Unit 01_010 – Arithmetic and Data Representation

The following is a cheatsheet for some of the material covered in the video. You may use this sheet on the quiz. You will get this sheet on the exam. You will need to be fill in the "Binary" column of the second table. I suggest that you use 4 binary digits with zero padding on the left.

I expect everyone to be able to do the following arithmetic without a calculator. We will only be using integers

- Addition and subtraction of multi-digit numbers
- Multiply and divide any number by 2
- Multiply and divide any number by 10
- Multiply any integer by 16 with the assistance of the second table on page 2.
- Divide any integer by 16 with the assistance of the second table on page 2.
- Find the remainder when dividing by 16 with the assistance of the second table on page 2.

n	2^n	Other
0	1	8^0 and 16^0
1	2	
2	4	
3	8	
4	16	16^1
5	32	
6	64	
7	128	
8	256	16^2
9	512	
10	1024	1 Kilobyte
11	2048	
12	4096	16^3
13	8092	
14	16,384	
15	32, 768	
16	65,536	16^4
17	131,082	
18	262,144	
19	524,288	
20	1,048,576	16^5 1 Megabyte

IT professionals will usually recognize many of the powers of 2. Non-IT professionals often recognize some powers of 2 as "computer numbers." The numbers that are shown in light gray are not as commonly recognized. The "Other" column shows some other useful equivalents.

Decimal	Hexadecimal	Binary
0	0	0000
1	1	0001
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9	9	
10	A	
11	B	
12	C	
13	D	
14	E	
15	F	

You will need to count to 15 in binary.

Multiplication	Result
$16 \cdot 0$	0
$16 \cdot 1$	16
$16 \cdot 2$	32
$16 \cdot 3$	48
$16 \cdot 4$	64
$16 \cdot 5$	80
$16 \cdot 6$	96
$16 \cdot 7$	112
$16 \cdot 8$	128
$16 \cdot 9$	144
$16 \cdot 10(a)$	160
$16 \cdot 11(b)$	176
$16 \cdot 12$ (c)	192
$16 \cdot 13$ (d)	208
$16 \cdot 14$ (e)	224
$16 \cdot 15$ (f)	240
$16 \cdot 16$	256

x86_64 Registers Map