

ĐẠI HỌC BÁCH KHOA HÀ NỘI
TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG



BÁO CÁO
Bài tập thực hành tuần 10
Học phần: Thực hành kiến trúc máy tính

Giảng viên hướng dẫn: Lê Bá Vui

Sinh viên thực hiện: Phạm Huy Cảnh - 20194490

Mã lớp: 130938

Hà Nội, tháng 6 năm 2022

Mã nguồn: <https://drive.google.com/drive/folders/1Jz6fsTlDVlcEN6UZIASLjXU19-ztPcUE?usp=sharing>

1. Bài 1: Hiển thị hai số cuối của mã số sinh viên

The screenshot shows the Mars 4.5 MIPS simulator interface. On the left, the assembly code for `Assignment1.asm` is displayed:

```

1 .eqv SEVENSEG_LEFT 0xFFFF0010      # Dia chi cua den led 7 doan trai.
2 jal SHOW_7SEG_LEFT                # Bit 0 = doan a; # Bit 1 = doan b; ...
3 li $a0, 0x3F                     # set value for segments
4 jal SHOW_7SEG_RIGHT               # Bit 7 = dau.
5 li $a0, 0x6F                     # set value for segments
6 jal SHOW_7SEG_RIGHT               # show
7 li $v0, 10                         # dia chi cua den led 7 doan phai
8 syscall
9 endmain:
10 #_____________________________________
11 # Function SHOW_7SEG_LEFT : turn on/off the 7seg
12 # param[in] $a0 value to show
13 # remark $t0 changed
14 SHOW_7SEG_LEFT:
15 li $t0, SEVENSEG_LEFT            # assign port's address
16 sb $a0, 0($t0)                  # assign new value
17 jr $ra
18 #_____________________________________
19 # Function SHOW_7SEG_RIGHT : turn on/off the 7seg
20 # param[in] $a0 value to show
21 # remark $t0 changed
22 SHOW_7SEG_RIGHT:
23 li $t0, SEVENSEG_RIGHT           # assign port's address
24 sb $a0, 0($t0)                  # assign new value
25 jr $ra
26 #_____________________________________
27
28
29
30
31
32

```

The digital lab simulation window in the center shows the number "8.8" on a seven-segment display. The registers window on the right shows the following values:

Name	Number	Value
\$zero	0	0x00000000
\$at	1	0x00000000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$t0	6	0x00000000
\$t1	7	0x00000000
\$t2	8	0x00000000
\$t3	9	0x00000000
\$t4	a	0x00000000
\$t5	b	0x00000000
\$t6	c	0x00000000
\$t7	d	0x00000000
\$t8	e	0x00000000
\$t9	f	0x00000000
\$gp	28	0x00000000
\$sp	29	0x7fffffefff
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x00040000
hi		0x00000000
lo		0x00000000

The Mars Messages window at the bottom shows the message "Line: 32 Column: 2 ✓ Show Line Numbers".

2. Bài 2: Nhập vào một số nguyên, in ra hai số cuối của số nguyên đó

The screenshot shows the Mars 4.5 MIPS simulator interface. On the left, the assembly code for `Assignment2.asm` is displayed:

```

1 .eqv SEVENSEG_LEFT 0xFFFF0011      # Dia chi cua den led 7 doan trai.
2 # Bit 0 = doan a; # Bit 1 = doan b; ...
3 .eqv SEVENSEG_RIGHT 0xFFFF0010      # Dia chi cua den led 7 doan phai
4 .data
5 message: .asciz "Nhap vao mot so nguyen: "
6
7 .text
8 main:
9 li $v0, 4
10 la $a0, message
11 syscall
12 li $v0, 5
13 syscall
14 move $s0, $v0
15 li $t2, 10
16 div $s0, $t2
17 mfhi $t1
18 case0r: bne $t1, 0, case1r
19 li $a0, 0x3F
20 jal SHOW_7SEG_RIGHT
21 j defaultr
22 case1r: bne $t1, 1, case2r
23 li $a0, 0x6F
24 jal SHOW_7SEG_RIGHT
25 j defaultr
26 case2r: bne $t1, 2, case3r

```

The digital lab simulation window in the center shows the number "8.8" on a seven-segment display. The registers window on the right shows the following values:

Name	Number	Value
\$zero	0	0
\$at	1	-65536
\$v0	2	10
\$v1	3	0
\$a0	4	102
\$a1	5	0
\$t0	6	0
\$t1	7	0
\$t2	8	-65519
\$t3	9	4
\$t4	a	10
\$t5	b	0
\$t6	c	0
\$t7	d	0
\$t8	e	0
\$t9	f	0
\$gp	27	0
\$sp	28	268468224
\$fp	29	2147479548
\$ra	30	0
pc	31	4194660
hi		4194772
lo		4

The Mars Messages window at the bottom shows the message "Nhap vao mot so nguyen: 42" and "-- program is finished running --".

3. Bài 3: Nhập vào một ký tự, in ra màn hình hai số cuối mã ASCII của ký tự đó

```

File Edit Run Settings Tools Help
Run speed at max (no interaction)

Edit Execute
HomeAssignment3.asm HomeAssignment4.asm Assignment1.asm Assignment2.asm Assignment3.asm
1 .eqv SEVENSEG_LEFT 0xFFFFF0011 # Dia chi cua den led 7 doan trai.
2 .eqv SEVENSEG_RIGHT 0xFFFFF0010 # Bit 0 = doan a; # Bit 1 = doan b; ...
3 .eqv SEVENSEG_MESSAGE 0x00000000 # Bit 7 = dau .
4 .data
5 .data message:.asciiz "Nhap vao mot ky tu: "
6
7 .text
8 main:
9     li      $v0, 4
10    la     $a0, message
11    syscall
12
13    li      $v0, 12
14    syscall
15
16    move   $s0, $v0
17    li      $t1, -1
18 For:   addi   $t1, $t1, 1
19    beq   $t1, $t1, EndFor
20    j      For
21 EndFor:
22    move   $s0, $t1
23    li      $t2, 10
24    div    $s0, $t2
25    mfhi   $t1
26 case0r: bne   $t1, 0, caseir
Line: 24 Column: 14 ✓ Show Line Numbers
Mars Messages Run I/O
Reset: reset completed.
Nhap vao mot ky tu: ?
-- program is finished running --

```

4. Bài 4: Hiển thị bàn cờ vua

```

File Edit Run Settings Tools Help
Run speed at max (no interaction)

Edit Execute
HomeAssignment2.asm HomeAssignment3.asm HomeAssignment4.asm Assignment1.asm Assignment2.asm
1 .eqv MONITOR_SCREEN 0x10010000
2 .eqv RED 0x00FF0000
3 .eqv GREEN 0x0000FF00
4 .eqv BLUE 0x000000FF
5 .eqv WHITE 0x00FFFFFF
6 .eqv YELLOW 0x00FFFF00
7
8 .text
9     li      $k0, MONITOR_SCREEN
10    li      $s0, 2
11    li      $t0, -1      # Khoi tao j
12 For1:  addi   $t0, $t0, 1
13    beq   $t0, $t0, 1
14    li      $t1, -1      # Khoi tao i
15 For2:  addi   $t1, $t1, 1
16    beq   $t1, $t1, 1
17    div    $t0, $s0
18    mfhi   $t2
19    div    $t1, $s0
20    mfhi   $t3
21    bne   $t2, 0, Tsugil
22    bne   $t3, 0, For2
23    j      Tsugil
24 Tsugil: beq   $t0, 0, For2
25 Tsugil2: sll   $s1, $t0, 3
Line: 34 Column: 8 ✓ Show Line Numbers
Mars Messages Run I/O
-- program is finished running (dropped off bottom) --
-- program is finished running (dropped off bottom) --
-- program is finished running (dropped off bottom) --

```

5. Bài 5: In hình viền đỏ, nền xanh lá

The screenshot shows the Mars Simulation Environment interface. On the left, the assembly code for 'Assignment5.asm' is displayed:

```
1 .eqv MONITOR_SCREEN 0x10010000
2 .eqv RED 0x00FF0000
3 .eqv GREEN 0x0000FF00
4 .data
5     x1: .asciz "Nhập x1: "
6     y1: .asciz "Nhập y1: "
7     x2: .asciz "Nhập x2: "
8     y2: .asciz "Nhập y2: "
9     error1: .asciz "Error: x2 phai khac x1. Moi nhap lai"
10    error2: .asciz "Error: y2 phai khac y1. Moi nhap lai"
11 .text
12    li $K0, MONITOR_SCREEN
13
14    li $V0, 4
15    la $A0, x1
16    syscall
17    li $V0, 5
18    syscall
19    move $S0, $V0
20
21    li $V0, 4
22    la $A0, y1
23    syscall
24    li $V0, 5
25    syscall
```

The code initializes monitor screen addresses for RED and GREEN colors, defines data for coordinates, and handles user input for x1, y1, x2, and y2. It then performs four system calls to draw rectangles at the specified coordinates.

In the center, the 'Bitmap Display' window shows a black square with a green rectangle inside it, which has a red border. The display settings are set to 8x8 pixels and 512x512 pixels.

On the right, the 'Mars Messages' window displays the output of the program:

```
-- program is finished running --
Nhập x1: 34
Nhập y1: 52
Nhập x2: 12
Nhập y2: 7
-- program is finished running --
```

At the bottom right, the 'Tool Control' buttons include 'Disconnect from MIPS', 'Reset', 'Help', and 'Close'.