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Introduction to Computers



475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1 PHONE: +1(604)558-8727, +1(604)409-8200

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BINARY?

- Yes / No, Ones / Zeros
- It is the principles of computer science
- Only 2 possibilities
- Combination of binary will represent

TEXT GAME IMAGE MUSIC VIDEO PROGRAM



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NUMBERS

Dividend ÷ Divisor = Quotient

154 ÷ 4

38

Remainder

 $R \rightarrow 2$

Place the value table 154 = (1x100) + (5x10) + (4x1)



REAL NUMBERS

• Dividend \div Divisor = Quotient 0.154 \div 4 = 0.0385 475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1 PHONE: +1(604)558-8727, +1(604)409-8200

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Place the value table 0.154 = (1x0.1) + (5x0.01) + (4x0.001)



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SUCCESSIVE POWERS

Infinite series of 10

$$1 + 10 + 100 + 1,000 + 10,000 + ...$$

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

Infinite series of 2

$$1 + 2 + 4 + 8 + 16 + \dots$$

$$2^0 + 2^1 + 2^2 + 2^3 + 2^4 + \dots$$



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CONVERTING BINARY TO DECIMAL

• Binary Number: 10101

Binary number	1	0	1	0	1
Successive powers of 2	24	2 ³	2 ²	2 ¹	20
calculation	1 x 16	0 x 8	1 x 4	0 x 2	1 x 1
decimal	16	0	4	0	1

$$10101 = 16 + 0 + 4 + 0 + 1$$

$$10101 = 21$$



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CONVERTING DECIMAL TO BINARY

• Decimal Number: 51

2	51	remainder -> 1
2	25	remainder -> 1
2	12	remainder -> 0
2	6	remainder -> 0
2	3	remainder -> 1
2	1	remainder -> 1

110011



BASIC CALCULATION

$$-2^8 = 256$$

$$\cdot 2^{16} = 65,536$$

$$\bullet 2^{32} = 4,294,967,296 (4 billion)$$

$$\bullet 2^{64} = 18$$
 quintillion

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ASCII - 1960s

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UTF - 8

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BACKWARDS COMPATIBLE WITH ASCII



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EXERCISE BINARY TO DECIMAL

- ·01001000?
- ·01000101?
- ·01001100?
- ·01001100?
- ·01001111?



Thank You!

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