Do Suggested HW for Section 1.1
Suggested HW and answers on website
www.leahhoward.com

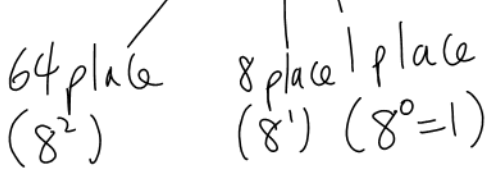
1.1 Decimal and Octal Cont'd

Octal: Base 8

Allowed digits: $0, 1, 2, \ldots, 7$

Decimal	Octal
0	0_8
1	1_8
2	2_8
3	3_8
⋮	
7	7_8
8	10_8
9	11_8
10	12_8
⋮	⋮
63	77_8
64	100_8
65	101_8

Consider 645_8



Ex: Convert to decimal

a) $5604_8 = 5\times8^3 + 6\times8^2 + 0\times8^1 + 4\times8^0$

8^3 place, 8^2 place, 8^1 place, 8^0 place

$= 5\times512 + 6\times64 + 4\times1$

$= 2948$

b) $212_3 = 2\times9 + 1\times3 + 2\times1$

9 place, 3 place, 1 place

$= 23$

What's wrong with writing 218_3?

8 is not an allowed digit.

1.2 Binary and Hexadecimal

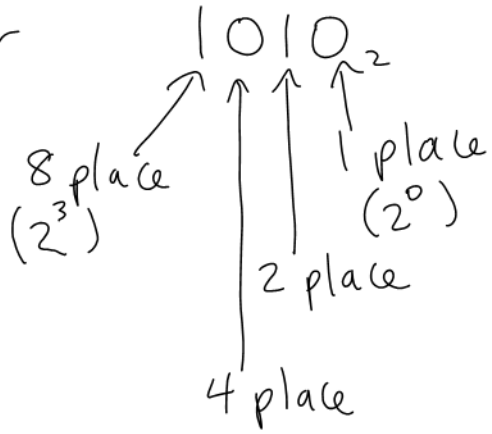
Binary: Base 2

Allowed digits: 0, 1

These are called "bits" or "binary digits"

Decimal	Binary
1	1_2
2	10_2
3	11_2
4	100_2
5	101_2

Consider 1010_2



Ex: Convert to decimal

a) 1100_2 $\uparrow$ 2^3 place, $\uparrow$ 2^2 place, $\uparrow$ 2^1 place, $\uparrow$ 2^0 place

$= 1 \times 2^3 + 1 \times 2^2$

$= 12$

b) 101110_2 $\uparrow$ 2^5 place, $\uparrow$ 2^0 place

$= 1 \times 2^5 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1$

$= 32 + 8 + 4 + 2$

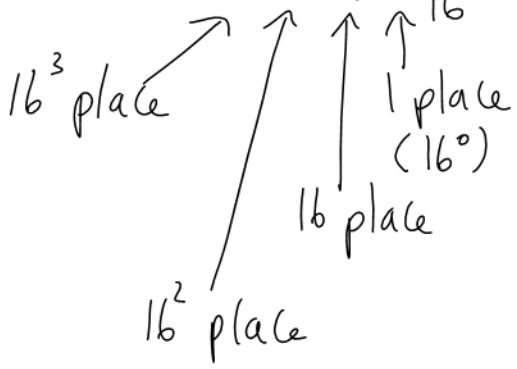
$= 46$

Hexadecimal : Base 16

Allowed digits: $0, 1, \ldots, 9, A, B, C, D, E, F$

Decimal	Hexadecimal
0	0_{16}
⋮	⋮
9	9_{16}
10	A_{16}
11	B_{16}
12	C_{16}
13	D_{16}
14	E_{16}
15	F_{16}
16	10_{16}
17	11_{16}

Consider $BA98_{16}$



Ex: Convert to decimal

a) $2B_{16}$

16 place, 1 place

Hex.	Decimal
9_{16}	9
A_{16}	10
B_{16}	11
C_{16}	12
⋮	

$= 2 \times 16 + \cancel{B}\,11 \times 1$

$= 43$

b) $98003_{16} = 9 \times 16^4 + 8 \times 16^3 + 3 \times 1$

16^4 place, 1 place

$= 622\ 595$

c) $B055_{16} = \cancel{B}\,11 \times 16^3 + 5 \times 16 + 5 \times 1$

16^3 place

$= 45\ 141$

$9_{16} = 9$
$A_{16} = 10$
$B_{16} = 11$