

Start States:

| Registers | Value |
|-----------|-------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0123 4567 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0x89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

A)

After Executing: lw \$t0, 0x8(\$s0)

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0123 4567 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0x89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: lw \$t1, 0xC(\$s0)

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0123 4567 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0x89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: add \$t0, \$t0, \$t1

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x8ACF 1356 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: lw \$t1, 0x10(\$s0)

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x8ACF 1356 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: add \$t0, \$t0, \$t1

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x8ACF 1356 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

B)

After Executing: addi \$s1, \$s0, 0x8

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0123 4567 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0008 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0x89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: lw \$t0, 0(\$s0)

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0008 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0x89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: addi \$s1, \$s0, 0x4

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0004 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0x89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: lw \$t1, 0(\$s0)

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0004 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: add \$t0, \$t0, \$t1

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0004 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: addi \$s1, \$s0, 0x4

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0004 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |

| | |
|-------------|-------------|
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: lw \$t1, 0(\$s0)

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0004 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: add \$t0, \$t0, \$t1

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0x0000 0000 |
| t1 | 0x0000 0000 |
| s0 | 0x1000 0000 |
| s1 | 0x1000 0004 |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

c)

After Executing: lui \$t0, 0XFEDC

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0XFEDC 0000 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: ori \$t0, 0xBA98

| Registers | Value |
|-----------|--------------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0XFEDC BA98 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|-------------|-------------|
| 0x1000 0000 | 0x0000 0000 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: sw \$t0, 0(\$s0)

| Registers | Value |
|-----------|-------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |
| t0 | 0XFEDC BA98 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|--------------------|--------------------|
| 0x1000 0000 | 0XFEDC BA98 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0x0000 0000 |

After Executing: sw \$t0, 5(\$s0)

In this case, 5 refers to the index of the array. Each element of an array is stored as a word (4 bytes), thus we must multiply by 4 giving us 20 which is 0x14 in hexadecimal format giving us the actual command of:

sw \$t0, 0x14(\$s0)

| Registers | Value |
|-----------|-------------|
| a0 | 0x0000 0190 |
| a1 | 0x0000 03E7 |

| | |
|----|-------------|
| t0 | 0XFEDC BA98 |
| t1 | 0x89AB CDEF |
| s0 | 0x1000 0000 |
| s1 | 0x251F 326D |

| Memory | Value |
|--------------------|--------------------|
| 0x1000 0000 | 0XFEDC BA98 |
| 0x1000 0004 | 0x0000 0000 |
| 0x1000 0008 | 0x0123 4567 |
| 0x1000 000C | 0X89AB CDEF |
| 0x1000 0010 | 0x0000 0000 |
| 0x1000 0014 | 0XFEDC BA98 |

After Executing: sw \$t0, 0xA(\$s0)

The number 0xA is not evenly divisible by 4 and is thus not a valid offset, this command can not be executed.