

**Problem EX-1 (3 parts)****MIPS Assembly Expressions**

**Part A** Suppose A is stored in memory location 1020 and B is stored in register \$1. Write a MIPS program fragment that computes “ $(25A - B)/16$ ” and stores the result at memory location 1024. Feel free to use additional registers, but use a minimum number of instructions and registers.

Label	Instruction	Comment
	lw \$2, 1020(\$0)	# \$2: A
	addi \$3, \$0, 25	# \$3: 25
	mult \$2, \$3	# 25*A
	mflo \$2	# \$2: 25*A
	sub \$2, \$2, \$1	# \$2: 25*A - B
	sra \$2, \$2, 4	# \$2/16
	sw \$2, 1024(\$0)	# Store \$2 @ Mem[1024]

**Part B** Write a code fragment that packs four unsigned eight bit values A, B, C, and D (stored in \$1, \$2, \$3, and \$4) in order into a single 32 bit word stored in \$1. When complete, value A should be stored in the least significant byte, while value D is stored in the most significant byte. Use only \$1, \$2, \$3, \$4, all of which can be modified.

label	instruction	comment
	sll \$2, \$2, 8	# move B 8 bits left
	or \$1, \$1, \$2	# pack B A
	sll \$3, \$3, 16	# move C 16 bits left
	or \$1, \$1, \$3	# pack C B A
	sll \$4, \$4, 24	# move D 24 bits left
	or \$1, \$1, \$4	# pack D C B A

**Part C** Write MIPS code that implements the expression:  $Y = Y / -144$ ; Assume Y is in \$5. Use additional registers as needed.

Label	Instruction	Comment
	addi \$6, \$0, -144	# load -144
	div \$5, \$6	# Y / -144
	mflo \$5	# Y = Y / -144