Binary Multiplication

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1010 is binary for 10

0101 is binary for 5

1010\*0101:

1 0 1 0

\* 0 1 0 1

------------------------------------------------------------

1) 1 0 1 0

2) 0 0 0 0 X

3) 1 0 1 0 X X

------------------------------------------------------------

4) = 1 1 0 0 1 0

STEPS EXPLAINED :

1. We multiply 1010 by the first number of 0101: 1\*1010 = 1010
2. We multiply 1010 by the second number of 0101: 0\*1010 = 0000
3. We multiply 1010 by the third number of 00101: 1\*1010 = 1010
4. We add them up and we get: 110010

2^5 2^4 2^3 2^2 2^1 2^0

1 1 0 0 1 0

------------------------------------------------------------------------

= 32 + 16 + 0 + 0 + 2 0

= 50

Binary Division

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Normal Division:

Let pose 8 dividing 128:

0 1 6

------------------------------------------------

8 | 1 2 8  
 |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
1) 1 < 8 => 0 | - 0  
2) 1 & 2 go down | 1 2  
3) 12 > 8 | - 1\*8  
4) 12 – 8 = 4 | ------------  
5) 4 & 8 go down | = 4  
6) 48 – 6\*8 = 0 |   
 | 4 8  
 | - 6\*8   
 | -------------  
 | 0

Binary Division:

101010 is binary for 42 0 0 0 1 1 1

000110 is binary for 6 -----------------------------------------------------------------------

110 | 1 0 1 0 1 0   
 |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
1) 1 < 110 => 0 | - 0  
2) write 0 above 1, remainder is 1 | --------------   
3) 1 & 0 go down we get 10 | 1 0  
3) 10 < 110 => 0 | - 0   
4) write 0 above 0 | ------------------------  
5) 101 go down | 1 0 1   
6) 101 < 110 => 0 | - 0   
7) 1010 go down | -----------------------------------   
8) 1010 > 110 | 1 0² 1 0   
9) 0-0=0; 1-1 = 0; 0-1 = 1+1remainder |  
10) 1-1remainder=0 | - ² 1 1 0   
11) We write 1 above | -----------------------------------------  
12) 1 goes down | = 0 1 0 0   
13) 1001 > 110 |  
14) 1-0 = 1; 0-1=move left… | 1 0 0 1  
15) 0 goes down | - 1 1 0  
16) 110 – 110 = 0 | -----------------------------------------  
12) We write 1 above | = 0 0 1 1   
 |   
 | 1 1 0  
 | - 1 1 0   
42/6 = 7 | --------------------------  
 | 0 0 0

111 is binary for 7: it’s correct