Báo cáo thực hành môn Kiến trúc máy tính

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1. Assignment 1

Code:

        .eqv    SEVENSEG\_LEFT, 0xFFFF0010

        .eqv    SEVENSEG\_RIGHT, 0xFFFF0011

.data

arr:    .word   0x3F, 0x06, 0x5B, 0x4F, 0x66, 0x6D, 0x7D, 0x07, 0x7F, 0x6F, 0x77, 0x7C, 0x39, 0x5E, 0x79, 0x71

.text

main:

    la      $t7,                arr

    add     $t8,                $0,             $t7

    add     $t9,                $0,             $t7

    li      $t1,                0

loop:

    subi    $t3,                $t1,            10

    slt     $t4,                $t3,            $0

    beq     $t4,                0,              exit

SO\_TRUOC\_9:

    lw      $t2,                0($t8)

    addi    $a0,                $0,             0x3F

    jal     SHOW\_7SEG\_RIGHT

    add     $a0,                $0,             $t2

    jal     SHOW\_7SEG\_LEFT

    addi    $t8,                $t8,            4

    addi    $t1,                $t1,            1

    li      $v0,                32

    li      $a0,                1000

    syscall

    j       loop

exit:

    li      $v0,                10

    syscall

endmain:

SHOW\_7SEG\_LEFT:

    li      $t0,                SEVENSEG\_LEFT

    sb      $a0,                0($t0)

    jr      $ra

SHOW\_7SEG\_RIGHT:

    li      $t0,                SEVENSEG\_RIGHT

    sb      $a0,                0($t0)

    jr      $ra

1. Assignment 2

Code:

.eqv MONITOR\_SCREEN 0x10010000 #Dia chi bat dau cua bo nho man hinh

.eqv RED 0x00FF0000 #Cac gia tri mau thuong su dung

.text

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop11:

    li $t0, RED

    sw $t0, 0($k0)

    addi $k0, $k0, 64

    addi $t1, $t1, 1

    ble $t1, $t2, loop11

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop12:

    li $t0, RED

    sw $t0, 4($k0)

    addi $k0, $k0, 64

    addi $t1, $t1, 1

    ble $t1, $t2, loop12

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop13:

    li $t0, RED

    sw $t0, 8($k0)

    addi $k0, $k0, 64

    addi $t1, $t1, 1

    ble $t1, $t2, loop13

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop21:

    li $t0, RED

    sw $t0, 60($k0)

    addi $k0, $k0, 64

    addi $t1, $t1, 1

    ble $t1, $t2, loop21

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop22:

    li $t0, RED

    sw $t0, 56($k0)

    addi $k0, $k0, 64

    addi $t1, $t1, 1

    ble $t1, $t2, loop22

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop23:

    li $t0, RED

    sw $t0, 52($k0)

    addi $k0, $k0, 64

    addi $t1, $t1, 1

    ble $t1, $t2, loop23

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop31:

    li $t0, RED

    sw $t0, 512($k0)

    addi $k0, $k0, 4

    addi $t1, $t1, 1

    ble $t1, $t2, loop31

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop32:

    li $t0, RED

    sw $t0, 576($k0)

    addi $k0, $k0, 4

    addi $t1, $t1, 1

    ble $t1, $t2, loop32

 nop

li $k0, MONITOR\_SCREEN #Nap dia chi bat dau cua man hinh

li $t1, 1

li $t2, 16

loop33:

    li $t0, RED

    sw $t0, 448($k0)

    addi $k0, $k0, 4

    addi $t1, $t1, 1

    ble $t1, $t2, loop33

 nop

Kết quả:

A screenshot of a computer

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1. Assignment 3

Code:

    .eqv HEADING, 0xffff8010                 # Integer: An angle between 0 and 359

    .eqv MOVING, 0xffff8050                  # Boolean: whether or not to move

    .eqv LEAVETRACK, 0xffff8020              # Boolean (0 or non-0):

    .eqv WHEREX, 0xffff8030                  # Integer: Current x-location of MarsBot

    .eqv WHEREY, 0xffff8040                  # Integer: Current y-location of MarsBot

.text

main:

    addi    $a0,        $zero,      90

    jal     ROTATE

    jal     GO

sleep1:

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

Turn1:

    addi    $a0,        $zero,      180

    jal     ROTATE

    jal     GO

Sleep2:

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

Draw1:

    jal     TRACK

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

    jal     UNTRACK

Turn2:

    addi    $a0,        $zero,      90

    jal     ROTATE

    jal     GO

Sleep3:

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

Turn3:

    addi    $a0,        $zero,      360

    jal     ROTATE

    jal     GO

Draw2:

    jal     TRACK

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

    jal     UNTRACK

Turn4:

    addi    $a0,        $zero,      270

    jal     ROTATE

    jal     GO

Sleep4:

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

Turn5:

    addi    $a0,        $zero,      180

    jal     ROTATE

    jal     GO

Sleep5:

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        1500

    syscall

Turn6:

    addi    $a0,        $zero,      90

    jal     ROTATE

    jal     GO

Draw3:

    jal     TRACK

    addi    $v0,        $zero,      32      # Keep running by sleeping in 1000 ms

    li      $a0,        3000

    syscall

    jal     UNTRACK

    jal     STOP

nop

end\_main:

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

    # GO procedure, to start running

    # param[in] none

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

GO:     li      $at,        MOVING          # change MOVING port

    addi    $k0,        $zero,      1       # to logic 1,

    sb      $k0,        0($at)              # to start running

    nop

    jr      $ra

    nop

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

    # STOP procedure, to stop running

    # param[in] none

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

STOP:    li      $at,        MOVING         # change MOVING port to 0

    sb      $zero,      0($at)              # to stop

    nop

    jr      $ra

    nop

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

    # TRACK procedure, to start drawing line

    # param[in] none

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

TRACK:    li      $at,        LEAVETRACK    # change LEAVETRACK port

    addi    $k0,        $zero,      1       # to logic 1,

    sb      $k0,        0($at)              # to start tracking

    nop

    jr      $ra

    nop

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

    # UNTRACK procedure, to stop drawing line

    # param[in] none

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

UNTRACK:    li      $at,        LEAVETRACK  # change LEAVETRACK port to 0

    sb      $zero,      0($at)              # to stop drawing tail

    nop

    jr      $ra

    nop

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

    # ROTATE procedure, to rotate the robot

    # param[in] $a0, An angle between 0 and 359

    # 0 : North (up)

    # 90: East (right)

    # 180: South (down)

    # 270: West (left)

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

ROTATE:    li      $at,        HEADING      # change HEADING port

    sw      $a0,        0($at)              # to rotate robot

    nop

    jr      $ra

    nop

Kết quả chương trình:

A black and blue squares

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1. Assignment 4

Code:

            .eqv    KEY\_CODE, 0xFFFF0004        # ASCII code from keyboard, 1 byte

            .eqv    KEY\_READY, 0xFFFF0000       # =1 if has a new keycode ?

            .eqv    DISPLAY\_CODE, 0xFFFF000C    # ASCII code to show, 1 byte

            .eqv    DISPLAY\_READY, 0xFFFF0008   # =1 if the display has already to do

.data

exit\_seq:   .byte   'e', 'x', 'i', 't'          # Sequence to check for

seq\_index:  .word   0                           # Index for sequence checking

.text

    li      $k0,    KEY\_CODE

    li      $k1,    KEY\_READY

    li      $s0,    DISPLAY\_CODE

    li      $s1,    DISPLAY\_READY

    la      $a3,    exit\_seq                    # Load address of exit sequence

    lw      $a2,    seq\_index                   # Load current index of sequence

loop:           nop

WaitForKey:     lw      $t1,    0($k1)          # $t1 = [$k1] = KEY\_READY

    nop

    beq     $t1,    $zero,          WaitForKey  # if $t1 == 0 then Polling

    nop

ReadKey:        lw      $t0,    0($k0)          # $t0 = [$k0] = KEY\_CODE

    nop

    sw      $t0,    0($s0)                      # Show key regardless of match

    lb      $t3,    0($a3)                      # Load expected char from exit\_seq

    bne     $t0,    $t3,            reset\_seq   # If not matching, reset sequence

    addi    $a3,    $a3,            1           # Move to next character in sequence

    addi    $a2,    $a2,            1           # Increment sequence index

    li      $t4,    4

    beq     $a2,    $t4,            exit        # If index is 4, exit

    j       loop

    nop

reset\_seq:

    la      $a3,    exit\_seq                    # Reset to start of sequence

    sw      $zero,  seq\_index                   # Reset index to 0

    j       loop

    nop

exit:

    li      $v0,    10                          # Exit syscall

    syscall