HW1_2025

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1. a. addi x8, x5, -5
   # addi is used as a constant is being added

   b. slli x5, x3, 3
   # This can be done as the multiplication is with 8 (a power of 2). Shifting the bits of x3 by 3 places to the left will do the trick.

   c. add x19, x19, x10

   d. srli x9, x15, 2
   # Same as 1b, but right shift for division

   e. addi x12, x19, 24

2. a. ld x6, 160(x5)
   addi x6, x6, 100
   sd x6, 96(x5)

   b. ld x7, 160(x5)
   addi x7, x7, 1
   sd x7, 160(x5)

   c. ld x8, 40(x5)
   ld x9, 96(x5)
   sd x8, 96(x5)
   sd x9, 40(x5)

   d. ldi x10, 32(x5)
   andi x10, x10, 0xFFFFFFFF
   sd x10, 32(x5)

   e. ld x11, 16(x5)
   srli x12, x11, 32
   slli x11, x11, 32
   or x11, x11, x12
   sd x11, 16(x5)

3. a. 00010111

b. Consider ‘1’
00000001 (binary form of 1)
11111110 (flipping it)
$\boxed{11111111}$ (adding 1)

c. $\boxed{\text{Out of range}}$ (8-bit 2’s complement ranges from -128 to 127)

d. Consider ‘128’
10000000 (binary form of 128)
01111111 (flipping it)
$\boxed{10000000}$ (adding 1)

4. a. 11010100
$= -2^7 + 2^6 + 2^4 + 2^2$
$= \boxed{-44}$

b. 00101011
This is the 1’s complement of 4a i.e. adding these two we get 11111111, which is -1 in decimal.
Thus, the decimal form of 4b is $\boxed{43}$ (since, -44 + 43 = -1)

c. 11111110
Its 2’s complement is 00000010 (= 00000001 + 1), whose decimal value is 2.
Thus, the decimal form of 4c is $\boxed{-2}$ (since, 4b has 1 as MSB)