COUNTING

1 2 3

1 2 3 10² 10¹ 10⁰ 1 2 3

10¹

10⁰

10²

$$= 1 \times 10^{2} + 2 \times 10^{1} + 3 \times 10^{0}$$

$$= 1 \times 100 + 2 \times 10 + 3 \times 1$$

$$= 123$$

$$= 4 \times 10^{3} + 1 \times 10^{2} + 2 \times 10^{1} + 3 \times 10^{0}$$

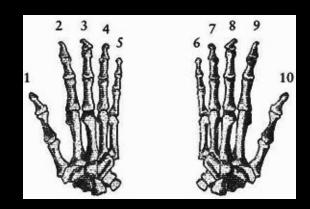
$$= 4 \times 10^{3} + 1 \times 10^{2} + 2 \times 10^{1} + 3 \times 10^{0}$$

$$= 4 \times 1000 + 1 \times 100 + 2 \times 10 + 3 \times 1$$

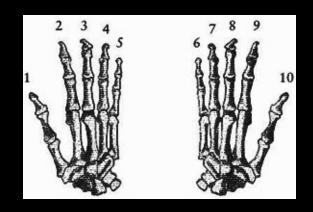
$$= 4 \times 10^{3} + 1 \times 10^{2} + 2 \times 10^{1} + 3 \times 10^{0}$$

$$= 4 \times 1000 + 1 \times 100 + 2 \times 10 + 3 \times 1$$

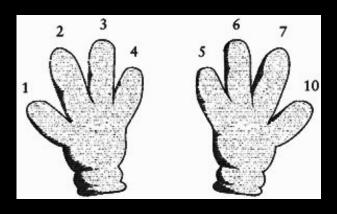
$$= 4123$$



human hand



human hand



cartoon character's hand

1 2 3 (octal)

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8² 8¹ 8⁰

2 3 (octal) 8² 8¹ 8⁰

$$= 1 \times 8^2 + 2 \times 8^1 + 3 \times 8^0$$

2 3 (octal) 8² 8¹ 8⁰

$$= 1 \times 8^{2} + 2 \times 8^{1} + 3 \times 8^{0}$$

$$= 1 \times 64 + 2 \times 8 + 3 \times 1$$

(octal)

8²

$$= 1 \times 8^2 + 2 \times 8^1 + 3 \times 8^0$$

$$= 1 \times 64 + 2 \times 8 + 3 \times 1$$

= 83 (decimal)

decimal octal 8

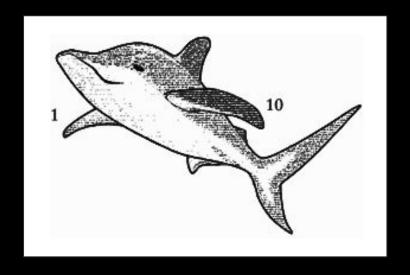
decimal octal

? ----

decimal octal 16 ?

decimal octal

100



what now?

0, 1, ...

0, 1, 10, ...

0, 1, 10, 11, ...

0, 1, 10, 11, 100, ...

0, 1, 10, 11, 100, 101, ...

0, 1, 10, 11, 100, 101, 110

(binary)

2² 2¹ 2⁰ (binary)

2² 2¹ 2⁰ (binary)

$$= 1 \times 2^{2} + 1 \times 2^{1} + 0 \times 2^{0}$$

2² 2¹ 2⁰ (binary)

$$= 1 \times 2^{2} + 1 \times 2^{1} + 0 \times 2^{0}$$

$$= 1 \times 4 + 1 \times 2 + 0 \times 1$$

(binary)

$$= 1 \times 2^{2} + 1 \times 2^{1} + 0 \times 2^{0}$$

$$= 1 \times 4 + 1 \times 2 + 0 \times 1$$

$$= 6 \text{ (decimal)}$$

2 3 4 5 6 0, 1, 10, 11, 100, 101, 110

place value systems

$$N = d_n * R^{n-1} + ... + d_2 * R^1 + d_1 *$$

 $d \in \{0, 1, ... R-1\}$

R≥2