

Practice Problem 2.2 (solution page 179)

Fill in the blank entries in the following table, giving the decimal and hexadecimal representations of different powers of 2:

n	2^n (decimal)	2^n (hexadecimal)
5	32	0x20
23	8388608	0x800000
15	32768	0x8000
13	8192	0x2000
12	4096	0x1000
6	64	0x40
8	256	0x100

$$2^{23} = 8\,388\,608 = 2^{(3+4+5)} = 2^3 \times (2^4)^5 = 8 \times (16)^5 = 0 \times \boxed{8} \boxed{00000}$$

$$32\,768 = 2^{15} = 2^{(3+4+8)} = 2^3 \times (2^4)^3 = 8 \times (16)^3 = 0 \times \boxed{8} \boxed{000}$$

$$0 \times \boxed{2} \boxed{000} = 2 \times (16)^3 = 2 \times (2^4)^3 = 2^{(1+4+8)} = 2^{13}$$

$$2^{12} = 4096 = 2^{(0+4+8)} = (2^4)^3 = (16)^3 = 0 \times \boxed{1} \boxed{000}$$

$$64 = 2^6 = 2^{(0+2+4)} = 2^2 \times 2^4 = 4 \times 16 = 0 \times \boxed{4} \boxed{0}$$

$$0 \times \boxed{1} \boxed{00} = (16)^2 = (2^4)^2 = 2^{(0+4+2)} = 2^8$$