ICS_HW01_solutions

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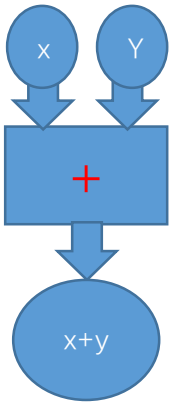
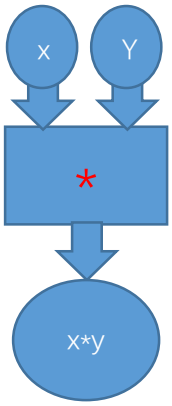
1.

To type conveniently ,I use the following forms to describe the addition and multiplication illustration.

add(x,y),



mul(x,y)



a. add(mul(a,x),b)
b. mul(1/4,add(add(x,y),add(w,z)))
c. mul(add(a+b),add(a+b))
d. mul(mul(a,a),mul(mul(a,a),mul(a,a)))
e. here ,I can combine the two operation : adml(a,b,c) as add(mul(a,b),c)
so the answer is
adml((adml(adml(x,a,b),x,c),x,d)

2.

a. No. Because the algorithm must be definite and accrue.
b. No. Because algorithm must be executed in limited time and space.
c. Yes.
d. No. There is probability that the steps continue to execute.
e. No. There is probability that the steps continue to execute.

3.

a. nine digits.

b. 112.

4.

a. 0111 1111 , 127

b. 1000 0000 , -128

c. $\mathbf{2^n - 1}$

d. $\mathbf{-2^n}$

5.

a. 1111 1010

b. 0001 1001

c. 1111 1000

d. 0000 0001

6.

a. 01 + 1011 = 1100 = -4

b. 11 + 01010101 = 01011000 = 88

c. 0101 + 110 = 1011 = -5

d. 01 + 10 = 11 = -1

7.

a. when the result's carry digit of the highest weight is different with the symbol digit.

b. eg. 1000 0000 0000 0000 and 1000 0000 0000 0000

c. Because the n-digit 2's complement integer's is $\mathbf{-2^n \sim 2^n - 1}$ .And the addition of a positive number and a negative number is in that span.

8.

a. 0111

b. 1000

c. 1101

d. 0110

9.

a. x5468

b. x1204

c. xFFFF

d. x32B3

10.

a. 63

b. $\mathbf{4^n - 1}$

c. $\mathbf{(023)_4 + (221)_4 = (310)_4 = (52)_{10}}$

d. $(42)_{10} = (222)_4$

e. $(123.3)_4 = (011011.11)_2$

f. 0.1101111e5

g. 7: and, or , xor, add, sub,mul, ~