Numbers in C (1C)

Please send corrections (or suggestions) to youngwlim@hotmail.com.

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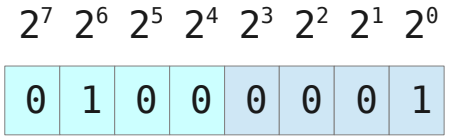
Format String



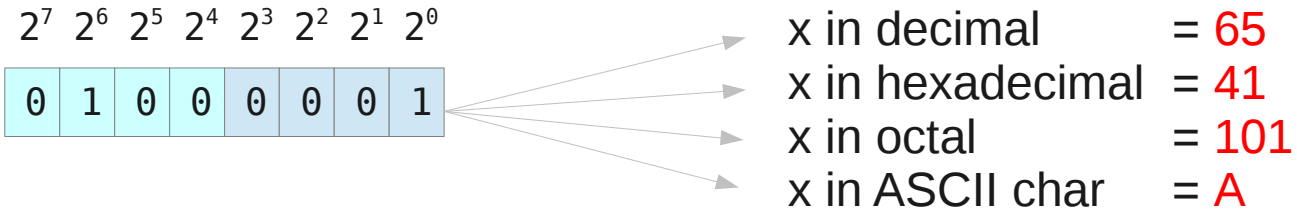

```
#include <stdio.h>

void main() {
  unsigned char x;

  x = 65;

  printf("x in decimal       = %d \n", x);
  printf("x in hexadecimal = %x \n", x);
  printf("x in octal           = %o \n", x);
  printf("x in ASCII char   = %c \n", x);

}
```



Singed & Unsigned Numbers

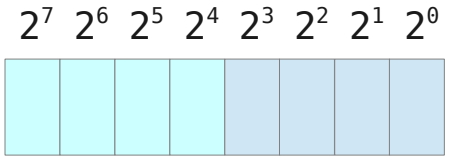
unsigned char x;
(signed) **char** y;

```
-------------------------------------
x = 127 0x7f   y =  +127 0x0000007f
x = 128 0x80   y =  -128 0xffffff80
x = 129 0x81   y =  -127 0xffffff81
-------------------------------------
x = 255 0xff   y =    -1 0xffffffff
-------------------------------------
x = 128 0x80   y =  -128 0xffffff80
x = 129 0x81   y =  -127 0xffffff81
x = 130 0x82   y =  -126 0xffffff82
-------------------------------------
x = 255 0xff   y =    -1 0xffffffff
```

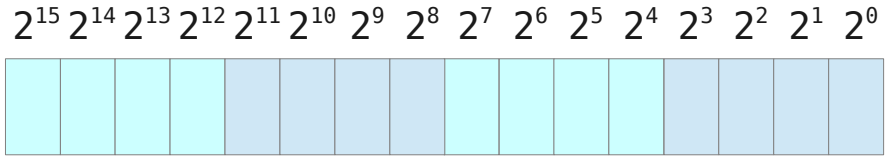
```
printf("-----------------------------------\n");
x = y = 127;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
x = y = 128;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
x = y = 129;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
printf("-----------------------------------\n");
x = y = 255;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
printf("-----------------------------------\n");
y = x = -128;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
y = x = -127;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
y = x = -126;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
printf("-----------------------------------\n");
y = x = -1;
printf("x = %d %#0x   y = %+5d %#010x\n", x, x, y, y);
```

Unsigned Integer Numbers in 1, 2, 4 Bytes

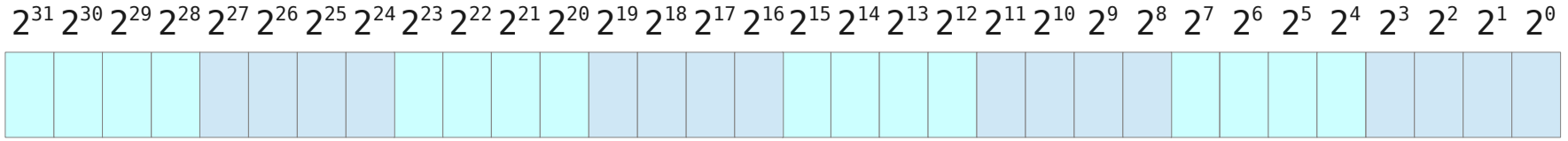
1 Byte : **unsigned char**



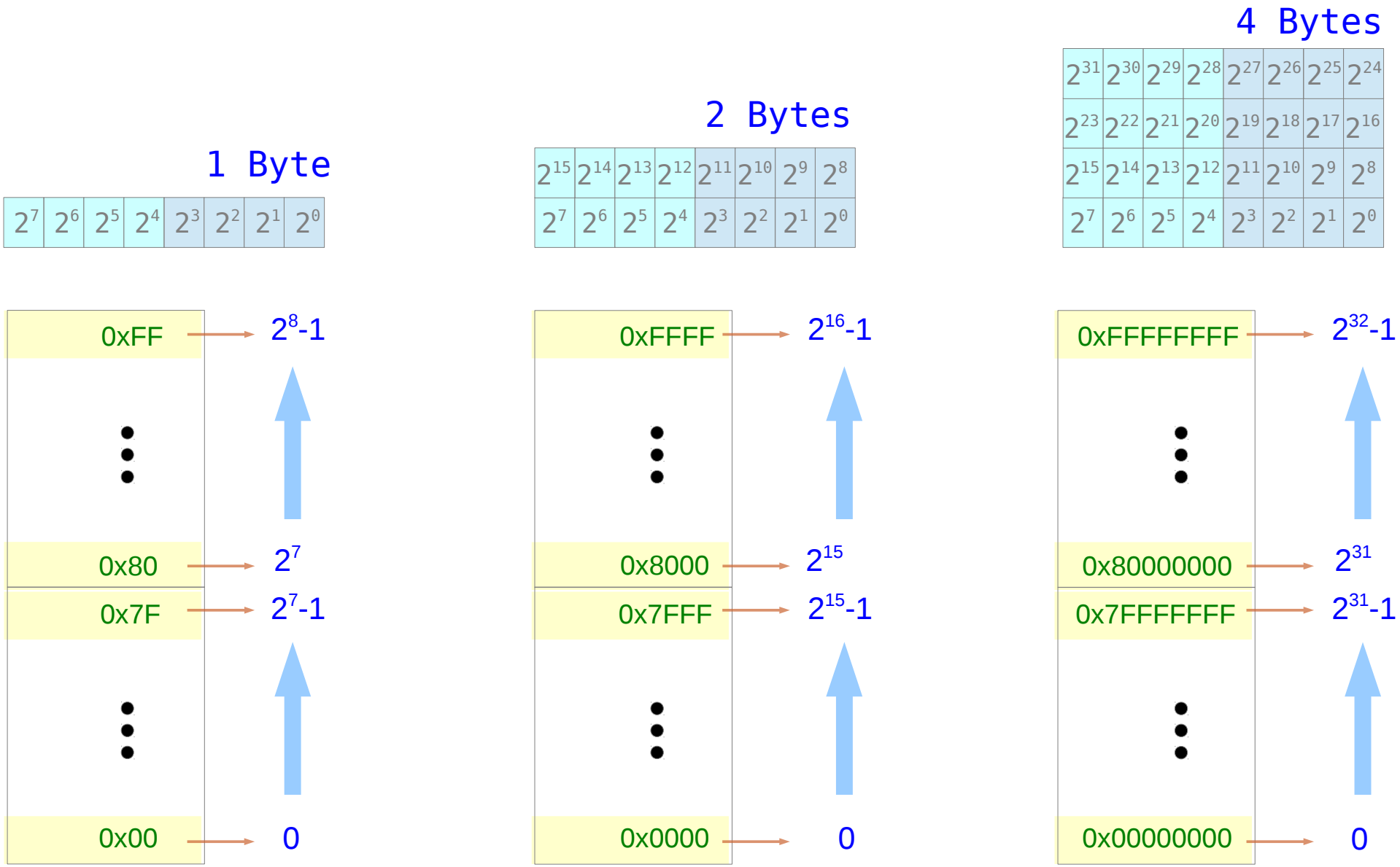
2 Bytes: **unsigned short**



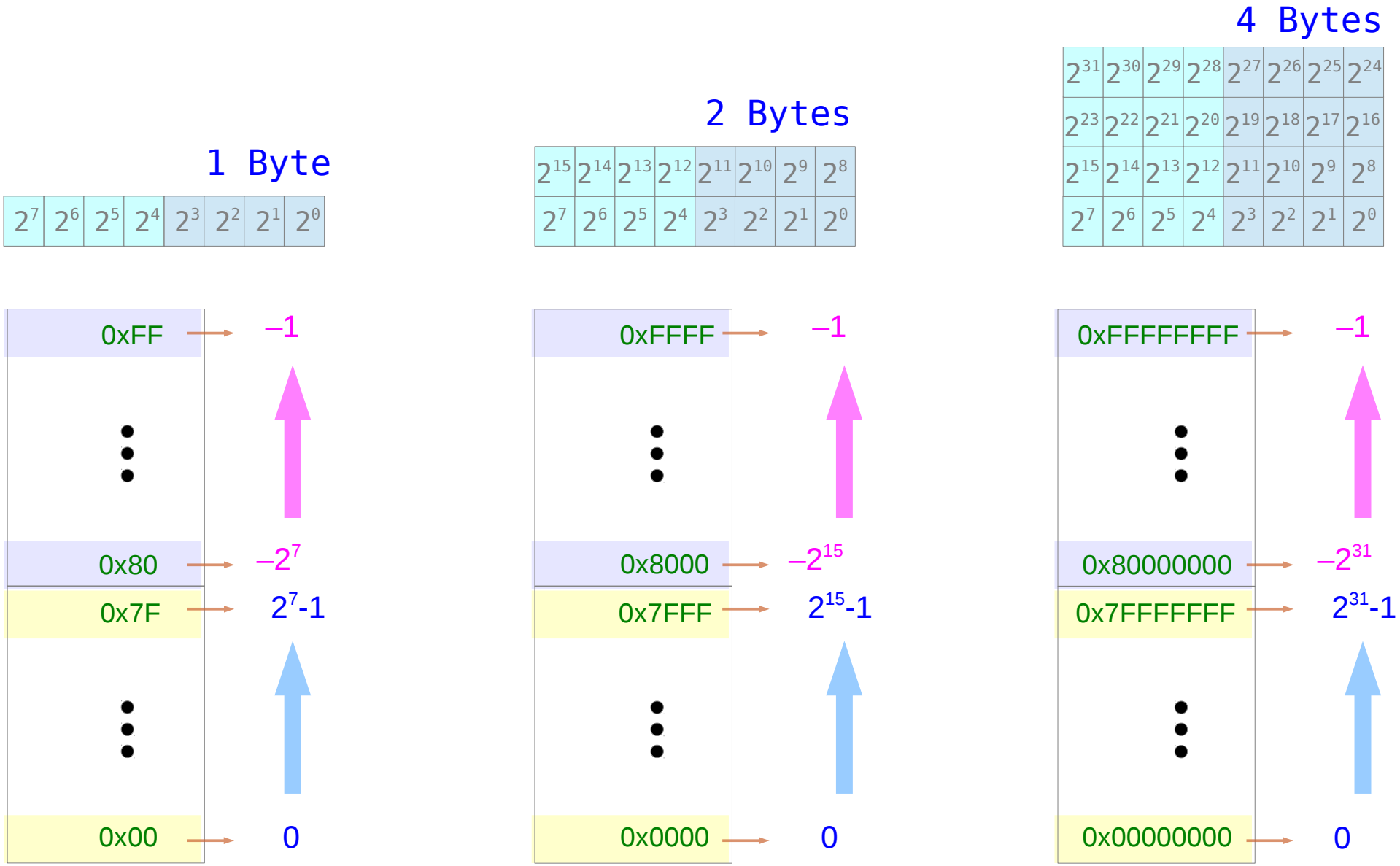
4 Bytes: **unsigned int**
unsigned long



Unsigned Integer Ranges



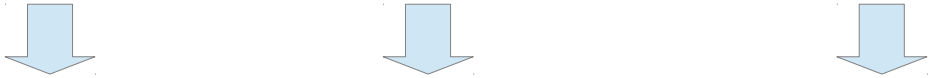
Signed Integer Ranges



Signed & Unsigned Interpretation of Hex Numbers

```
unsigned char  x1;
signed   char  y1;
unsigned short x2;
signed   short y2;
unsigned int   x4;
signed   int   y4;
```

```
x1 = y1 = 0x7F;   x2 = y2 = 0x7FFF;   x4 = y4 = 0x7FFFFFFF;
x1 = y1 = 0x80;   x2 = y2 = 0x7FFF;   x4 = y4 = 0x80000000;
x1 = y1 = 0x81;   x2 = y2 = 0xFFFF;   x4 = y4 = 0xFFFFFFFF;
```



```
printf("x = %+12d %+12x   y = %+12d %+12x\n", x, x, y, y);
```

```
X1, x1, y1, y1
X2, x2, y2, y2
X4, x4, y4, y4
```

```
-------------------------------------
x1 =         +127           7f   y1 =         +127           7f
x1 =         +128           80   y1 =         -128     ffffff80
x1 =         +255           ff   y1 =           -1     ffffffff
-------------------------------------
x2 =       +32767         7fff   y2 =       +32767         7fff
x2 =       +32768         8000   y2 =       -32768     ffff8000
x2 =       +65535         ffff   y2 =           -1     ffffffff
-------------------------------------
x4 =  +2147483647     7fffffff   y4 =  +2147483647     7fffffff
x4 =  -2147483648     80000000   y4 =  -2147483648     80000000
x4 =           -1     ffffffff   y4 =           -1     ffffffff
-------------------------------------
```

Laplace Equation

Laplace Equation

References

[1] http://en.wikipedia.org/
[2] http://planetmath.org/
[3] M.L. Boas, “Mathematical Methods in the Physical Sciences”