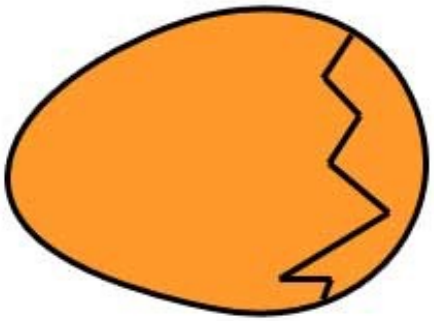
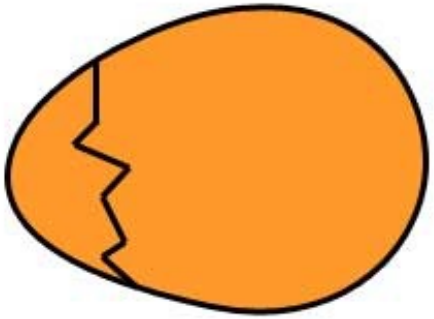
Endianness

Lightning Talk — PDX-D2

Big Endian, Little Endian – from Gulliver's Travels.

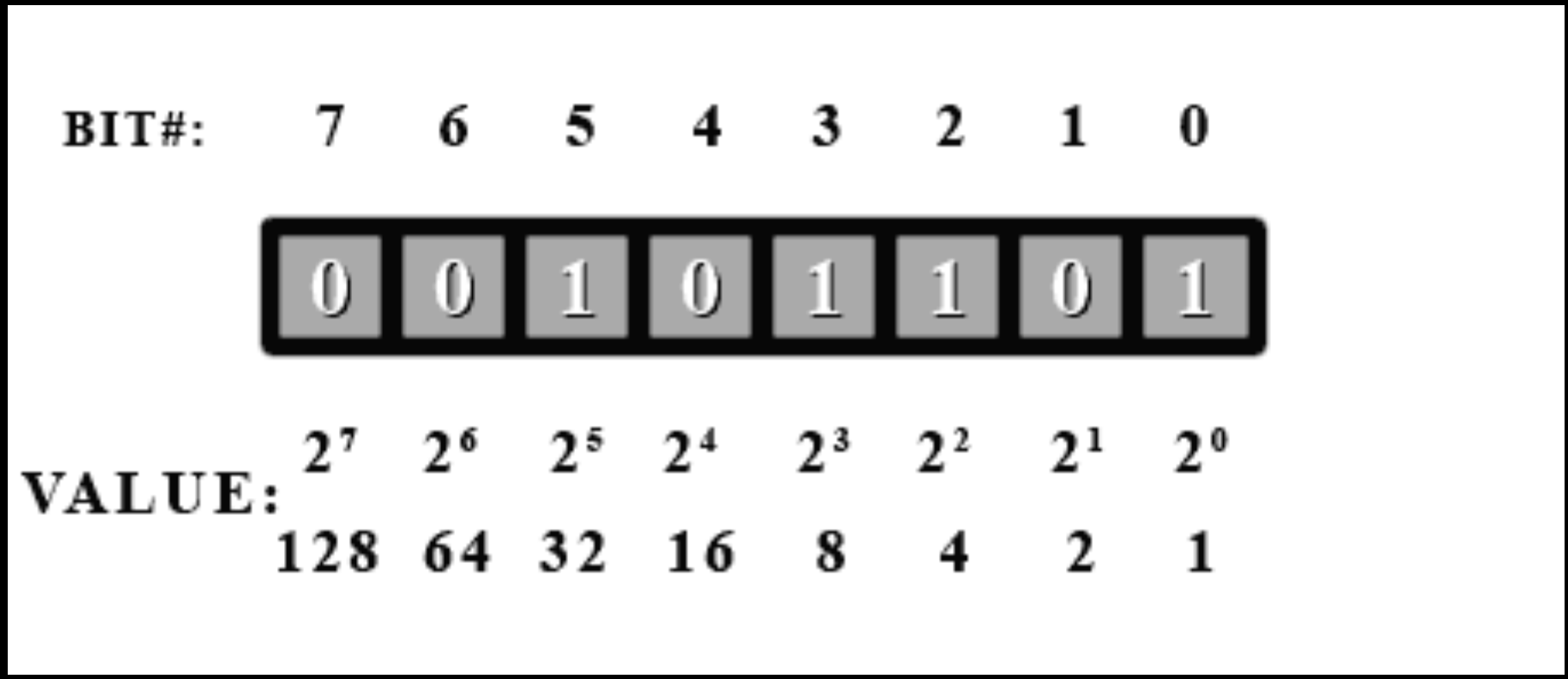


BIG ENDIAN - The way people always broke their eggs in the Lilliput land



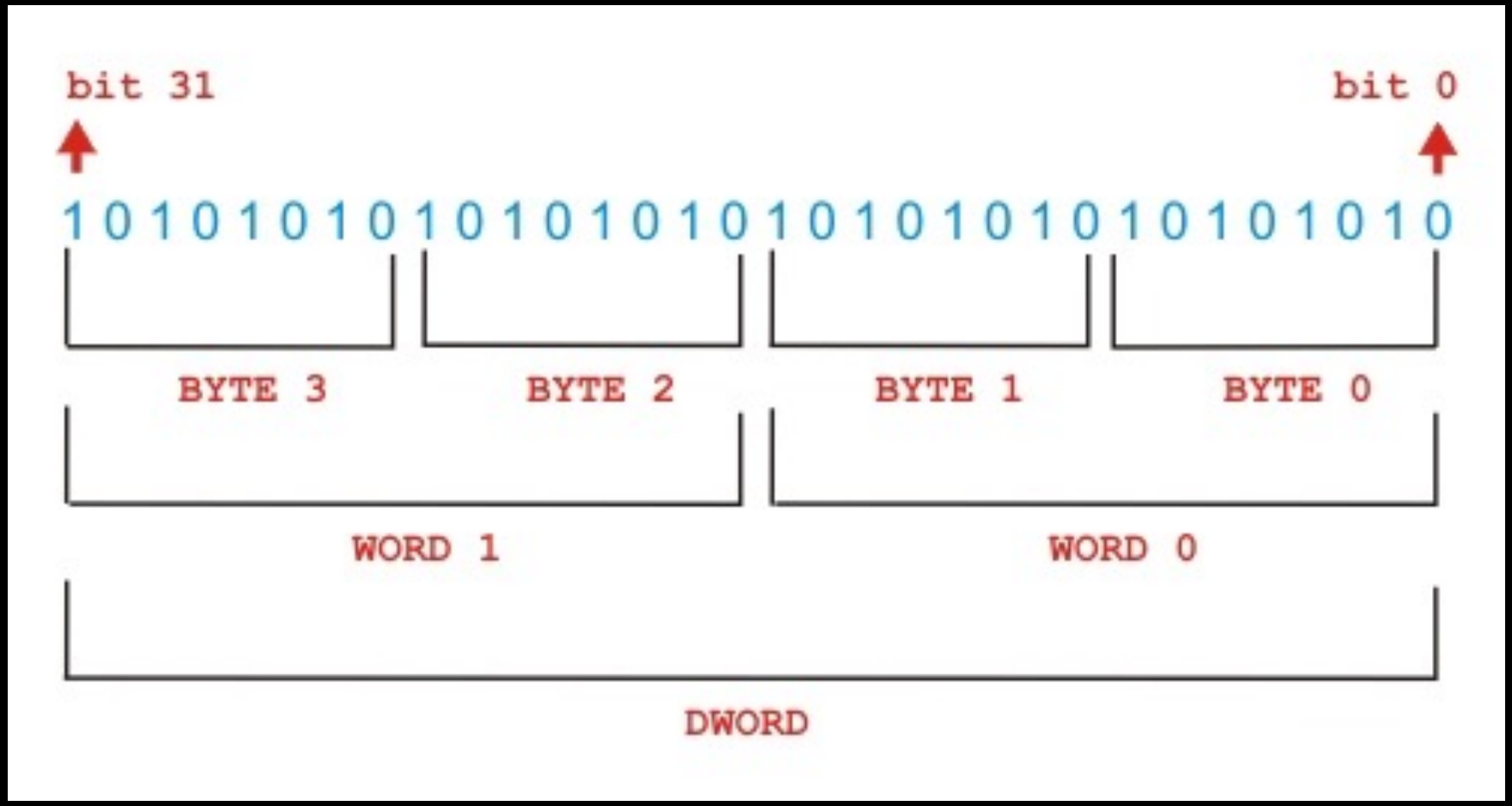
LITTLE ENDIAN - The way the king then ordered the people to break their eggs

http://www.slideshare.net/sameerdharur/kcircle-quiz-march-1-2014



https://en.wikibooks.org/wiki/C%2B%2B_Programming/All_Chapters

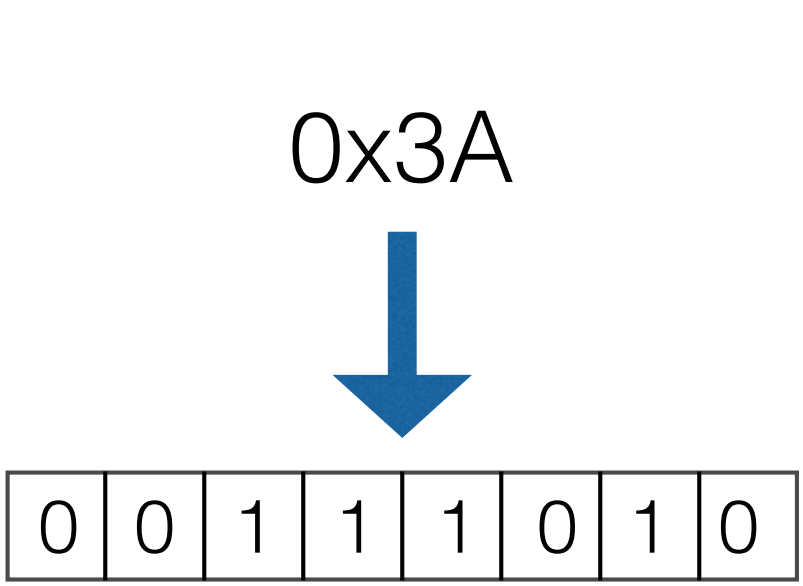
Bits, Bytes, Words ….



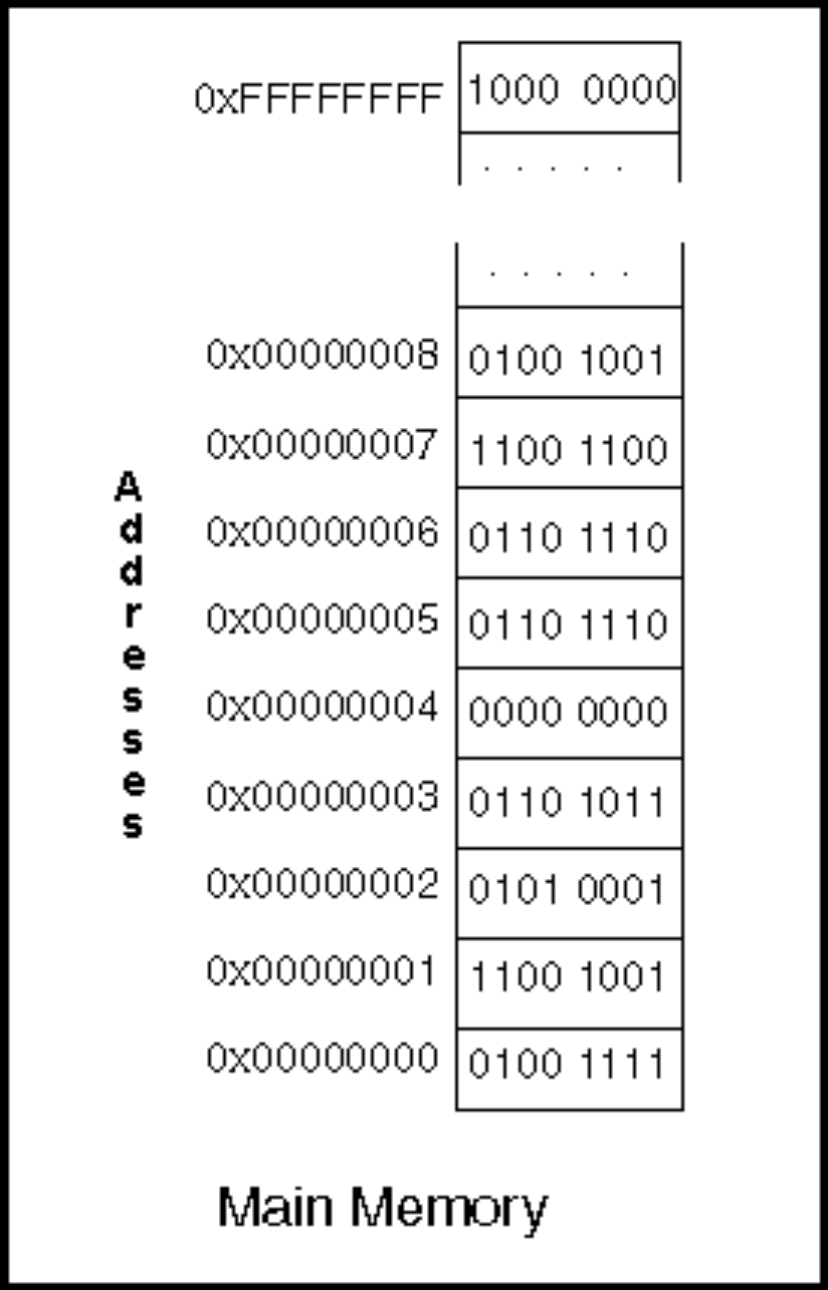
http://www.intelliproject.net/articles/showArticle/index/bitwise_operators_cpp

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

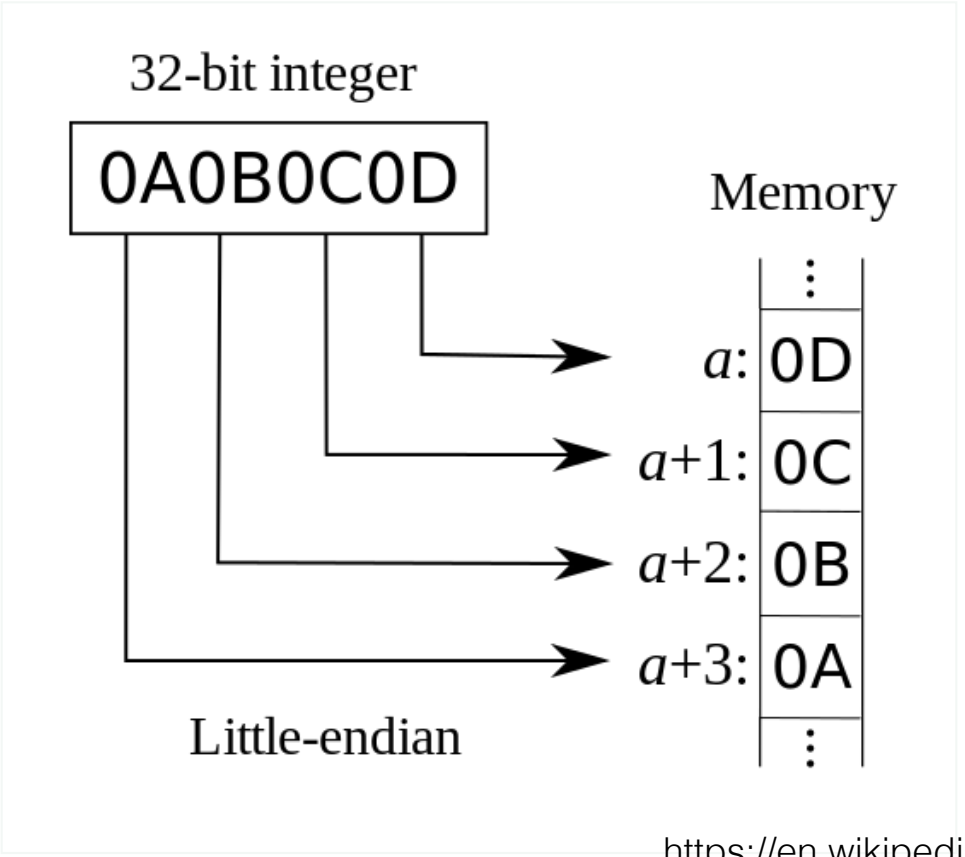
http://blog.refu.co/?p=804

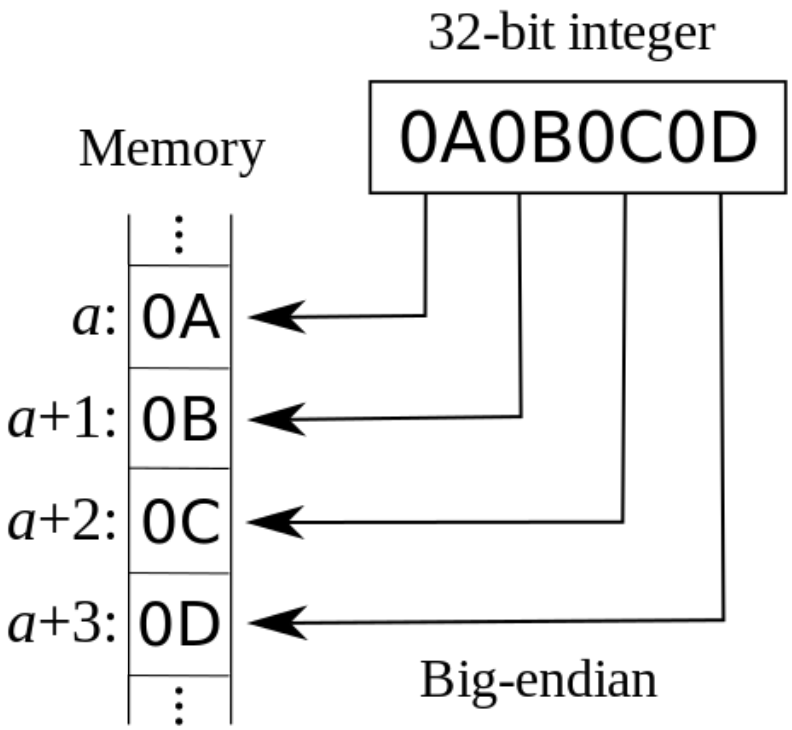


32-bit architecture



https://chortle.ccsu.edu/AssemblyTutorial/Chapter-10/ass10_2.html



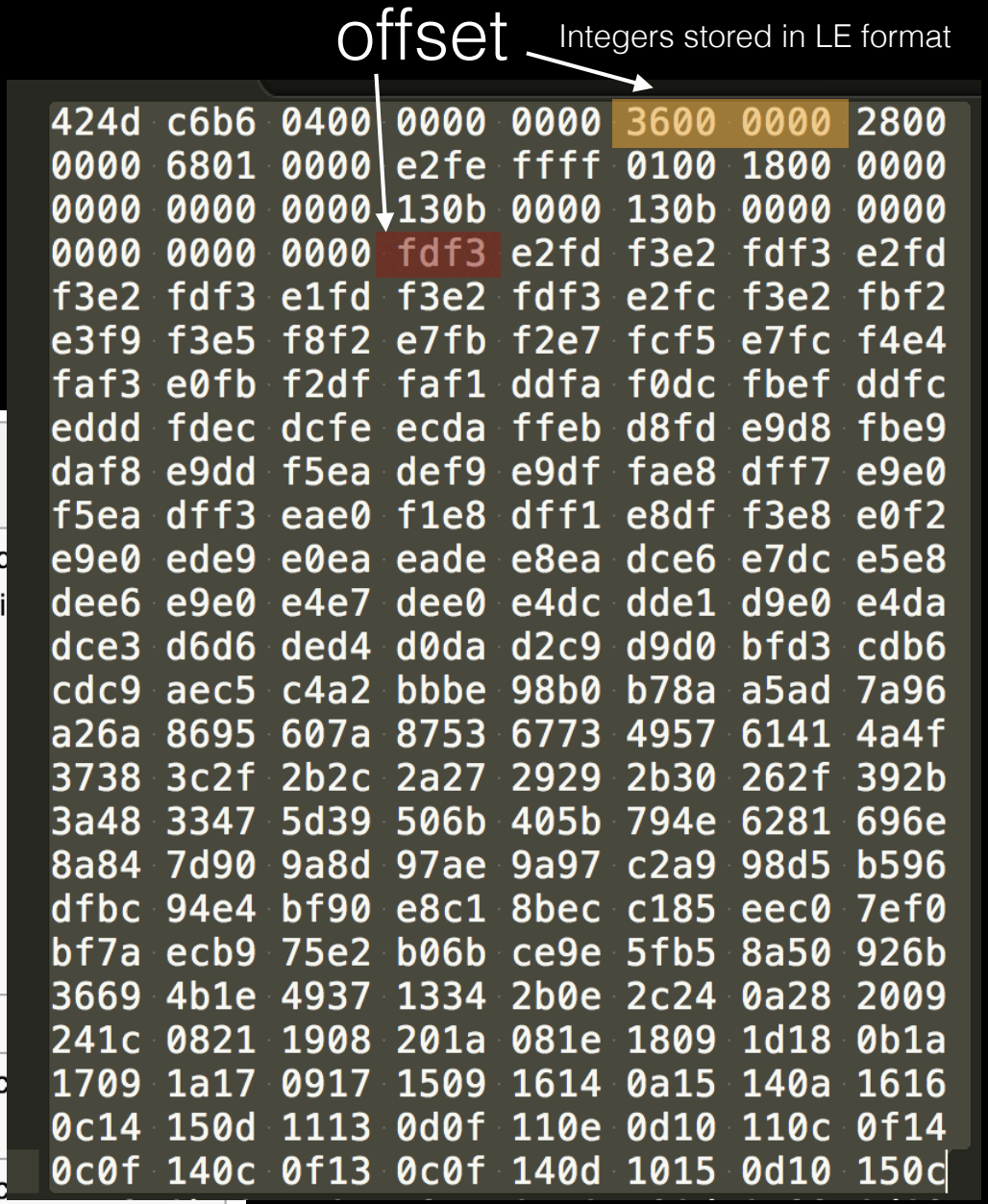


https://en.wikipedia.org/wiki/Endianness

Examples:
Intel x86 and x86-64
DEC Alpha
PDP-11

Examples:
Motorola 6800 and 68
SUN Sparc

Bitmap Example



Offset hex	Offset dec	Size	Purpose
00	0	2 bytes	The header field used to identify the BMP and `0x42 0x4D` in hexadecimal, same as `BM` i following entries are possible: • **BM** – Windows 3.1x, 95, NT, ... etc. • **BA** – OS/2 struct bitmap array • **CI** – OS/2 struct color icon • **CP** – OS/2 const color pointer • **IC** – OS/2 struct icon • **PT** – OS/2 pointer
02	2	4 bytes	The size of the BMP file in bytes
06	6	2 bytes	Reserved; actual value depends on the applic creates the image
08	8	2 bytes	Reserved; actual value depends on the applic creates the image
0A	10	4 bytes	The offset, i.e. starting address, of the byte where the bitmap image data (pixel array) can be found.

https://en.wikipedia.org/wiki/BMP_file_format

Sample Length:	4				4				4				4			
Channel Membership:	Alpha				Red				Green				Blue			
Bit Number:	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RGBAX	R. G. B. A. X															
Sample Length Notation:	4.4.4.4.0															

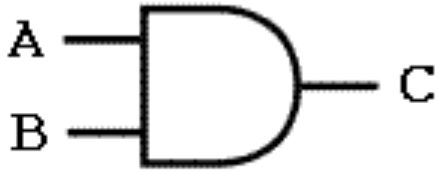
https://en.wikipedia.org/wiki/BMP_file_format

```
var pixel = buffer.readUIntBE(offset, 2);
```

```
var green = ( pixel & 0x00F0 ) >>> 4;
```

Backup

AND



Inputs		Output
A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

OR

Inputs		Output
A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

NOT

Input	Output
A	C
0	1
1	0

http://slpwildern.blogspot.com/2015/10/y8-unit3-truth-tables.html


1 0 1 1
AND
0 0 0 1
0 0 0 1