

BÁO CÁO THỰC HÀNH KIẾN TRÚC MÁY TÍNH – TUẦN 11

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Assignment 1:

- Code:

```
.eqv HEADING 0xffff8010
.eqv MOVING 0xffff8050
.eqv LEAVETRACK 0xffff8020
.eqv WHEREX 0xffff8030
.eqv WHEREY 0xffff8040
.text
main:
    jal UNTRACK # draw track line
    addi $a0, $zero, 90 # Marsbot rotates 90* and start
    jal ROTATE
    jal GO
sleep1:
    addi $v0, $zero, 32 # Keep running by sleeping in 1000 ms
    li $a0, 5000
    syscall
    jal UNTRACK # keep old track
    jal TRACK # and draw new track line
goDOWN:
    addi $a0, $zero, 180 # Marsbot rotates 180*
```

jal UNTRACK

jal ROTATE

sleep2:

addi \$v0,\$zero,32 # Keep running by sleeping in 2000 ms

li \$a0,5000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

ve tam giac

canh_1:

*addi \$a0, \$zero, 150 # Marsbot rotates 270**

jal ROTATE

sleep3:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_2:

*addi \$a0, \$zero, 270 # Marsbot rotates 120**

jal ROTATE

sleep4:

addi \$v0,\$zero,32 # Keep running by sleeping in 2000 ms

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_3:

*addi \$a0, \$zero, 30 # Marsbot rotates 120**

jal ROTATE

sleep5:

addi \$v0, \$zero, 32 # Keep running by sleeping in 2000 ms

li \$a0, 3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

ve hình vuông

tieptuc1:

jal UNTRACK # draw track line

addi \$a0, \$zero, 90 # Marsbot rotates 90 and start*

jal ROTATE

jal GO

sleep6:

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

li \$a0, 5000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_1_hv:

*addi \$a0, \$zero, 90 # Marsbot rotates 270**

jal ROTATE

sleep7:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_2_hv:

*addi \$a0, \$zero, 180 # Marsbot rotates 270**

jal ROTATE

sleep8:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_3_hv:

*addi \$a0, \$zero, 270 # Marsbot rotates 270**

jal ROTATE

sleep9:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_4_hv:

*addi \$a0, \$zero, 360 # Marsbot rotates 270**

jal ROTATE

sleep10:

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

li \$a0, 3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

ve hình ngôi sao

tieptuc2:

jal UNTRACK # draw track line

addi \$a0, \$zero, 90 # Marsbot rotates 90 and start*

jal ROTATE

jal GO

slee11:

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

li \$a0, 8000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_1_sao:

*addi \$a0, \$zero, 198 # Marsbot rotates 270**

jal ROTATE

sleep11:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_2_sao:

*addi \$a0, \$zero, 54 # Marsbot rotates 270**

jal ROTATE

sleep12:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_3_sao:

*addi \$a0, \$zero, 270 # Marsbot rotates 270**

jal ROTATE

sleep13:

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

li \$a0,3000

syscall

jal UNTRACK # keep old track

jal TRACK # and draw new track line

canh_4_sao:

*addi \$a0, \$zero, 126 # Marsbot rotates 270**

jal ROTATE

sleep14:

addi \$v0,\$zero,32 # Keep running by sleeping in 1000 ms
li \$a0,3000
syscall
jal UNTRACK # keep old track
jal TRACK # and draw new track line

canh_5_sao:

*addi \$a0, \$zero, 343 # Marsbot rotates 270**
jal ROTATE

sleep15:

addi \$v0,\$zero,32 # Keep running by sleeping in 1000 ms
li \$a0,3000
syscall
jal UNTRACK # keep old track
jal TRACK # and draw new track line

tieptuc3:

jal UNTRACK # draw track line
addi \$a0, \$zero, 90 # Marsbot rotates 90 and start*
jal ROTATE
jal GO

slee16:

addi \$v0,\$zero,32 # Keep running by sleeping in 1000 ms
li \$a0,2000
syscall
jal UNTRACK # keep old track
jal TRACK # and draw new track line

end_main:

jal STOP

li \$v0, 10

syscall

GO:

li \$at, MOVING # change MOVING port

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

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

jr \$ra

STOP:

li \$at, MOVING # change MOVING port to 0

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

jr \$ra

TRACK:

li \$at, LEAVETRACK # change LEAVETRACK port

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

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

jr \$ra

UNTRACK:

li \$at, LEAVETRACK # change LEAVETRACK port to 0

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

jr \$ra

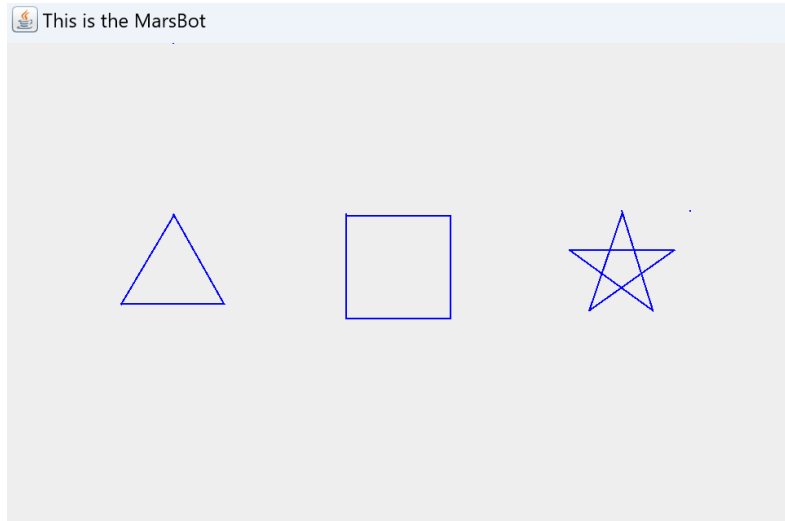
ROTATE:

li \$at, HEADING # change HEADING port

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

jr \$ra

- Kết quả:



→ Kết quả đúng với lý thuyết.

Assignment 2:

- Code:

```
.eqv KEY_CODE 0xFFFF0004    # Mã ASCII từ bàn phím, 1 byte

.eqv KEY_READY 0xFFFF0000    # =1 nếu có mã ký tự mới, tự động xóa sau khi
lw

.eqv DISPLAY_CODE 0xFFFF000C # Mã ASCII để hiển thị, 1 byte

.eqv DISPLAY_READY 0xFFFF0008 # =1 nếu màn hình đã sẵn sàng, tự động
xóa sau khi sw

.text

li $k0, KEY_CODE    # Địa chỉ của KEY_CODE

li $k1, KEY_READY    # Địa chỉ của KEY_READY

li $s0, DISPLAY_CODE # Địa chỉ của DISPLAY_CODE (chứa ký tự cần in ra
màn hình)

li $s1, DISPLAY_READY # Địa chỉ của DISPLAY_READY
```

loop:

nop

WaitForKey:

lw \$t1, 0(\$k1) # Đọc KEY_READY vào \$t1

beq \$t1, \$zero, WaitForKey # Nếu \$t1 == 0 thì tiếp tục chờ

ReadKey:

lw \$t0, 0(\$k0) # Đọc KEY_CODE vào \$t0

WaitForDis:

lw \$t2, 0(\$s1) # Đọc DISPLAY_READY vào \$t2

beq \$t2, \$zero, WaitForDis # Nếu \$t2 == 0 thì tiếp tục chờ

Kiemtra:

KiemTraE:

beq \$t3, 1, KiemTraX

beq \$t0, 101, Co

KiemTraX:

beq \$t3, 2, KiemTraI

beq \$t0, 120, Co

KiemTraI:

beq \$t3, 3, KiemTraT

beq \$t0, 105, Co

KiemTraT:

beq \$t3, 4, Encrypt2

beq \$t0, 116, Co

Encrypt:

addi \$t3, \$zero, 0

Encrypt2:

ChuHoa:

bgt \$t0, 90, ChuThuong

blt \$t0, 65, ChuThuong

addi \$t0, \$t0, 32

j ShowKey

ChuThuong:

bgt \$t0, 122, ChuSo

blt \$t0, 97, ChuSo

addi \$t0, \$t0, -32

j ShowKey

ChuSo:

bgt \$t0, 57, Khac

blt \$t0, 48, Khac

j ShowKey

Khac:

addi \$t0, \$zero, 42

ShowKey:

sw \$t0, 0(\$s0) # Hiển thị ký tự

nop

beq \$t3, 4, Exit

j loop

Co:

addi \$t3, \$t3, 1

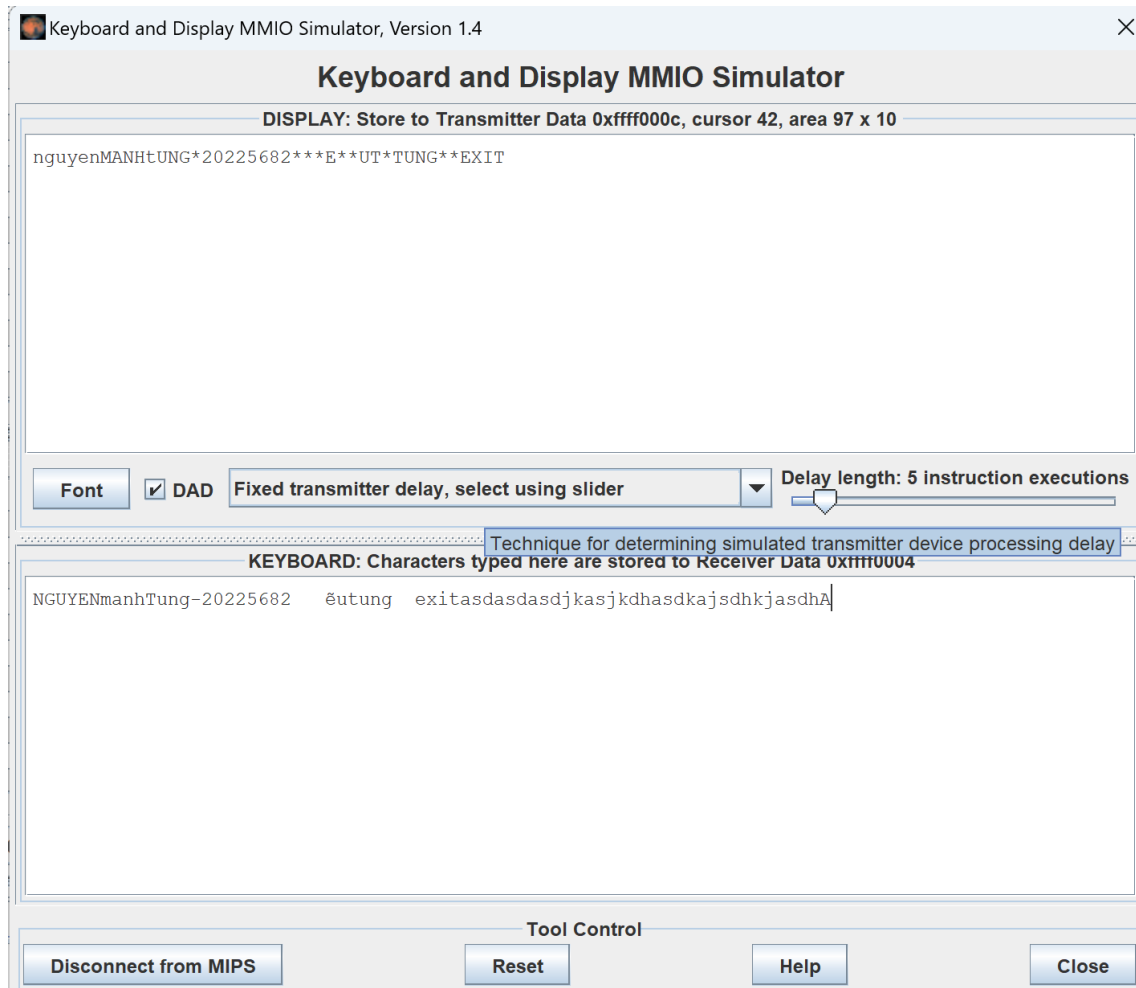
j Encrypt2

Exit:

li \$v0, 10

syscall

- Kết quả:



→ Kết quả đúng với lý thuyết.

Assignment 3:

- Code:

```
.eqv KEY_CODE 0xFFFF0004
.eqv KEY_READY 0xFFFF0000
.eqv DISPLAY_CODE 0xFFFF000C
.eqv DISPLAY_READY 0xFFFF0008
.eqv MOVING 0xFFFF8050
.eqv LEAVETRACK 0xFFFF8020
.eqv HEADING 0xFFFF8010

.text

    li $k0, KEY_CODE
    li $k1, KEY_READY
    li $s0, DISPLAY_CODE
    li $s1, DISPLAY_READY
    li $t3, 0

loop:
    nop

WaitForKey:
    lw $t1, 0($k1)
    beq $t1, $zero, WaitForKey

ReadKey:
    lw $t0, 0($k0)

WaitForDis:
    lw $t2, 0($s1)
    beq $t2, $zero, WaitForDis
```

```
sw $t0, 0($s0)
nop
li $t4, 32
beq $t0, $t4, ToggleMove
li $t4, 87
beq $t0, $t4, MoveUp
li $t4, 119
beq $t0, $t4, MoveUp
li $t4, 83
beq $t0, $t4, MoveDown
li $t4, 115
beq $t0, $t4, MoveDown
li $t4, 65
beq $t0, $t4, MoveLeft
li $t4, 97
beq $t0, $t4, MoveLeft
li $t4, 68
beq $t0, $t4, MoveRight
li $t4, 100
beq $t0, $t4, MoveRight
```

```
j loop
```

ToggleMove:

```
beq $t3, $zero, StartMoving
j StopMoving
```

StartMoving:

li \$at, LEAVETRACK

li \$v0, 1

sb \$v0, 0(\$at)

li \$at, MOVING

sb \$v0, 0(\$at)

li \$t3, 1

j loop

StopMoving:

li \$at, LEAVETRACK

sb \$zero, 0(\$at)

li \$at, MOVING

sb \$zero, 0(\$at)

li \$t3, 0

j loop

MoveUp:

li \$a0, 0

j SetHeading

MoveDown:

li \$a0, 180

j SetHeading

MoveLeft:

li \$a0, 270

j SetHeading

MoveRight:

li \$a0, 90

SetHeading:

li \$at, HEADING

sw \$a0, 0(\$at)

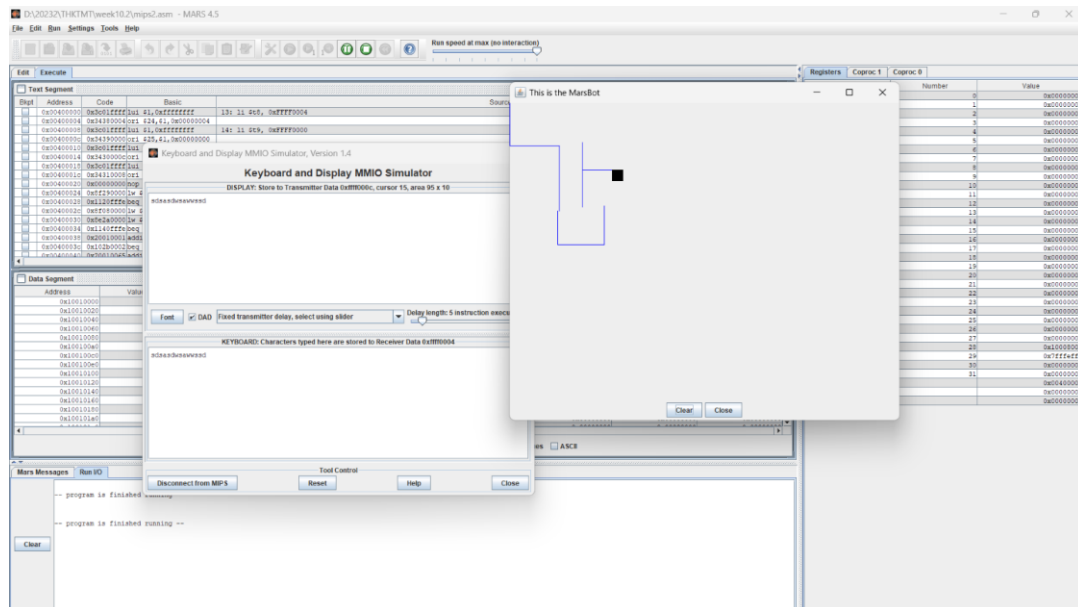
j loop

End:

li \$v0, 10

syscall

- Kết quả:



➔ Kết quả đúng với lý thuyết.