Laboratory Session 2

Testing and Branching

1. **MIPS assembler directives**

2. **Pseudo-instructions**

The real instructions work of “li $t0, -5”:

lui $1, -1

ori $8, $1, -5

The real instructions work of “li $t0, 0xaabbccdd”:

lui $1, -21829

ori $8, $1, -13091

3. **Branching**

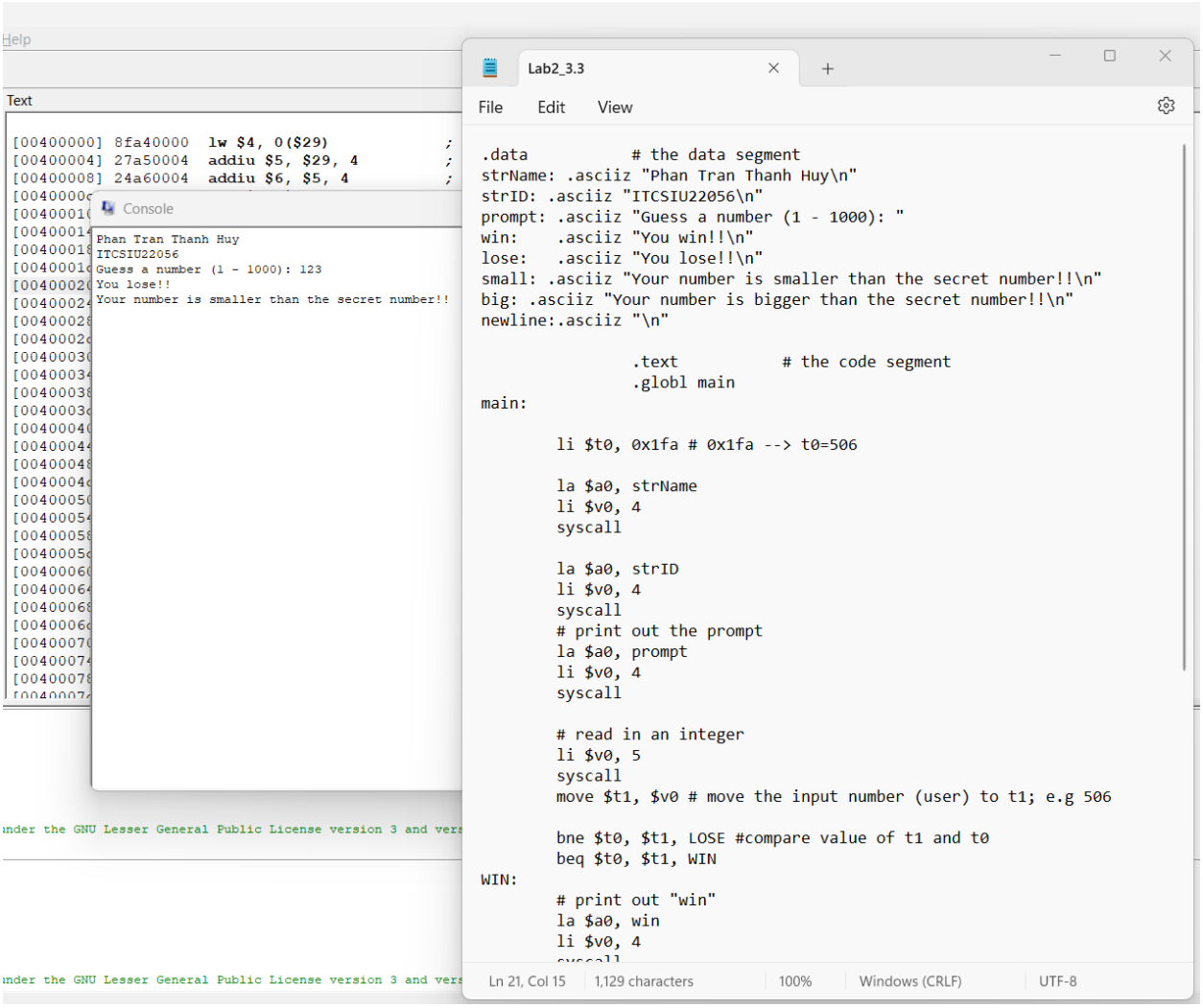
3.1

The secret number is: 506 (0x1FA)

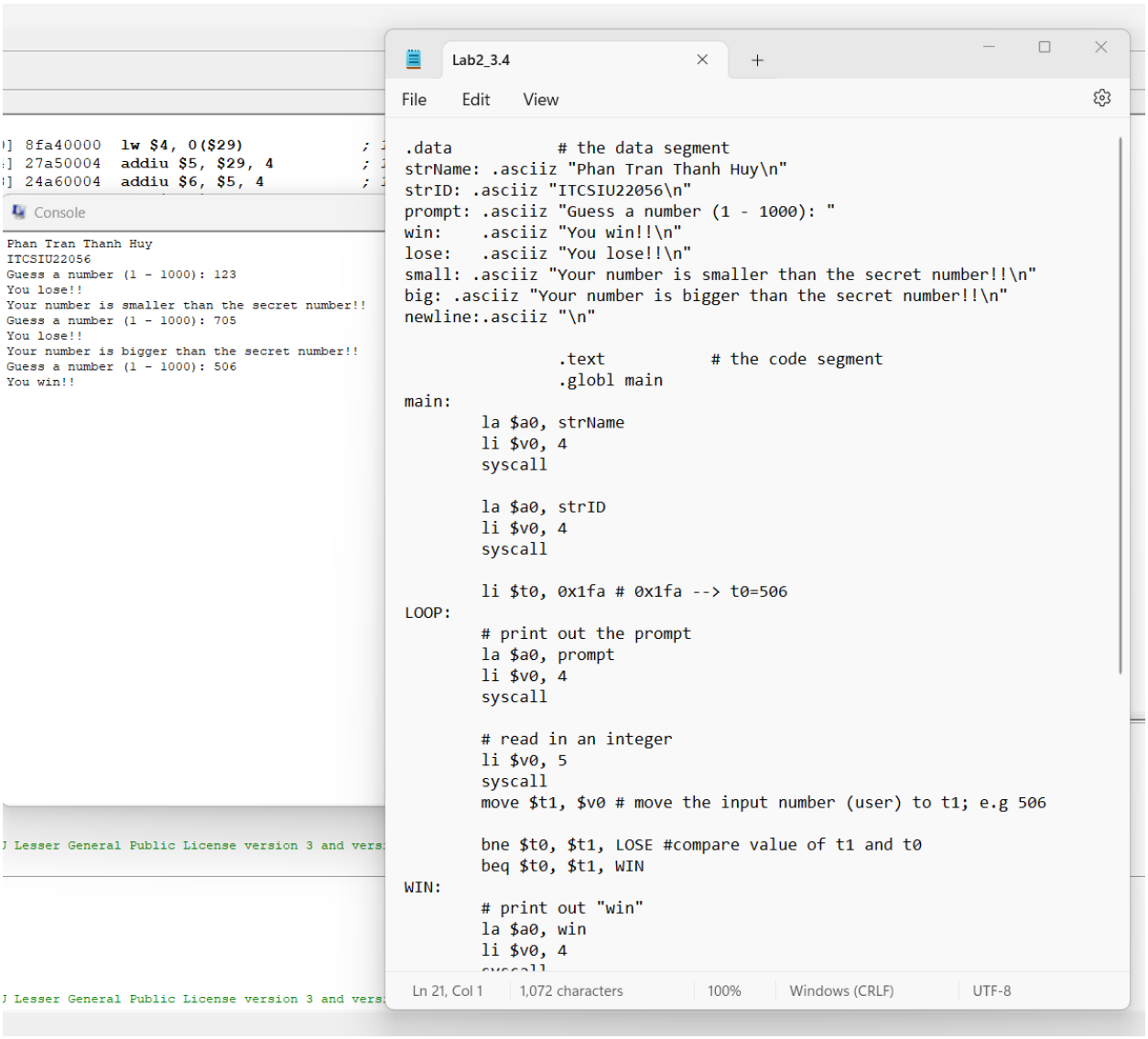
3.2

I suppose that deleting “jr $ra” in the WIN label can run the LOSE label after the WIN label.

3.3

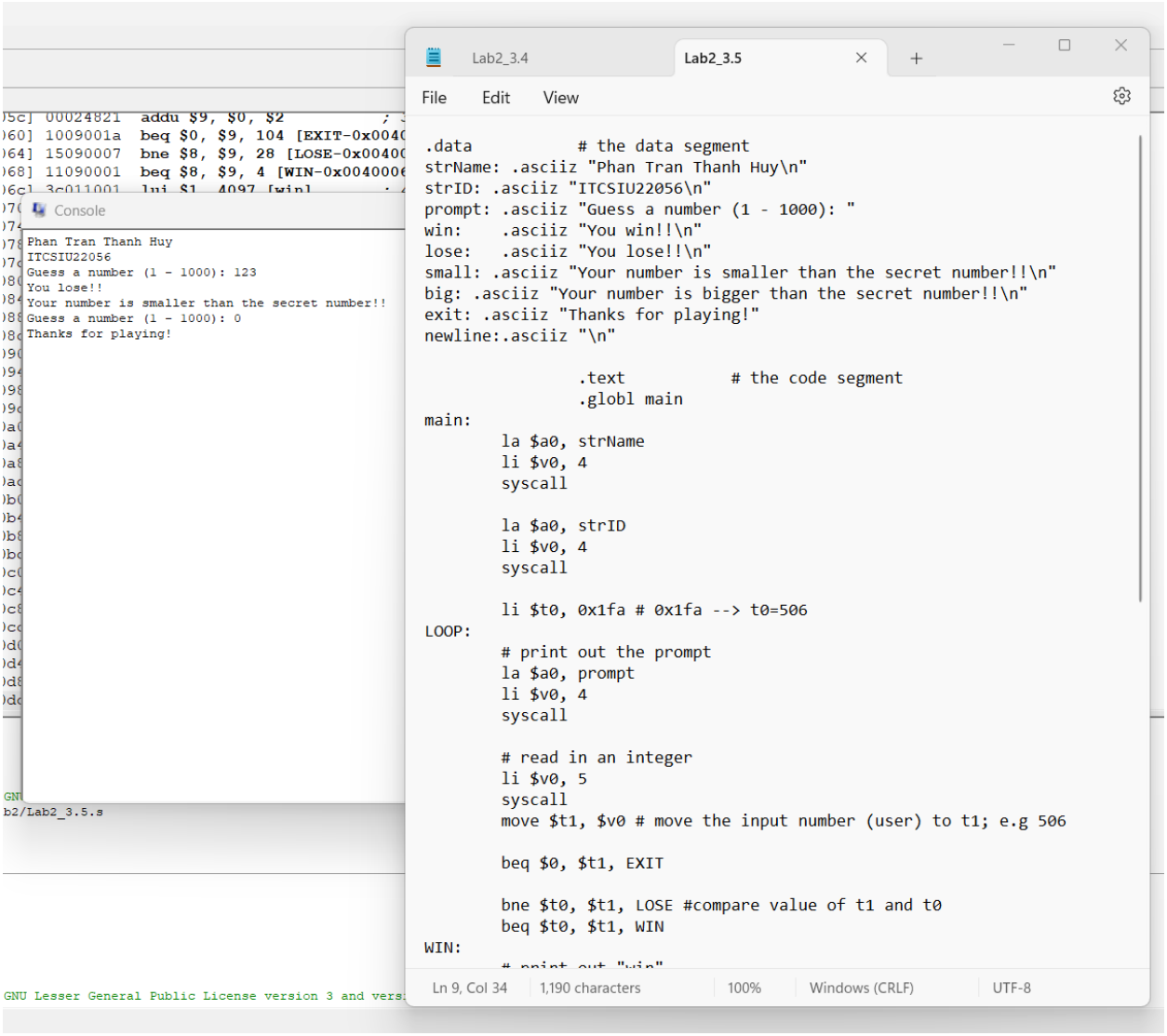

Help
Text
[00400000] 8fa40000 lw $4, 0($29) ;
[00400004] 27a50004 addiu $5, $29, 4 ;
[00400008] 24a60004 addiu $6, $5, 4 ;
Console
Phan Tran Thanh Huy
ITCSIU22056
Guess a number (1 - 1000): 123
You lose!!
Your number is smaller than the secret number!!
under the GNU Lesser General Public License version 3 and vers
Lab2_3.3
File Edit View
.data # the data segment
strName: .asciiz "Phan Tran Thanh Huy\n"
strID: .asciiz "ITCSIU22056\n"
prompt: .asciiz "Guess a number (1 - 1000): "
win: .asciiz "You win!!\n"
lose: .asciiz "You lose!!\n"
small: .asciiz "Your number is smaller than the secret number!!\n"
big: .asciiz "Your number is bigger than the secret number!!\n"
newline:.asciiz "\n"
.text # the code segment
.globl main
main:
li $t0, 0x1fa # 0x1fa --> t0=506
la $a0, strName
li $v0, 4
syscall
la $a0, strID
li $v0, 4
syscall
print out the prompt
la $a0, prompt
li $v0, 4
syscall
read in an integer
li $v0, 5
syscall
move $t1, $v0 # move the input number (user) to t1; e.g 506
bne $t0, $t1, LOSE #compare value of t1 and t0
beq $t0, $t1, WIN
WIN:
print out "win"
la $a0, win
li $v0, 4
Ln 21, Col 15
1,129 characters
100%
Windows (CRLF)
UTF-8

3.4

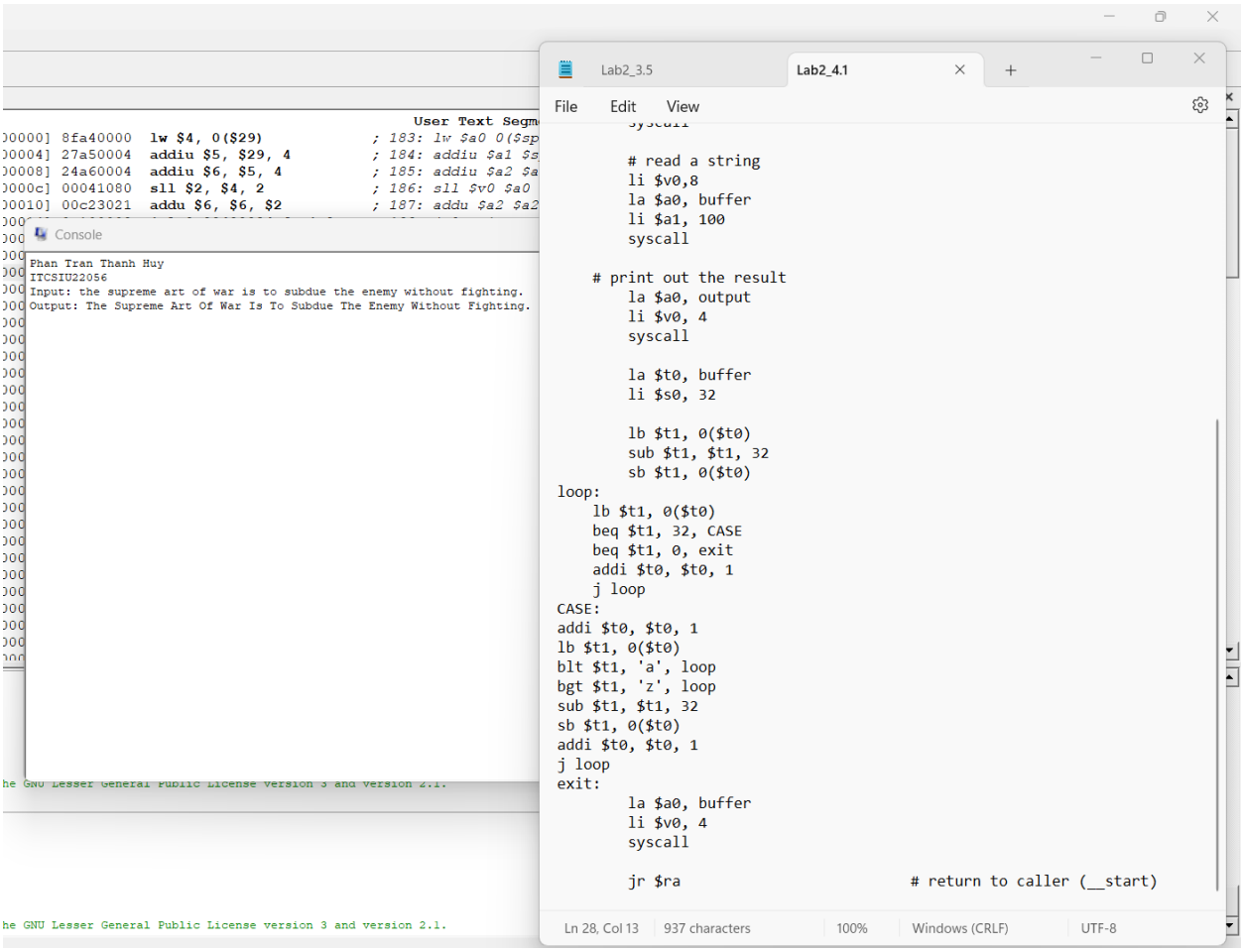


3.5

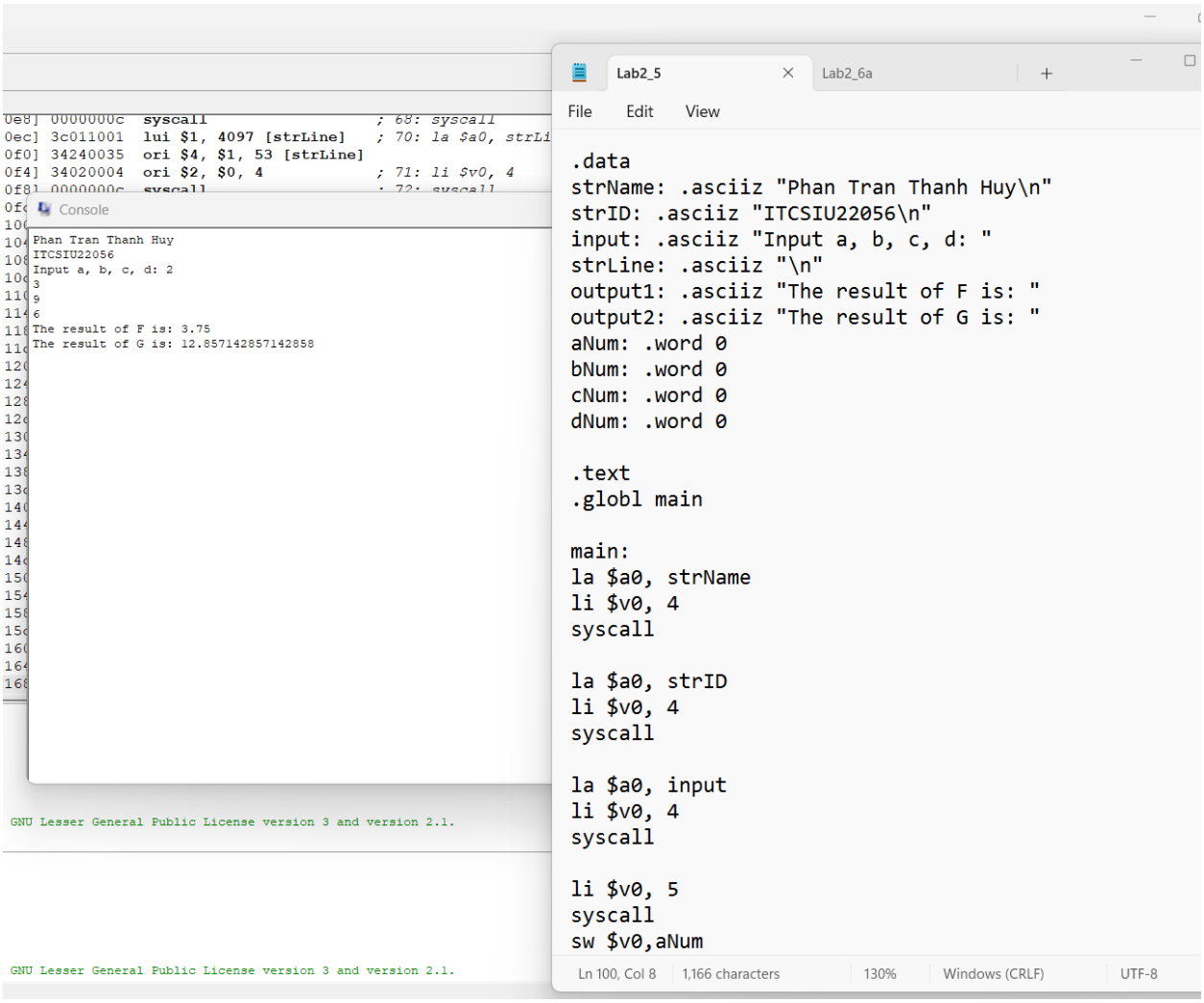
‘0’ is the **flag** character.


Lab2_3.4
Lab2_3.5
File
Edit
View
.data # the data segment
strName: .asciiz "Phan Tran Thanh Huy\n"
strID: .asciiz "ITCSIU22056\n"
prompt: .asciiz "Guess a number (1 - 1000): "
win: .asciiz "You win!!\n"
lose: .asciiz "You lose!!\n"
small: .asciiz "Your number is smaller than the secret number!!\n"
big: .asciiz "Your number is bigger than the secret number!!\n"
exit: .asciiz "Thanks for playing!"
newline:.asciiz "\n"
.text # the code segment
.globl main
main:
la $a0, strName
li $v0, 4
syscall
la $a0, strID
li $v0, 4
syscall
li $t0, 0x1fa # 0x1fa --> t0=506
LOOP:
print out the prompt
la $a0, prompt
li $v0, 4
syscall
read in an integer
li $v0, 5
syscall
move $t1, $v0 # move the input number (user) to t1; e.g 506
beq $0, $t1, EXIT
bne $t0, $t1, LOSE #compare value of t1 and t0
beq $t0, $t1, WIN
WIN:
Ln 9, Col 34
1,190 characters
100%
Windows (CRLF)
UTF-8
Console
Phan Tran Thanh Huy
ITCSIU22056
Guess a number (1 - 1000): 123
You lose!!
Your number is smaller than the secret number!!
Guess a number (1 - 1000): 0
Thanks for playing!
b2/Lab2_3.5.s
GNU Lesser General Public License version 3 and vers

4. String

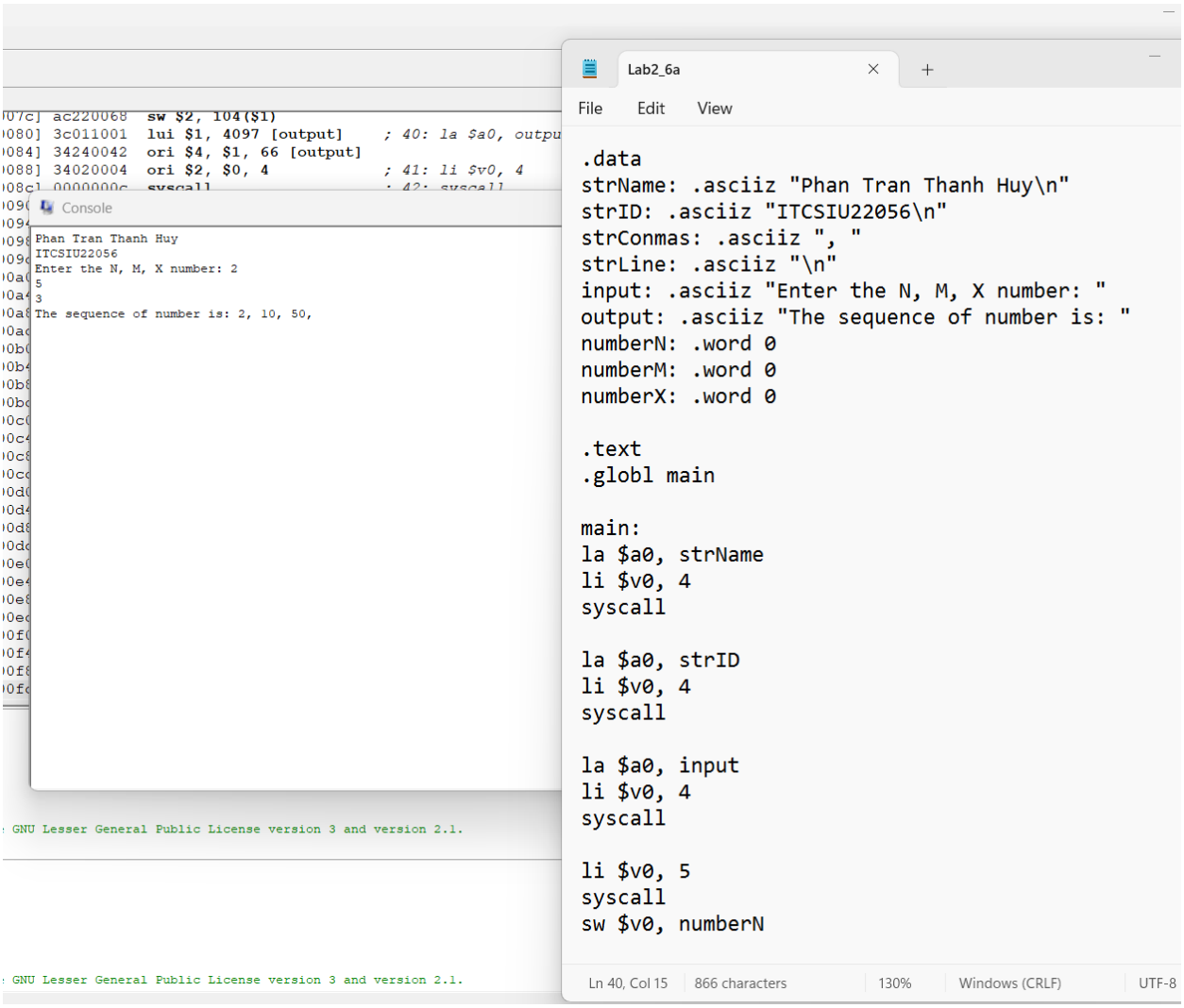

User Text Segm
00000] 8fa40000 lw $4, 0($29) ; 183: lw $a0 0($sp
00004] 27a50004 addiu $5, $29, 4 ; 184: addiu $a1 $s
00008] 24a60004 addiu $6, $5, 4 ; 185: addiu $a2 $a
0000c] 00041080 sll $2, $4, 2 ; 186: sll $v0 $a0
00010] 00c23021 addu $6, $6, $2 ; 187: addu $a2 $a2
Console
Phan Tran Thanh Huy
ITCSIU22056
Input: the supreme art of war is to subdue the enemy without fighting.
Output: The Supreme Art Of War Is To Subdue The Enemy Without Fighting.
he GNU Lesser General Public License version 3 and version 2.1.
he GNU Lesser General Public License version 3 and version 2.1.
Lab2_3.5
Lab2_4.1
File
Edit
View
read a string
li $v0,8
la $a0, buffer
li $a1, 100
syscall
print out the result
la $a0, output
li $v0, 4
syscall
la $t0, buffer
li $s0, 32
lb $t1, 0($t0)
sub $t1, $t1, 32
sb $t1, 0($t0)
loop:
lb $t1, 0($t0)
beq $t1, 32, CASE
beq $t1, 0, exit
addi $t0, $t0, 1
j loop
CASE:
addi $t0, $t0, 1
lb $t1, 0($t0)
blt $t1, 'a', loop
bgt $t1, 'z', loop
sub $t1, $t1, 32
sb $t1, 0($t0)
addi $t0, $t0, 1
j loop
exit:
la $a0, buffer
li $v0, 4
syscall
jr $ra # return to caller (__start)
Ln 28, Col 13
937 characters
100%
Windows (CRLF)
UTF-8

5.

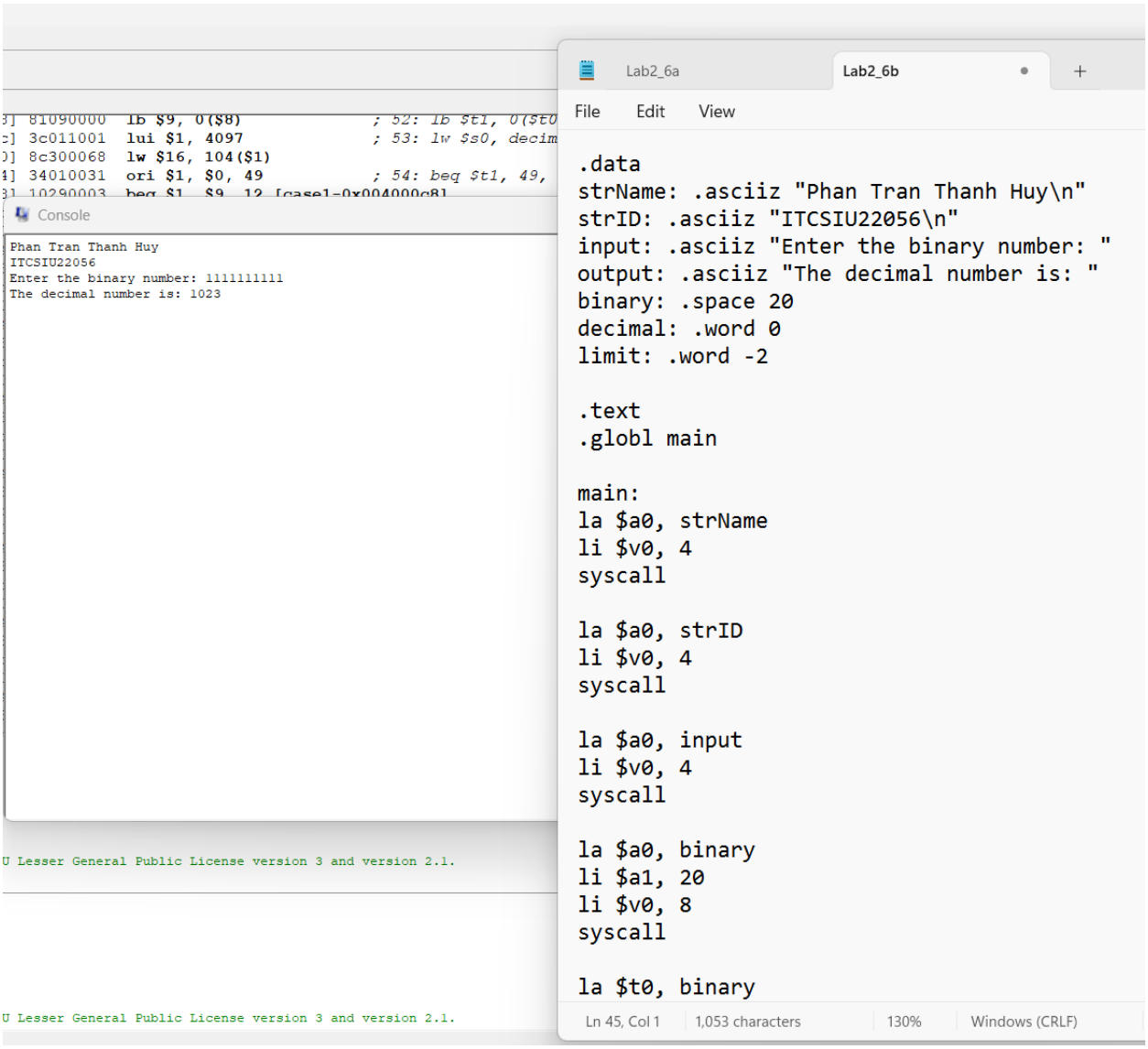

0e8] 0000000c syscall ; 68: syscall
0ec] 3c011001 lui $1, 4097 [strLine] ; 70: la $a0, strLi
0f0] 34240035 ori $4, $1, 53 [strLine]
0f4] 34020004 ori $2, $0, 4 ; 71: li $v0, 4
Console
Phan Tran Thanh Huy
ITCSIU22056
Input a, b, c, d: 2
3
9
6
The result of F is: 3.75
The result of G is: 12.857142857142858
GNU Lesser General Public License version 3 and version 2.1.
GNU Lesser General Public License version 3 and version 2.1.
Lab2_5
Lab2_6a
File Edit View
.data
strName: .asciiz "Phan Tran Thanh Huy\n"
strID: .asciiz "ITCSIU22056\n"
input: .asciiz "Input a, b, c, d: "
strLine: .asciiz "\n"
output1: .asciiz "The result of F is: "
output2: .asciiz "The result of G is: "
aNum: .word 0
bNum: .word 0
cNum: .word 0
dNum: .word 0
.text
.globl main
main:
la $a0, strName
li $v0, 4
syscall
la $a0, strID
li $v0, 4
syscall
la $a0, input
li $v0, 4
syscall
li $v0, 5
syscall
sw $v0,aNum
Ln 100, Col 8 1,166 characters 130% Windows (CRLF) UTF-8

6.

a/


sw $2, 104($1)
lui $1, 4097 [output] ; 40: la $a0, outpu
ori $4, $1, 66 [output]
ori $2, $0, 4 ; 41: li $v0, 4
Console
Phan Tran Thanh Huy
ITCSIU22056
Enter the N, M, X number: 2
5
3
The sequence of number is: 2, 10, 50,
GNU Lesser General Public License version 3 and version 2.1.
Lab2_6a
File Edit View
.data
strName: .asciiz "Phan Tran Thanh Huy\n"
strID: .asciiz "ITCSIU22056\n"
strConmas: .asciiz ", "
strLine: .asciiz "\n"
input: .asciiz "Enter the N, M, X number: "
output: .asciiz "The sequence of number is: "
numberN: .word 0
numberM: .word 0
numberX: .word 0
.text
.globl main
main:
la $a0, strName
li $v0, 4
syscall
la $a0, strID
li $v0, 4
syscall
la $a0, input
li $v0, 4
syscall
li $v0, 5
syscall
sw $v0, numberN
Ln 40, Col 15
866 characters
130%
Windows (CRLF)
UTF-8

b/


3] 81090000 lb $9, 0($8) ; 52: lb $t1, 0($t0
:] 3c011001 lui $1, 4097 ; 53: lw $s0, decim
)] 8c300068 lw $16, 104($1)
4] 34010031 ori $1, $0, 49 ; 54: beq $t1, 49,
3] 10290003 beq $1, $9, 12 [case1-0x004000c8]
Console
Phan Tran Thanh Huy
ITCSIU22056
Enter the binary number: 1111111111
The decimal number is: 1023
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U Lesser General Public License version 3 and version 2.1.
Lab2_6a
Lab2_6b
File
Edit
View
.data
strName: .asciiz "Phan Tran Thanh Huy\n"
strID: .asciiz "ITCSIU22056\n"
input: .asciiz "Enter the binary number: "
output: .asciiz "The decimal number is: "
binary: .space 20
decimal: .word 0
limit: .word -2
.text
.globl main
main:
la $a0, strName
li $v0, 4
syscall
la $a0, strID
li $v0, 4
syscall
la $a0, input
li $v0, 4
syscall
la $a0, binary
li $a1, 20
li $v0, 8
syscall
la $t0, binary
Ln 45, Col 1
1,053 characters
130%
Windows (CRLF)