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ASSIGNMENT 4

.eqv IN\_ADRESS\_HEXA\_KEYBOARD 0xFFFF0012

.eqv COUNTER 0xFFFF0013 # Time Counter

.eqv MASK\_CAUSE\_COUNTER 0x00000400 # Bit 10: Counter interrupt

.eqv MASK\_CAUSE\_KEYMATRIX 0x00000800 # Bit 11: Key matrix interrupt

.data

msg\_keypress: .asciiz "Someone has pressed a key!\n"

msg\_counter: .asciiz "Time inteval!\n"

#~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

# MAIN Procedure

#~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

.text main:

#---------------------------------------------------------

# Enable interrupts you expect

#---------------------------------------------------------

# Enable the interrupt of Keyboard matrix 4x4 of Digital Lab Sim

li $t1, IN\_ADRESS\_HEXA\_KEYBOARD

li $t3, 0x80 # bit 7 = 1 to enabl

sb $t3, 0($t1) # Enable the interrupt of TimeCounter of Digital Lab Sim

li $t1, COUNTER

sb $t1, 0($t1)

#---------------------------------------------------------

# Loop an print sequence numbers

#---------------------------------------------------------

Loop: nop

nop

nop

sleep: addi $v0,$zero,32

# BUG: must sleep to wait for Time Counter

li $a0,200 # sleep 300 ms

syscall

nop # WARNING: nop is mandatory here.

b Loop

end\_main:

#~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

# GENERAL INTERRUPT SERVED ROUTINE for all interrupts

#~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

.ktext 0x80000180 IntSR:

#--------------------------------------------------------

# Temporary disable interrupt

#--------------------------------------------------------

dis\_int:li $t1, COUNTER # BUG: must disable with Time Counter

sb $zero, 0($t1) # no need to disable keyboard matrix interrupt

#--------------------------------------------------------

# Processing

#--------------------------------------------------------

get\_caus:mfc0 $t1, $13 # $t1 = Coproc0.cause IsCount:

li $t2, MASK\_CAUSE\_COUNTER# if Cause value confirm Counter..

and $at, $t1,$t2

beq $at,$t2, Counter\_Intr

IsKeyMa:li $t2, MASK\_CAUSE\_KEYMATRIX # if Cause value confirm Key..

and $at, $t1,$t2

beq $at,$t2, Keymatrix\_Intr

others: j end\_process # other cases

Keymatrix\_Intr:

li $v0, 4 # Processing Key Matrix Interrupt

la $a0, msg\_keypress

syscall

j end\_process

Counter\_Intr:

li $v0, 4 # Processing Counter Interrupt

la $a0, msg\_counter

syscall

j end\_process

end\_process:

mtc0 $zero, $13 # Must clear cause reg en\_int:

#--------------------------------------------------------

# Re-enable interrupt

#--------------------------------------------------------

li $t1, COUNTER

sb $t1, 0($t1)

#--------------------------------------------------------

# Evaluate the return address of main routine

# epc <= epc + 4

#--------------------------------------------------------

next\_pc:mfc0 $at, $14 # $at <= Coproc0.$14 = Coproc0.epc

addi $at, $at, 4 # $at = $at + 4 (next instruction)

mtc0 $at, $14 # Coproc0.$14 = Coproc0.epc <= $at

return: eret # Return from exception

Kết quả :

