### Question No. 2

1. For each of the two MIPS instructions below, [10 marks]
   * Specify as much of the machine code of the instruction as you can, showing how many bits are in each field and leaving unknown fields blank; draw the datapath and controls for a single cycle implementation of the instruction; only include parts of the datapath that are used in the instruction; specify the bit width of any lines you draw in the datapath, and write any known values on the lines.
2. addi $15, $0, -8 # add immediate
3. sltu $16, $15, $0 # set less than (unsigned)
4. Explain Big Endian and little Endian addressing. [2 marks]

Question No. 3

1. Give the minimal sequence of MIPS instructions to perform $s3 ← $s2 \* 9 using ***only*** add instructions and shift instructions. As a reminder the syntax for the MIPS shift left logical (sll) instruction is, sll $t2, $s0, 8 #$t2 = $s0 << 8 bits [4 marks]
2. What decimal number dose this two’s complement binary number represents 1111 1111 1111 1111 1111 1111 1111 1111two. [2 marks]
3. Explain the various addressing modes in MIPS. [6 marks]

## Question No. 4

1. Show the hardware for multiplication algorithm. Show the content of various registers of multiplication hardware when multiplying 11002 × 11012. [8 marks]
2. Explain how brunch destination is calculated with necessary figure? [4 marks]

## Question No. 5

1. Define CPU execution time, CPI and effective CPI. [3 marks]
2. Show the IEEE 754 binary representation for the floating point number 20.3ten.

Also show the equivalent hex representation. [4 marks]

1. With x=0101 111 1011 1110 0100 0100 0000 0000 0000 two and y=0011 1111 1111 1000 0000 0000 0000 0000two representing single precision IEEE754 floating point numbers, find x+y and its equivalent decimal value. [5 marks]

## Question No. 6

1. What is datapath? [1 marks]
2. Compare single cycle datapath, multicycle datapath and pipelining. [4 marks]
3. Explain different pipelining hazards with necessary hazards. [5 marks]

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