

เริ่มต้น text data & int regs อยู่ในสภาพ default

| FP Regs | nt Regs [10] | Data | Text |
|---------------|--------------|---|------|
| Int Regs [10] | | Text | |
| PC | = 0 | | |
| EPC | = 0 | | |
| Cause | = 0 | | |
| BadVAddr | = 0 | | |
| Status | = 805371664 | | |
| HI | = 0 | | |
| LO | = 0 | | |
| R0 [r0] | = 0 | | |
| R1 [at] | = 0 | | |
| R2 [v0] | = 0 | | |
| R3 [v1] | = 0 | | |
| R4 [a0] | = 1 | | |
| R5 [a1] | = 2147481624 | | |
| R6 [a2] | = 2147481632 | | |
| 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 | | |
| R21 [s5] | = 0 | | |
| R22 [s6] | = 0 | | |
| R23 [s7] | = 0 | | |
| R24 [t8] | = 0 | | |
| R25 [t9] | = 0 | | |
| R26 [k0] | = 0 | | |
| R27 [k1] | = 0 | | |
| | | User Text Segment [00400000]..[00440000] [00400000] 8fa40000 lw \$4, 0(\$29) ; 183: lw \$a0 0(\$sp) # argc [00400004] 27a50004 addiu \$5, \$29, 4 ; 184: addiu \$a1 \$sp 4 # argv [00400008] 24a60004 addiu \$6, \$5, 4 ; 185: addiu \$a2 \$a1 4 # envp [0040000c] 00041080 sll \$2, \$4, 2 ; 186: sll \$v0 \$a0 2 [00400010] 00c23021 addu \$6, \$6, \$2 ; 187: addu \$a2 \$a2 \$v0 [00400014] 0c000000 jal 0x00000000 [main] ; 188: jal main [00400018] 00000000 nop ; 189: nop [0040001c] 3402000a ori \$2, \$0, 10 ; 191: li \$v0 10 [00400020] 0000000c syscall ; 192: syscall # syscall 10 (exit) | |
| | | Kernel Text Segment [80000000]..[80010000] [80000180] 0001d821 addu \$27, \$0, \$1 ; 90: move \$k1 \$at # Save \$at [80000184] 3c019000 lui \$1, -28672 ; 92: sw \$v0 \$1 # Not re-entrant and we can't \$sp [80000188] ac220200 sw \$2, 512(\$1) [8000018c] 3c019000 lui \$1, -28672 ; 93: sw \$a0 \$2 # But we need to use these re [80000190] ac240204 sw \$4, 516(\$1) [80000194] 401a6800 mfc0 \$26, \$13 ; 95: mfc0 \$k0 \$13 # Cause register [80000198] 001a2082 srl \$4, \$26, 2 ; 96: srl \$a0 \$k0 2 # Extract ExcCode Field [8000019c] 3084001f andi \$4, \$4, 31 ; 97: andi \$a0 \$a0 0x1f [800001a0] 34020004 ori \$2, \$0, 4 ; 101: li \$v0 4 # syscall 4 (print_str) [800001a4] 3c049000 lui \$4, -28672 [__m1_] ; 102: la \$a0 __m1_ [800001a8] 0000000c syscall ; 103: syscall [800001ac] 34020001 ori \$2, \$0, 1 ; 105: li \$v0 1 # syscall 1 (print_int) [800001b0] 001a2082 srl \$4, \$26, 2 ; 106: srl \$a0 \$k0 2 # Extract ExcCode Field [800001b4] 3084001f andi \$4, \$4, 31 ; 107: andi \$a0 \$a0 0x1f [800001b8] 0000000c syscall ; 108: syscall [800001bc] 34020004 ori \$2, \$0, 4 ; 110: li \$v0 4 # syscall 4 (print_str) [800001c0] 3344003c andi \$4, \$26, 60 ; 111: andi \$a0 \$k0 0x3c [800001c4] 3c019000 lui \$1, -28672 ; 112: lw \$a0 __excp(\$a0) [800001c8] 00240821 addu \$1, \$1, \$4 [800001cc] 8c240180 lw \$4, 384(\$1) [800001d0] 00000000 nop ; 113: nop [800001d4] 0000000c syscall ; 114: syscall [800001d8] 34010018 ori \$1, \$0, 24 ; 116: bne \$k0 0x18 ok_pc # Bad PC exception special checks | |

หลังโหลด ไฟล์ asm text มีการ assign code ลงใน memory

```

[00400020] 0000000c syscall ; 192: syscall # syscall 10 (exit)
[00400024] 3c081001 lui $8, 4097 [my_array] ; 10: la $8, my_array # move address of my_array
(&my_array) into $8
[00400028] 8d090000 lw $9, 0($8) ; 11: lw $9, 0($8) # load my_array[0] into $9
[0040002c] 8d0a0004 lw $10, 4($8) ; 12: lw $10, 4($8) # load my_array[1] into $10
[00400030] 012a5820 add $11, $9, $10 ; 13: add $11, $9, $10 # add the two numbers into $11
[00400034] 8d090008 lw $9, 8($8) ; 14: lw $9, 8($8) # load my_array[2] into $9
[00400038] 01695820 add $11, $11, $9 ; 15: add $11, $11, $9 # add the number in $11 to it
and accumulate to $11
[0040003c] ad0b000c sw $11, 12($8) ; 16: sw $11, 12($t0) # store the added result to
my_array[3]
[00400040] 3402000a ori $2, $0, 10 ; 20: li $v0, 10
[00400044] 0000000c syscall ; 21: syscall

```

หลังรัน register มีการเปลี่ยนแปลงตามโค้ด คือทำตามคำสั่งในโค้ดที่ละบรรทัด จนถึง syscall

```
PC      = 4194372
EPC     = 0
Cause   = 0
BadVAddr = 0
Status  = 805371664

HI      = 0
LO      = 0

R0 [r0] = 0
R1 [at] = 0
R2 [v0] = 10
R3 [v1] = 0
R4 [a0] = 1
R5 [a1] = 2147481624
R6 [a2] = 2147481632
R7 [a3] = 0
R8 [t0] = 268500992
R9 [t1] = 500
R10 [t2] = -200
R11 [t3] = 400
```

เพราะการแทนจำนวนลบ เมื่อแปลงเป็นฐานสิบหก จะนับย้อนกลับจาก 00000000 ดังนั้นค่าจำนวนลบในรูปฐานสิบหกจึงมีมากกว่าจำนวนบวก