Lab 5

Problem 1

```
addi a0, zero, 79 # give a value to a0
addi t1, zero, 9  # condition variable
addi t2, zero, 1  # condition variable
addi t3, zero, 8  # condition variable
loop: ble a0, t3, if # if a0 <= 8:
sub a0, a0, t1       # a0 = a0 - 9
j loop               # go back to line 5
if: bge a0, t2, assign # if a0 >= 1, which means it can not be divisible by 9
j end                  # if a0 = 9, which means it can be divisible by 9
assign: addi a0, zero, 1 # will set it to 1
end: add a0, a0, zero    # final output

```

Problem 2

```
lui s0, 0xA1A2A # s0 = 0xA1A2A000
addi s0, s0, 0x3A4 # s0 = 0xA1A2A3A4
sw s0, 0x300(zero) # memory[300] = 0xA1A2A3A4

lui s0, 0xB1B2B # s0 = 0xB1B2B000
addi s0, s0, 0x3B4 # s0 = 0xB1B2B3B4
sw s0, 0x304(zero) # memory[304] = 0xB1B2B3B4

lui s0, 0xC1C2C # s0 = 0xC1C2C000
addi s0, s0, 0x3C4 # s0 = 0xC1C2C3C4
sw s0, 0x308(zero) # memory[308] = 0xC1C2C3C4

lui s0, 0xD1D2D # s0 = 0xD1D2D000
addi s0, s0, 0x3D4 # s0 = 0xD1D2D3D4
sw s0, 0x30c(zero) # memory[30c] = 0xD1D2D3D4

lui s0, 0xE1E2E # s0 = 0xE1E2E000
addi s0, s0, 0x3E4 # s0 = 0xE1E2E3E4
sw s0, 0x310(zero) # memory[310] = 0xE1E2E3E4

lui s0, 0xF1F2F # s0 = 0xF1F2F000
addi s0, s0, 0x3F4 # s0 = 0xF1F2F3F4
sw s0, 0x314(zero) # memory[314] = 0xE1E2E3E4

lui s0, 0x11223 # s0 = 0x11223000
addi s0, s0, 0x344 # s0 = 0x11223344
sw s0, 0x318(zero) # memory[318] = 0x11223344

lui s0, 0x55667 # s0 = 0x55667000
addi s0, s0, 0x788 # s0 = 0x55667788
sw s0, 0x31c(zero) # memory[31c] = 0x55667788
```

```
lw t0, 0x300(zero) # t0 = 0xA1A2A3A4
srli t1, t0, 24    # t1 = 0x000000a1

slli t2, t0, 8     # t2 = 0xa2a3a400
srli t2, t2, 24    # t2 = 0x000000a2
slli t2, t2, 8     # t2 = 0x0000a200

srli t3, t0, 8     # t3 = 0x00a1a2a3
slli t3, t3, 24    # t3 = 0xa3000000
srli t3, t3, 8     # t3 = 0x00a30000

slli t4, t0, 24    # t4 = 0xa4000000

add t5, t1, t2     # t5 = 0x0000a2a1
add t5, t5, t3     # t5 = 0x00a3a2a1
add t5, t5, t4     # t5 = 0xa4a3a2a1
sw t5, 0x300(zero) # memory[300] = t5 = 0xa4a3a2a1

# The code below will be pretty much like the 300 address, so no comment

lw t0, 0x304(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
add t5, t5, t3
add t5, t5, t4
sw t5, 0x304(zero)

lw t0, 0x308(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
```

```
add t5, t5, t3
add t5, t5, t4
sw t5, 0x308(zero)

lw t0, 0x30c(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
add t5, t5, t3
add t5, t5, t4
sw t5, 0x30c(zero)

lw t0, 0x310(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
add t5, t5, t3
add t5, t5, t4
sw t5, 0x310(zero)

lw t0, 0x314(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
add t5, t5, t3
add t5, t5, t4
sw t5, 0x314(zero)
```

```
lw t0, 0x318(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
add t5, t5, t3
add t5, t5, t4
sw t5, 0x318(zero)

lw t0, 0x31c(zero)
srli t1, t0, 24
slli t2, t0, 8
srli t2, t2, 24
slli t2, t2, 8
srli t3, t0, 8
slli t3, t3, 24
srli t3, t3, 8
slli t4, t0, 24
add t5, t1, t2
add t5, t5, t3
add t5, t5, t4
sw t5, 0x31c(zero)

```

Problem 3

```
addi s0, zero, 89
sw s0, 0x400(zero) # memory[400] = 89
addi s0, zero, 63
sw s0, 0x404(zero) # memory[404] = 63
addi s0, zero, -55
sw s0, 0x408(zero) # memory[408] = -55
addi s0, zero, -107
sw s0, 0x40c(zero) # memory[40c] = -107
addi s0, zero, 42
sw s0, 0x410(zero) # memory[410] = 42
addi s0, zero, 98
sw s0, 0x414(zero) # memory[414] = 98
addi s0, zero, -425
sw s0, 0x418(zero) # memory[418] = -425
addi s0, zero, 203
sw s0, 0x41c(zero) # memory[41c] = 203
addi s0, zero, 0
sw s0, 0x420(zero) # memory[420] = 0
addi s0, zero, 303
sw s0, 0x424(zero) # memory[424] = 303

addi s0, zero, 1
addi t0, zero , 1  # change = 1

loop: beq t0, zero, end
addi t0, zero, 0  # change = 0
addi t2, zero, 0  # x = 0
addi t3, zero, 4  # y = 1
addi t1, zero, 9  # num = 9

for: beq t1, zero, switch
lw s1, 0x400(t2)  # s1 = array[x]
lw s2, 0x400(t3)  # s2 = array[y]
blt s1, s2, con   # if s1 < s2, then do nothing
addi t5, s1, 0    # otherwise: t5 = s1
addi s1, s2, 0    # s1 = s2
addi s2, t5, 0    # s2 = t5
addi t0, t0, 1    # change += 1
con: sw s1, 0x400(t2)  # array[x] = s1
sw s2, 0x400(t3)  # array[y] = s2
addi t2, t2, 4    # x += 1
addi t3, t3, 4    # y += 1
addi t1, t1, -1   # t1 -= 1
j for
switch:
j loop
end:
```