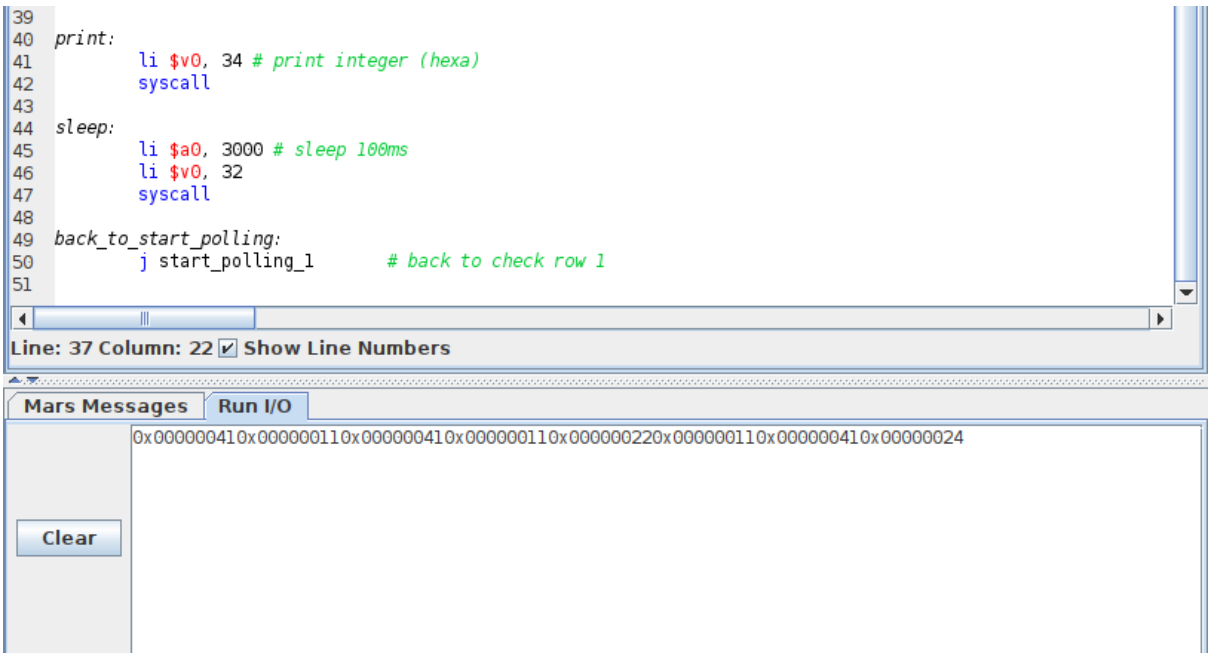
Bai 1:

```
.eqv IN_ADRESS_HEXA_KEYBOARD 0xFFFF0012
.eqv OUT_ADRESS_HEXA_KEYBOARD 0xFFFF0014


.text
main:
        li $t1, IN_ADRESS_HEXA_KEYBOARD
        li $t2, OUT_ADRESS_HEXA_KEYBOARD


start_polling_1:
        li $t3, 0x01 # check row 1 with key 0, 1, 2, 4
        sb $t3, 0($t1) # must reassign expected row
        jal polling

start_polling_2:
        li $t3, 0x02 # check row 2 with key 4, 5, 6, 7
        sb $t3, 0($t1) # must reassign expected row
        jal polling

start_polling_3:
        li $t3, 0x04 # check row 3 with key 8, 9, A, B
        sb $t3, 0($t1) # must reassign expected row
        jal polling

start_polling_4:
        li $t3, 0x08 # check row 4 with key C, D, E, F
        sb $t3, 0($t1) # must reassign expected row
        jal polling

check_after_polling_4:
        beq $a0, 0x0, print
        j start_polling_1

polling:
        lb $a0, 0($t2) # read scan code of key button
        bne $a0, 0x0, print
        jr $ra
```



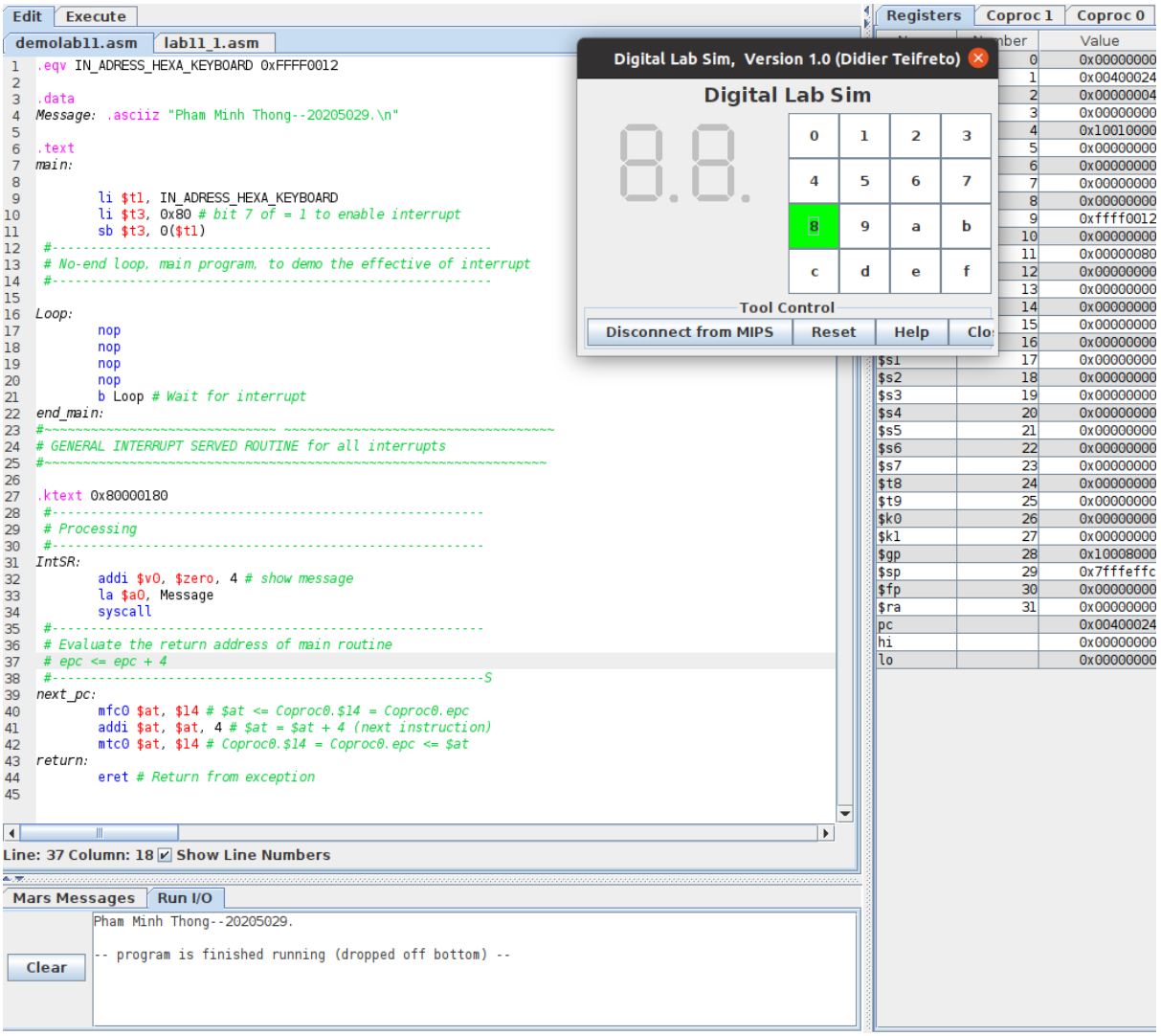
Yêu cầu: Check toàn bộ các ký tự từ 0 -> F

In ra kết quả khi nhập mã số sinh viên từ bàn phím

0x41 là số 2;
0x11 là số 0;
0x22 là số 5;
0x24 là số 9;

Từ kết quả => MSSV của em: 20205029

Bai 2:



Yêu cầu:

Khi nhấn phím bất kì từ 0 -> F thì sẽ hiện ra tên và mssv

Bài 3:

demolab11.asm | lab11_1.asm | mips1.asm*

```
.eqv IN_ADRESS_HEXA_KEYBOARD 0xFFFF0012
.eqv OUT_ADRESS_HEXA_KEYBOARD 0xFFFF0014

.data
Message: .asciiz "Key scan code "

.text
main:
        li $t1, IN_ADRESS_HEXA_KEYBOARD
        li $t3, 0x80 # bit 7 = 1 to enable
        sb $t3, 0($t1)


        xor $s0, $s0, $s0 # count = $s0 = 0

Loop:
        addi $s0, $s0, 1 # count = count + 1
prn_seq:
        addi $v0,$zero,1
        add $a0,$s0,$zero # print auto sequence number
        syscall

prn_eol:
        addi $v0,$zero,11
        li $a0,'\n' # print endofline
        syscall
sleep:
        addi $v0,$zero,32
        li $a0,3000 # sleep 300 ms
        syscall
        nop # WARNING: nop is mandatory here.
        b Loop # Loop
end_main:

# Interrupt
.ktext 0x80000180
 #---------------------------------------------------------
 # SAVE the current REG FILE to stack
 #---------------------------------------------------------
IntSR:
        addi $sp,$sp,4 # Save $ra because we may change it later
        sw $ra,0($sp)
        addi $sp,$sp,4 # Save $ra because we may change it later
        sw $at,0($sp)
        addi $sp,$sp,4 # Save $ra because we may change it later
        sw $v0,0($sp)
        addi $sp,$sp,4 # Save $a0, because we may change it later
        sw $a0,0($sp)
        addi $sp,$sp,4 # Save $t1, because we may change it later
        sw $t1,0($sp)
        addi $sp,$sp,4 # Save $t3, because we may change it later
        sw $t3,0($sp)
 #---------------------------------------------------------
 # Processing
 #---------------------------------------------------------
prn_msg:
        addi $v0, $zero, 4
        la $a0, Message
        syscall

get_cod:
        li $t1, IN_ADRESS_HEXA_KEYBOARD
        li $t2, OUT_ADRESS_HEXA_KEYBOARD

start_inter_1:
        li $t3, 0x81 # check row 1 with key 0, 1, 2, 4
        sb $t3, 0($t1) # must reassign expected row
        jal inter
```

```
69
70  start_inter_2:
71          li $t3, 0x82 # check row 2 with key 4, 5, 6, 7
72          sb $t3, 0($t1) # must reassign expected row
73          jal inter
74
75  start_inter_3:
76          li $t3, 0x84 # check row 3 with key 8, 9, A, B
77          sb $t3, 0($t1) # must reassign expected row
78          jal inter
79
80  start_inter_4:
81          li $t3, 0x88 # check row 4 with key C, D, E, F
82          sb $t3, 0($t1) # must reassign expected row
83          jal inter
84
85  check_after_inter_4:
86          beq $a0, 0x0, prn_cod
87          j start_inter_1
88
89  inter:
90          lb $a0, 0($t2) # read scan code of key button
91          bne $a0, 0x0, prn_cod
92          jr $ra
93
94  prn_cod:
95          li $v0,34
96          syscall
97
98          li $v0,11
99          li $a0,'\n' # print endofline
100         syscall
101  #---------------------------------------------------------
```

```
101  #---------------------------------------------------------
102  # Evaluate the return address of main routine
103  # epc <= epc + 4
104  #---------------------------------------------------------
105 next_pc:
106         mfc0 $at, $14 # $at <= Coproc0.$14 = Coproc0.epc
107         addi $at, $at, 4 # $at = $at + 4 (next instruction)
108         mtc0 $at, $14 # Coproc0.$14 = Coproc0.epc <= $at
109  #---------------------------------------------------------
110  # RESTORE the REG FILE from STACK
111  #---------------------------------------------------------
112  restore:
113         lw $t3, 0($sp) # Restore the registers from stack
114         addi $sp,$sp,-4
115         lw $t1, 0($sp) # Restore the registers from stack
116         addi $sp,$sp,-4
117         lw $a0, 0($sp) # Restore the registers from stack
118         addi $sp,$sp,-4
119         lw $v0, 0($sp) # Restore the registers from stack
120         addi $sp,$sp,-4
121         lw $ra, 0($sp) # Restore the registers from stack
122         addi $sp,$sp,-4
123 return:
124         eret # Return from exception
```

Line: 107 Column: 29 ☑ Show Line Numbers

Mars Messages | Run I/O

Clear

```
Key scan code 0x00000041
Key scan code 0x00000011
Key scan code 0x00000041
Key scan code 0x00000011
Key scan code 0x00000022
Key scan code 0x00000011
Key scan code 0x00000041
Key scan code 0x00000024
```

Yêu cầu: In ra kết quả khi nhập mssv vào Lab Sim

Kết quả ra như sau:

0x41 là số 2;
0x11 là số 0;
0x22 là số 5;
0x24 là số 9;

=> Kết quả là MSSV của em: 20205029