Binary Multiplication

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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

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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