

計算機結構-hw02

tags: 40823117L 資工系 方國丞

Question 1

(a) $2^7 - 1 = 127$

(b) $-2^{15} \sim 2^{15}-1 = -32768 \sim 32767$

Question 2

(a)

(1) 00001111

$$15 / 2 = 7 \dots 1$$

$$7 / 2 = 3 \dots 1$$

$$3 / 2 = 1 \dots 1$$

$$1 / 2 = 0 \dots 1$$

(2) 01110001

$$113 / 2 = 56 \dots 1$$

$$56 / 2 = 28 \dots 0$$

$$28 / 2 = 14 \dots 0$$

$$14 / 2 = 7 \dots 0$$

$$7 / 2 = 3 \dots 1$$

$$3 / 2 = 1 \dots 1$$

$$1 / 2 = 0 \dots 1$$

(b)

(1) 17 in decimal

$$2^0 + 2^4 = 17$$

(2) 130 in decimal(unsigned)

$$2^7 + 2^1 = 130$$

Question 3

- $A = 54 = 00110110$ (binary)
- $B = -77 = 10110011$ (binary)
- 8-bit 2's complement signed numbers (-128 ~ 127)

(a) -23, no overflow

- $A + B = -23$
- 11101001(binary)

(b) 131, overflow

- $A - B = 131$
- 1 01111011(binary)

Question 4

Operand/Operator	Value/Instruction
OP1	\$s6
OP2	\$t1
OP3	lw

Question 5

1.

- add \$s4, \$t3, \$t2: R-type instruction.
- 000000 01010 01011 10100 00000 100000

2.

- lw \$s0, 48(\$t1): I-type instruction
- 100011 01001 10000 0000000000110000