1. Name two advantages of digital data as compared to analog data.

1. 0-0.8V 低电平，2-5V 高电平，都是区间 抗干扰
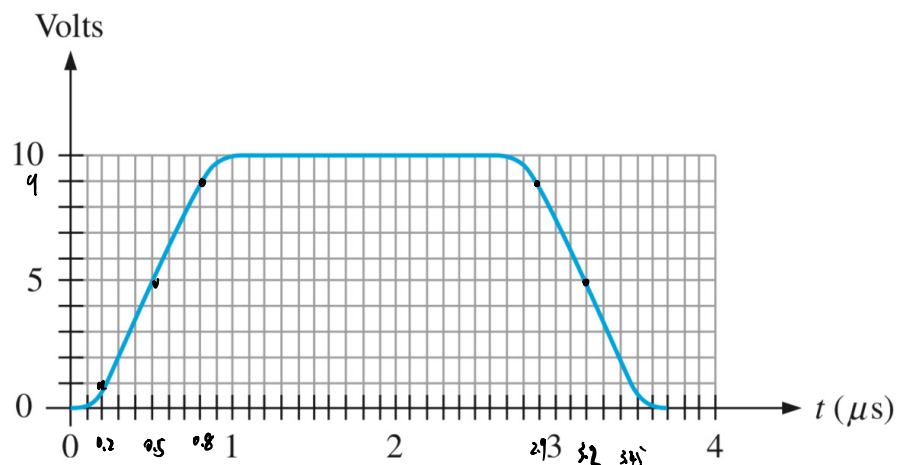2. 离散的 01 信号，可能连续出现若干 01 方便压缩，另外 01 两种状态易用物理表示，方便存储。

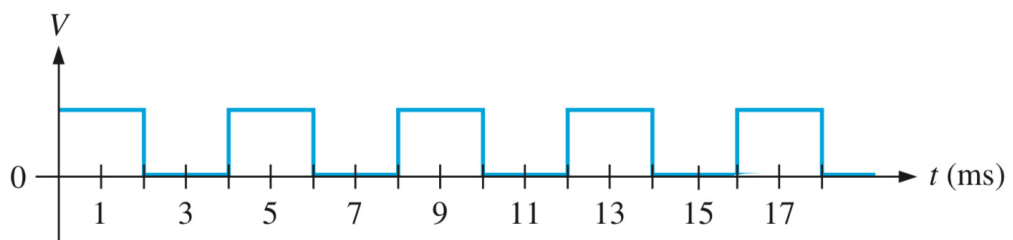**2.** Name an analog quantity other than temperature and sound.

压力

7. For the pulse shown in Figure 1–60, graphically determine the following:

    (a) rise time   **(b)** fall time   **(c)** pulse width   **(d)** amplitude
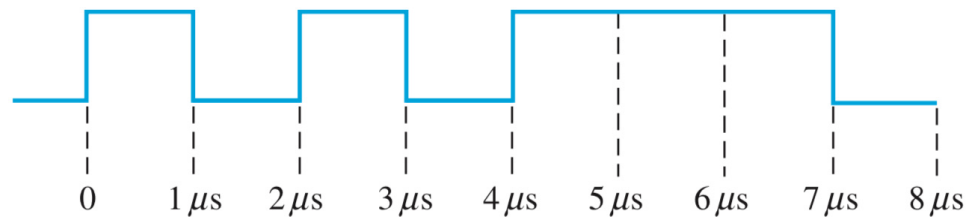

(a) 0.6 μs   (b) 0.55 μs   (c) 2.7 μs   (d) 10 V

11. Determine the duty cycle of the waveform in Figure 1–61.

$T_W = 2\,ms$, $T = 4\,ms$, Duty Cycle $= \dfrac{2\,ms}{4\,ms} \times 100\% = 50\%$

13. What is the total serial transfer time for the eight bits in Figure 1–62? What is the total parallel transfer time?

14. What is the period if the clock frequency is 3.5 GHz?

| | 0 | 1 μs | 2 μs | 3 μs | 4 μs | 5 μs | 6 μs | 7 μs | 8 μs |

13. serial: $8\,\mu s$

parallel: $1\,\mu s$

14. $T = 1/3.5GHz \approx 0.29\ ns$

6. List the sequence of levels (HIGH and LOW) that represent each of the following bit sequences:

    (a) 1 0 1 1 1 0 1   (b) 1 1 1 0 1 0 0 1

(a) HIGH 简写H, LOW 简写L

    H L H H H L H

(b) H H H L H L L H

2. Express each of the following decimal numbers as a power of ten:

    (a) 10   (b) 100   (c) 10,000   d) 1,000,000

(a) 10^1 (b) 10^2 (c) 10^4 (d) 10^6

6. Convert the following binary numbers to decimal:

    (a) 1110   (b) 1010   (c) 11100   (d) 10000

    (e) 10101   (f) 11101   (g) 10111   (h) 11111

(a) $8+4+2 = 14$ (b) $8+2 = 10$ (c) $16+8+4 = 28$ (d) 16
(e) $16+4+1 = 21$ (f) $16+8+4+1 = 29$ (g) $16+4+2+1 = 23$ (h) $16+8+4+2+1 = 31$

10. Generate the binary sequence for each decimal sequence:

   (a) 0 through 7   (b) 8 through 15   (c) 16 through 31

   (d) 32 through 63   (e) 64 through 75

(a) 000, 001, 010, 011, 100, 101, 110, 111

(b) 1000, 1001, 1010, 1011, 1100, 1101, 1110, 1111

(c) 10000, 10001, 10010, 10011, 10100, 10101, 10110, 10111,
    11000, 11001, 11010, 11011, 11100, 11101, 11110, 11111

(d) 1100000, 100001, 100010, 100011, 100100, 100101, 100110,
    100111, 101000, 101001, 101010, 101011, 101100, 101101,
    101110, 101111, 110000, 110001, 110010, 110011, 110100,
    110101, 110110, 110111, 111000, 111001, 111010, 111011,
    111100, 111101, 111110, 111111

(e) 1000000, 1000001, 1000010, 1000011, 1000100,
    1000101, 1000110, 1000111, 1001000, 1001001,
    1001010, 1001011, 1001100, 1001101, 1001110,
    1001111

16. Use direct subtraction on the following binary numbers:

   (a) $11 - 1$ (b) $101 - 100$ (c) $110 - 101$

   (d) $1110 - 11$ (e) $1100 - 1001$ (f) $11010 - 10111$

(a) 10   (b) 1   (c) 1   (d) 1011   (e) 11   (f) 11

20. How is zero represented in 2's complement form?

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24. Express each decimal number as an 8-bit number in the 1's complement form:

   (a) -34 **(b)** $+57$ **(c)** -99 **(d)** $+115$

(a) $34 = 32 + 2$,   00100010

    $\therefore -34 : 11011101$

(b) $57 = 32 + 16 + 8 + 1$,   00111001

(c) $99 = 64 + 32 + 2 + 1$,   01100011

    $\therefore -99 : 10011100$

(d) $115 = 64 + 32 + 16 + 2 + 1$,   01110011