

Practice for ISA

For all questions, please show your computation clearly.

1. Assume that int array A has 10 elements and \$s1 register has the base address of A.
Write MIPS assembly code segment that swaps A[4] and A[9].

For #2 and #3, consider the following register values (represented in Hex number):

\$s1 = A1B2C3D4

\$s2 = 5A6B7C8D

2. Show the contents of \$t1 and \$t2 after executing the following two consecutive instructions.

sar \$t1, \$s1, 3

slr \$t2, \$t1, 1

3. Assume that the following three consecutive instructions are executed.

sw \$s1, 4(\$zero)

sw \$s2, 8(\$zero)

lw \$s1, 6(\$zero)

Show the content of \$s1 in Hex number:

How many memory accesses are made?

4. Consider the following MIPS assembly code segment for implementing a while loop.

Start: add \$t1, \$s2, \$s1	instruction type: _____	addressing mode: _____
lw \$t0, 4(\$t1)	instruction type: _____	addressing mode: _____
bne \$t0, \$s5, End	instruction type: _____	addressing mode: _____
addi \$s1, \$s1, 2	instruction type: _____	addressing mode: _____
subi \$s1, \$s1, 1	instruction type: _____	addressing mode: _____
j Start	instruction type: _____	addressing mode: _____

End:

- (a) Specify the instruction type and addressing mode used in each instruction above.
 - (b) Write MIPS machine code for the 2nd instruction (lw) in Hex number.
Opcode for lw is 35 in decimal; register numbers for \$t0 and \$t1 are 8 and 9 in decimal, respectively.
 - (c) Write MIPS machine code for the 3rd instruction (bne) in Hex number.
Opcode for bne is 5 in decimal; register number for \$s5 is 21 in decimal.
5. Explain clearly the addressing mode used in the jump (e.g., j Loop) instruction.
You should explain clearly the PC updating process.

- Submission: Please write answers on blank papers and submit a .pdf version (single file).

Please organize your answer sheets in the order of #1,2,3,... and don't forget to write your name on the first page.