## Lab Report

## **ECPE 170 - Computer Systems and Networks - Fall 2015**

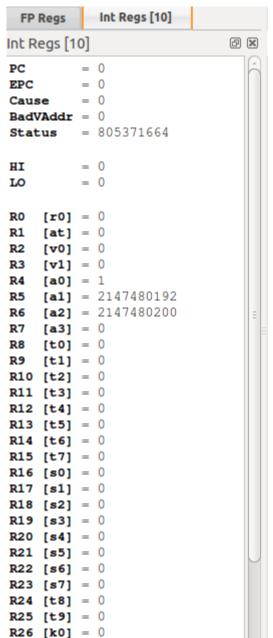
Name: Zhiyun Yan

**Lab Topic:** MIPS Assembly Programming (Basic)

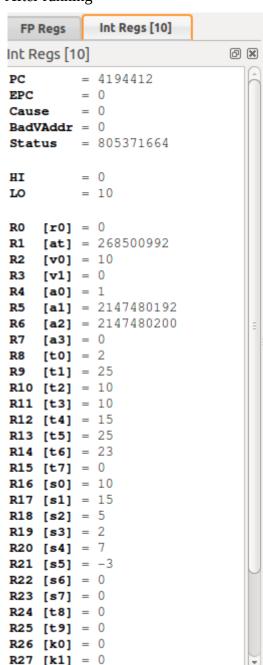
Question(1) Take two screenshots of the MIPS register panel: one before your program runs, and one after your program finishes. Put the register panel in Decimal mode (right-click) so it is easy to see register values.

Answer:

Before running



After running



Question(2) Take two screenshots of the MIPS memory panel (data tab): one before your program runs, and one after your program finishes. Put the memory panel in Decimal mode (right-click), so it is easy to see memory values. In the after-execution capture, **circle the memory location (not register) that contains the final calculated value of Z**.

Answer:

**D27 (1-11** - ∩

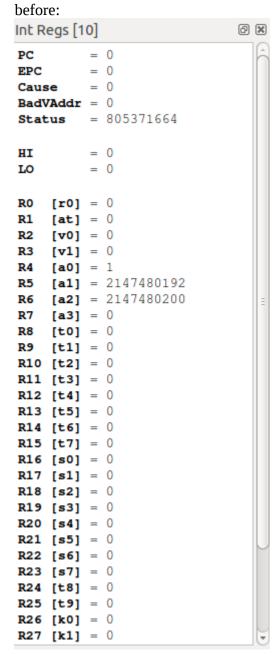
Before

[10000000]..[1003ffff] 00000000

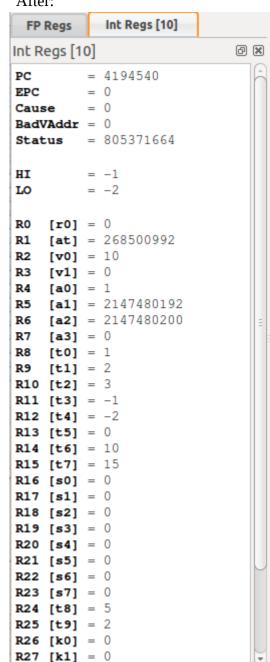
```
User Stack [7ffff27c]..[80000000]
[7ffff27c] 0000000001
[7ffff280]
            2147480447 0000000000 2147483637 2147483619
[7ffff2901
            2147483597 2147483580 2147483528 2147483513
[7fffff2a0]
            2147483460 2147483449 2147483433 2147483410
[7ffff2b0]
            2147483393 2147483375 2147483307 2147483255
[7fffff2c0]
            2147483208 2147483194 2147481881 2147481823
[7ffff2d0]
            2147481771 2147481723 2147481641 2147481590
[7ffff2e0]
            2147481522 2147481428 2147481405 2147481387
            2147481354 2147481345 2147481326 2147481306
[7ffff2f0]
[7ffff3001
            2147481283 2147481266 2147481251 2147481197
            2147481179 2147481150 2147481132 2147481106
[7ffff310]
[7ffff3201
            2147481091 2147481071 2147481063 2147481048
[7ffff330]
            2147481004 2147480987 2147480961 2147480882
[7ffff340]
            2147480864 2147480804 2147480772 2147480762
[7ffff350]
             2147480741 2147480710
                                   2147480699
                                              2147480673
[7ffff360]
             2147480654
                       2147480620
                                   2147480587
                                              2147480562
             2147480524
[7ffff370]
                       2147480506
                                   0000000000 0788529152
[7ffff380]
            1701670760 2038069551
                                  2038069601
                                             1768042338
                                                          home/yzyayzyb/
            1668637300 0796157291 0892416050 1818322527
                                                          tbucket/2015_fa
[7ffff390]
            1667587948 0925984112 1634479920 0791687522
                                                          1_ecpe170/lab10/
[7fffff3a0]
            1953653104 1935748657 1029636205 1920169263
[7fffff3b0]
                                                          part1.asm._=/usr
            1852400175 1937010991 0007170416 1414873432
                                                          /bin/qtspim.XAUT
[7fffff3c0]
            1230131016 0792549716 1701670760 2038069551
                                                          HORITY = /home/yzy
[7ffff3d0]
           2038069601 1479421794 1752462689 1953067631
                                                          ayzyb/.Xauthorit
[7fffff3e01
           1329791097 1414680396 1028477509 1836019303 y . C O L O R T E R M = g n o m
[7ffff3f01
           1702112613 1852403058 1409313889 1146378309 e-terminal.TEXTD
[7ffff4001
[7ffff410]
           1229016399 1380533326 1937059645 1752379250 OMAINDIR = / usr/sh
            0795177569 1633906540 0003106156 1397966156
                                                          are/locale/.LESS
[7ffff420]
 755551201
                       10//02/01/10
                                             1015047705
After:
Data
                                                                                     O X
User data segment [10000000]..[10040000]
[10000000]..[100@ffff] Q0000000
            000000023 000000000 000000000 000000000
[10010010]..[1003fffff] 00000000
User Stack [7ffff27c]..[80000000]
[7fffff27c]
            0000000001
[7ffff280]
            2147480447
                      0000000000 2147483637 2147483619
            2147483597 2147483580 2147483528 2147483513
[7ffff2901
            2147483460 2147483449 2147483433 2147483410
[7ffff2a01
[7ffff2b01
            2147483393 2147483375 2147483307 2147483255
[7ffff2c0]
           2147483208 2147483194 2147481881 2147481823
[7ffff2d0]
            2147481771 2147481723 2147481641 2147481590
[7fffff2e0] 2147481522 2147481428 2147481405 2147481387
[7ffff2f0]
            2147481354 2147481345 2147481326 2147481306
            2147481283 2147481266 2147481251
                                            2147481197
[7ffff3001
[7ffff310]
            2147481179 2147481150
                                 2147481132
                                            2147481106
[7ffff320]
            2147481091
                       2147481071
                                  2147481063
                                            2147481048
[7ffff330]
            2147481004
                       2147480987
                                 2147480961
                                            2147480882
[7ffff340]
            2147480864 2147480804 2147480772
                                            2147480762
[7ffff350]
           2147480741 2147480710 2147480699 2147480673
[7ffff360]
            2147480654 2147480620 2147480587 2147480562
            2147480524 2147480506 0000000000 0788529152
```

Question(3) Take two screenshots of the MIPS register panel: one before your program runs, and one after your program finishes. Put the register panel in Decimal mode (right-click) so it is easy to see register values.

Answer:



After:



Question(4) Take two screenshots of the MIPS memory panel (data tab): one before your program runs, and one after your program finishes. Put the memory panel in Decimal mode (right-click), so it is easy to see memory values. In the after-execution capture, **circle the memory location (not register) that contains the final calculated value of Z**.

Answer:

before:

Data							ð
User data se [10000000] [10010004] [10010010]	0000000010	000][100400 00000000 0000000015	0000000005				
User Stack [	7ffff27c][8	300000001					
[7fffff27c]	00000000001	,					
[7ffff280]	2147480447	0000000000	2147483637	2147483619			
[7ffff290]	2147483597	2147483580	2147483528	2147483513		v .	
[7ffff2a0]	2147483460	2147483449	2147483433	2147483410	D9)	-	
[7ffff2b0]	2147483393	2147483375	2147483307	2147483255		w .	
[7fffff2c0]	2147483208	2147483194	2147481881	2147481823	н :		
[7ffff2d0]	2147481771	2147481723	2147481641	2147481590	( )		
[7fffff2e0]	2147481522	2147481428	2147481405	2147481387	T =	+ .	
[7ffff2f0]	2147481354	2147481345	2147481326	2147481306			
[7ffff300]	2147481283	2147481266	2147481251	2147481197		m .	
[7ffff310]	2147481179	2147481150	2147481132	2147481106	[ > ,		
[7ffff320]	2147481091	2147481071	2147481063	2147481048			
[7ffff330]	2147481004	2147480987	2147480961	2147480882		2 .	
£							
after: Data							Œ
User data sec	gment [100000 [1000ffff] 0	<b>00][100400</b>	00]				
[10010000] [10010010]	-2	0000000010	0000000015	0000000005			
	7ffff27c][8						
[7fffff27c]	00000000001	0000000					
[7ffff280]	2147480447	0000000000	2147483637	2147483619			
[,1111200]	214/40044/	000000000	214/40303/	214/403013			

Question(5) Take a screenshot of the MIPS register panel after your program finishes. Put the register panel in Decimal mode (right-click) so it is easy to see register values. Answer:

. . . . { . . . ) . . . . . . .

. . . . T . . . = . . . + . . .

before: after:

[7ffff290] 2147483597 2147483580 2147483528 2147483513

[7ffff2d0] 2147481771 2147481723 2147481641 2147481590

[7fffff2e0] 2147481522 2147481428 2147481405 2147481387

[7ffff2f0] 2147481354 2147481345 2147481326 2147481306

Data

```
FP Regs
           Int Regs [10]
                             a X
nt Regs [10]
PC
           0
EPC
         = 0
Cause
BadVAddr = 0
Status
       = 805371664
ΗI
         = 0
         = 0
LO
R0
    [r0] = 0
R1
    [at] = 0
    [v0] = 0
R2
R3
    [v1] = 0
R4
    [a0] = 1
R5
    [a1] = 2147480192
    [a2] = 2147480200
R6
    [a3] = 0
R7
    [t0] = 0
R8
R9
    [t1] = 0
R10 [t2] = 0
R11 [t3] = 0
R12 [t4] = 0
R13 [t5] = 0
R14 [t6] = 0
R15 [t7] = 0
R16 [s0] = 0
R17 [s1] = 0
R18 [s2] = 0
R19 [s3] = 0
R20 [s4] = 0
R21 [s5] = 0
R22 [s6] = 0
R23 [s7] = 0
R24 [t8] = 0
R25 [t9] = 0
R26 [k0] = 0
R27 [k1] = 0
```

```
a X
Int Regs [10]
PC
          = 4194428
          = 0
EPC
          = 0
Cause
BadVAddr = 0
         = 805371664
Status
ΗI
          = 0
LO
          = 0
R0
    [r0] = 0
    [at] = 268500992
R1
R2
    [v0] = 10
    [v1] = 0
R3
    [a0] = 1
R4
    [a1] = 2147480192
R5
    [a2] = 2147480200
R6
R7
    [a3] = 0
R8
    [t0] = 10
R9
    [t1] = 10
R10 [t2] = 10
R11 [t3] = 0
R12 [t4] = 10
R13 [t5] = 0
R14 [t6] = 0
R15 [t7] = 0
R16 [s0] = 0
R17 [s1] = 0
R18 [s2] = 0
R19 [s3] = 0
R20 [s4] = 0
R21 [s5] = 0
D22 [a61 - 0
```

Question(6) Take a screenshot of the MIPS memory panel (data tab) after your program finishes. Put the memory panel in Decimal mode (right-click), so it is easy to see memory values. **Circle the memory location (not register) that contains the final calculated values of I and Z**. Answer:

before:

```
User data segment [10000000]..[10040000]
[10000000]..[1000ffff] 00000000
            [100100001
[10010010]..[1003fffff] 00000000
User Stack [7ffff27c]..[80000000]
[7ffff27c] 0000000001
            2147480447 0000000000 2147483637 2147483619
[7ffff280]
[7ffff290]
            2147483597 2147483580 2147483528 2147483513
[7ffff2a0]
            2147483460 2147483449 2147483433 2147483410
                                                         D . . . 9 . . . ) . .
[7ffff2b0]
            2147483393
                       2147483375 2147483307
                                            2147483255
            2147483208 2147483194 2147481881 2147481823
[7fffff2c0]
            2147481771 2147481723 2147481641 2147481590
[7fffff2d0]
           2147481522 2147481428 2147481405 2147481387
[7fffff2e0]
[7ffff2f0] 2147481354 2147481345 2147481326 2147481306
[7fffff300] 2147481283 2147481266 2147481251 2147481197
[7fffff310] 2147481179 2147481150 2147481132 2147481106 [ . . . > . . . ,
[7fffff320] 2147481091 2147481071 2147481063 2147481048
[7fffff330] 2147481004 2147480987 2147480961 2147480882
[7fffff340] 2147480864 2147480804 2147480772 2147480762
[7ffff350]
            2147480741 2147480710 2147480699 2147480673
after:
Data
                                                                                     O X
User data segment [10000000]..[10040000]
[10000000]..[1000ffff]_00000000
            [10010000]
[10010010]..[1003ffff] 00000000
User Stack [7ffff27c]..[80000000]
[7ffff27c] 000000001
           2147480447 0000000000 2147483637 2147483619
[7ffff280]
[7ffff290]
            2147483597 2147483580 2147483528 2147483513
[7fffff2a0]
            2147483460 2147483449 2147483433 2147483410
                                                         D . . . 9
            2147483393 2147483375 2147483307 2147483255
[7ffff2b0]
                                                         . . . .
            2147483208 2147483194 2147481881 2147481823
[7ffff2c0]
            2147481771 2147481723 2147481641 2147481590
[7ffff2d0]
           2147481522 2147481428 2147481405 2147481387
[7ffff2e0]
                                                              . T
[7ffff2f0] 2147481354 2147481345 2147481326 2147481306
[7fffff300] 2147481283 2147481266 2147481251 2147481197
[7ffff310] 2147481179 2147481150 2147481132 2147481106
                                                        [ . . . >
[7fffff320] 2147481091 2147481071 2147481063 2147481048
[7fffff330] 2147481004 2147480987 2147480961 2147480882
          2147480864 2147480804 2147480772 2147480762
[7ffff3401
```

Question(7) Take a screenshot of the MIPS register panel after your program finishes. Put the register panel in Decimal mode (right-click) so it is easy to see register values.

Answer:

before: after:

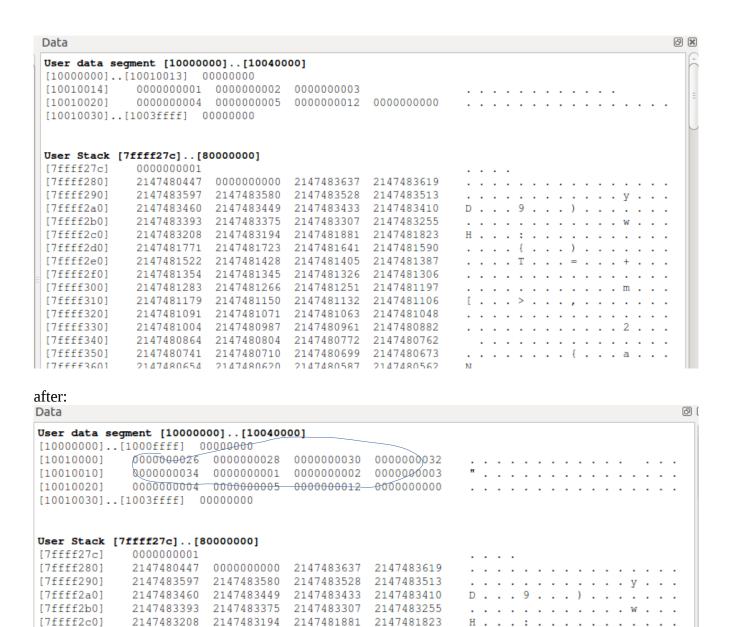
```
Int Regs [10]
                             a X
PC
EPC
         = 0
Cause
         = 0
BadVAddr = 0
Status = 805371664
ΗI
         = 0
         = 0
LO
    [r0] = 0
R0
    [at] = 0
R1
R2
    [\mathbf{v0}] = 0
R3
    [v1] = 0
    [a0] = 1
R4
    [a1] = 2147480192
R6 [a2] = 2147480200
R7
   [a3] = 0
R8 [t0] = 0
R9 [t1] = 0
R10 [t2] = 0
R11 [t3] = 0
R12 [t4] = 0
R13 [t5] = 0
R14 [t6] = 0
R15 [t7] = 0
R16 [s0] = 0
R17 [s1] = 0
R18 [s2] = 0
R19 [s3] = 0
R20 [s4] = 0
D21 [e51 — ∩
```

```
FP Regs
          Int Regs [10]
nt Regs [10]
                             a x
PC
         = 4194456
EPC
         = 0
Cause
         = 0
BadVAddr = 0
Status
         = 805371664
ΗI
         = 0
LO
         = 26
   [r0] = 0
R0
R1
    [at] = 1
R2
    [v0] = 10
   [v1] = 0
   [a0] = 1
R4
   [a1] = 2147480192
R5
R6
   [a2] = 2147480200
R7
   [a3] = 0
R8 [t0] = 268500992
R9 [t1] = 268501012
R10 [t2] = -4
R11 [t3] = 268500992
R12 [t4] = 268501028
R13 [t5] = 19
R14 [t6] = 26
R15 [t7] = 5
R16 [s0] = 12
R17 [s1] = 0
R18 [s2] = 0
R19 [s3] = 0
R20 [s4] = 0
R21 [s5] = 0
R22 [s61 = 0]
```

Question(8) Take a screenshot of the MIPS memory panel (data tab) after your program finishes. Put the memory panel in Decimal mode (right-click), so it is easy to see memory values. **Circle the final values of array A.** 

Answer:

before:



Question(9) Take a screenshot of the MIPS memory panel (data tab) after your program finishes. Put the memory panel in Hex mode (right-click), since Decimal mode will not allow us to distinguish between bytes. **Circle two things: the final value of the pointer 'result' in memory, and the corresponding location that result points to.** Does that location in memory contain the ASCII code for the character 'e'? (*If not, you had better check your work!*)

Answer:

[7ffff2d0]

[7ffff2e0]

[7ffff2f0]

2147481354 2147481345 2147481326 2147481306

User data segment [100		0040000]		
[10010000] 0000000a	00000000	00000000	00000000	
[10010010][10010107] [10010108] 72694620				Foirst m
[10010110] 68637461		72646461	20737365	atch at address
[10010120] (6f4e2)000		66206863	646e756f	
[10010130] 54200020	6d206568	68637461	20676e69	
[10010140] 72616863	65746361	73692072	00000020	character is
[10010150][1003ffff]	00000000			
User Stack [7ffff27c].	. [80000000]	l		
[7ffff27c] 00000001				
[7ffff280] 7ffff37f		7ffffff5	7fffffe3	
[7ffff290] 7fffffcd		7fffff88	7ffffff79	
[7ffff7-0] 7fffff//	7444450	1444450	7444410	D 0 /