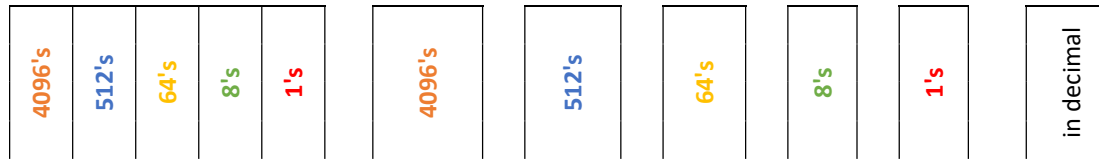


Base 8 (Octal)

Places: The unit of each place is 8 times the unit of the place to the right ($1*8 = 8$, $8*8 = 64$, $64*8 = 512$, $512*8 = 4,096$, etc)

Possible digits: 0 – 7



Examples:

$$\begin{array}{rcllcl}
 573: & & 5 & 7 & 3 & = & & & 5*64 & + & 7*8 & + & 3*1 & = & 379 \\
 4106: & & 4 & 1 & 0 & 6 & = & & 4*512 & + & 1*64 & + & 0*8 & + & 6*1 & = & 2,118 \\
 20531: & 2 & 0 & 5 & 3 & 1 & = & 2*4096 & + & 0*512 & + & 5*64 & + & 3*8 & + & 1*1 & = & 8,537
 \end{array}$$

Base 16 (Hexadecimal)

Places: The unit of each place is 16 times the unit of the place to the right ($1*16 = 16$, $16*16 = 256$, $256*16 = 4,096$, etc)

Possible digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, a, b, c, d, f (So a = 10, b = 11, c = 12, d = 13, e = 14 and f = 15)



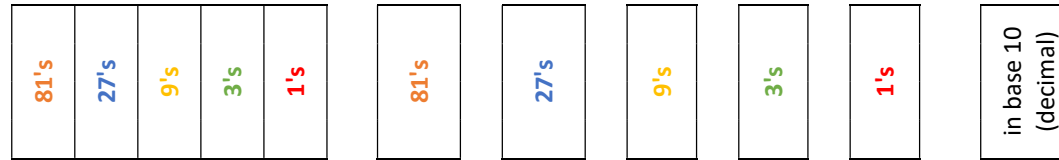
Examples:

$$\begin{array}{rcllcl}
 a7d: & a & 7 & d & = & & & 10*256 & + & 7*16 & + & 13*1 & = & 2,685 \\
 3e0b: & 3 & e & 0 & b & = & 3*4,096 & + & 14*256 & + & 0*16 & + & 11*1 & = & 15,883 \\
 8cf2: & 8 & c & f & 2 & = & 8*4,096 & + & 12*256 & + & 15*16 & + & 2*1 & = & 36,082
 \end{array}$$

Base 3 (Ternary)

Places: The unit of each place is 3 times the unit of the place to the right ($1 \cdot 3 = 3$, $3 \cdot 3 = 9$, $9 \cdot 3 = 27$, $27 \cdot 3 = 81$, etc)

Possible digits: 0, 1 and 2



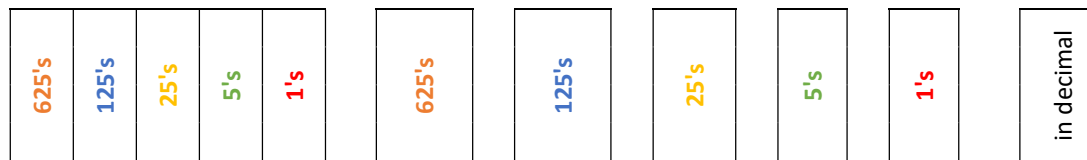
Examples:

$$\begin{array}{r}
 221: \quad \quad \quad 2 \quad 2 \quad 1 = \quad \quad \quad 2 \cdot 9 + 2 \cdot 3 + 1 \cdot 1 = 25 \\
 2102: \quad \quad 2 \quad 1 \quad 0 \quad 2 = \quad \quad 2 \cdot 27 + 1 \cdot 9 + 0 \cdot 3 + 2 \cdot 1 = 65 \\
 12021: \quad 1 \quad 2 \quad 0 \quad 2 \quad 1 = 1 \cdot 81 + 2 \cdot 27 + 0 \cdot 9 + 2 \cdot 3 + 1 \cdot 1 = 142
 \end{array}$$

Base 5 (Quinary)

Places: The unit of each place is 5 times the unit of the place to the right ($1 \cdot 5 = 5$, $5 \cdot 5 = 25$, $25 \cdot 5 = 125$, $125 \cdot 5 = 625$, etc)

Possible digits: 0 – 4



Examples:

$$\begin{array}{r}
 423: \quad \quad \quad 4 \quad 2 \quad 3 = \quad \quad \quad 4 \cdot 25 + 2 \cdot 5 + 3 \cdot 1 = 113 \\
 1234: \quad \quad 1 \quad 2 \quad 3 \quad 4 = \quad \quad 1 \cdot 125 + 2 \cdot 25 + 3 \cdot 5 + 4 \cdot 1 = 194 \\
 23041: \quad 2 \quad 3 \quad 0 \quad 4 \quad 1 = 2 \cdot 625 + 3 \cdot 125 + 0 \cdot 25 + 4 \cdot 5 + 1 \cdot 1 = 1646
 \end{array}$$

Homework Example - Count to 25 in base 5.

(Hint: Remember you cannot use any digits other than 0-4 in base 5.)

base 5	25's	5's	1's		25's	5's	1's		base 10
0:			0	=			0*1	=	0
1:			1	=			1*1	=	1
2:			2	=			2*1	=	2
3:			3	=			3*1	=	3
4:			4	=			4*1	=	4
10:		1	0	=		1*5	+ 0*1	=	5
11:		1	1	=		1*5	+ 1*1	=	6
12:		1	2	=		1*5	+ 2*1	=	7
13:		1	3	=		1*5	+ 3*1	=	8
14:		1	4	=		1*5	+ 4*1	=	9
20:		2	0	=		2*5	+ 0*1	=	10
21:		2	1	=		2*5	+ 1*1	=	11
22:		2	2	=		2*5	+ 2*1	=	12
23:		2	3	=		2*5	+ 3*1	=	13
24:		2	4	=		2*5	+ 4*1	=	14
30:		3	0	=		3*5	+ 0*1	=	15
31:		3	1	=		3*5	+ 1*1	=	16
32:		3	2	=		3*5	+ 2*1	=	17
33:		3	3	=		3*5	+ 3*1	=	18
34:		3	4	=		3*5	+ 4*1	=	19
40:		4	0	=		4*5	+ 0*1	=	20
41:		4	1	=		4*5	+ 1*1	=	21
42:		4	2	=		4*5	+ 2*1	=	22
43:		4	3	=		4*5	+ 3*1	=	23
44:		4	4	=		4*5	+ 0*1	=	24
100:	1	0	0	=	1*25	+ 0*5	+ 0*1	=	25