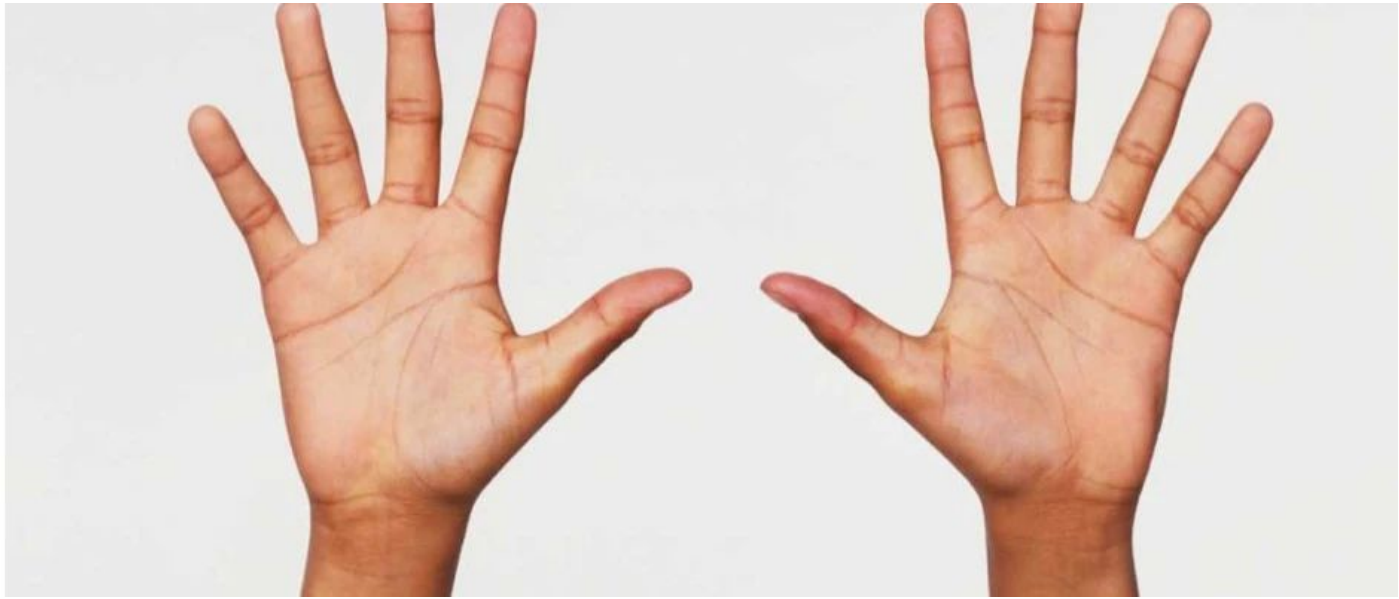
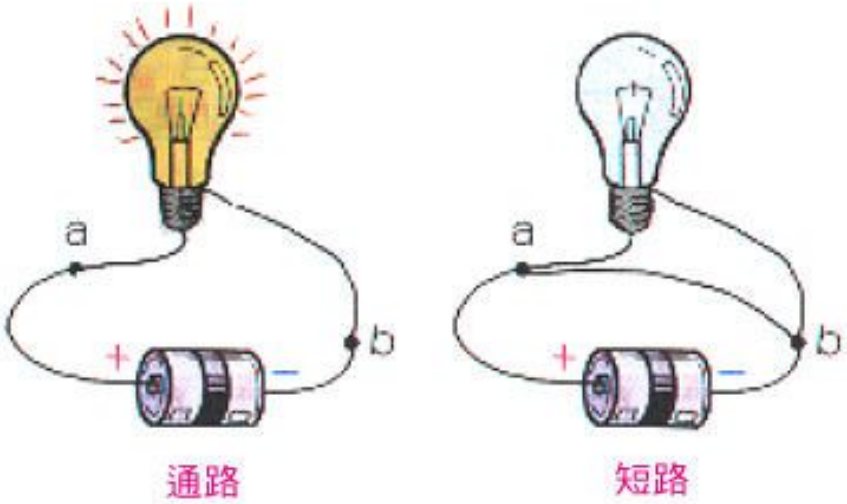
🎮 用指頭描述事物(人類)



資料來源:
取自Science Focus網站
https://www.sciencefocus.com/the-human-body/why-do-we-have-lines-on-the-palms-of-our-hands/

使用「0 與 1」描述事物（電腦）



資料來源：
取自科學小芽子網站
http://www.bud.org.tw/answer/9906/990626.htm

二顆燈泡

4 種 Pattern (形式)

資料來源：取自 Lazada網站
https://www.lazada.com.ph/products/globe-light-bulb-retro-dimmable-led-light-bulb-e27-tungsten-filament-bulb-dimmable-led-bulb-i548128150.html

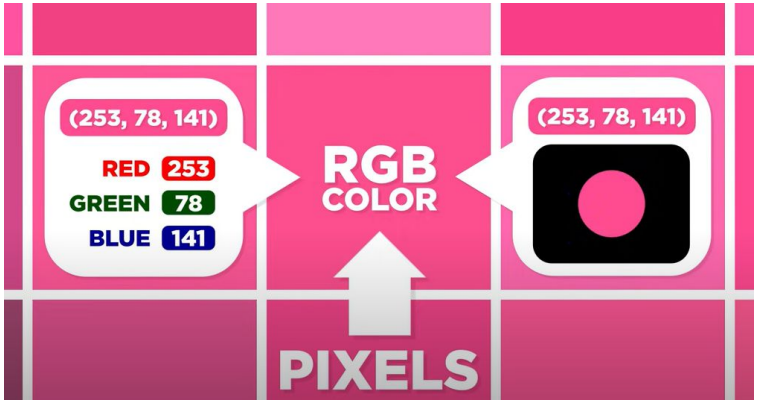
🎮 八顆燈泡

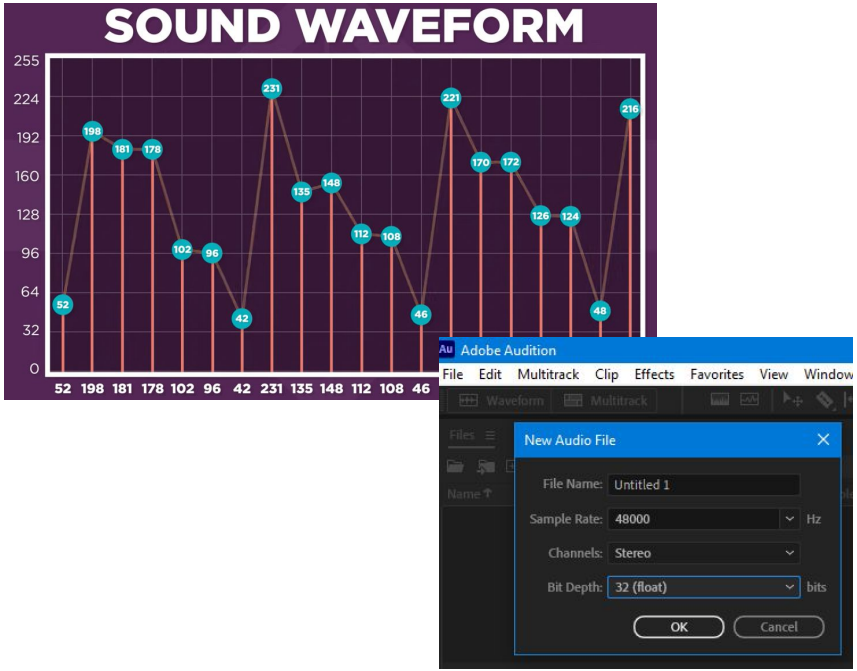
有幾種 Pattern (狀態)？

資料來源：取自 Lazada網站
https://www.lazada.com.ph/products/globe-light-bulb-retro-dimmable-led-light-bulb-e27-tungsten-filament-bulb-dimmable-led-bulb-i548128150.html

🎮二進制(Binary)與資料(Data)

資料來源:
Code.org(2018), *Binary & Data*, 取自Youtube網站
https://www.youtube.com/watch?v=USCBCmwMCDA





資料來源:
Code.org(2018), *Binary & Data*, 取自Youtube網站
https://www.youtube.com/watch?v=USCBCmwMCDA

🎮 Bit & Byte

1 Bit

1 Byte

資料來源：取自 Lazada網站
https://www.lazada.com.ph/products/globe-light-bulb-retro-dimmable-led-light-bulb-e27-tungsten-filament-bulb-dimmable-led-bulb-i548128150.html

Werner Buchholz Coins the Term "Byte", Deliberately Misspelled to Avoid Confusion with Bit

7/1956
Permalink

Image Source: computer-history.info

Operator's console and part of the overall system of the IBM 7030 Stretch, IBM's first transistorized supercomputer.

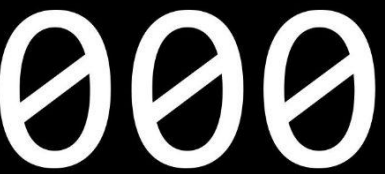
In July 1956 German born American computer scientist Werner Buchholz coined the term byte as a unit of digital information during the early design phase for the IBM 7030 Stretch, IBM's first transistorized supercomputer. A byte was an ordered collection of bits, which were the smallest amounts of data that a computer could process ("bite").The Stretch incorporated addressing to the bit, and variable field length (VFL) instructions with a byte size encoded in the instruction. Byte was a deliberate respelling of bite to avoid accidental confusion with bit.

"Early computers used a variety of 4-bit binary coded decimal (BCD) representations and the 6-bit codes for printable graphic patterns common in the U.S. Army (Fieldata) and Navy. These representations included alphanumeric

資料來源：取自 HistoryOfInformation網站
https://www.historyofinformation.com/detail.php?entryid=4771

~~Bite~~
Byte

資料來源:
CuriousMarc(2014), *1964 IBM 029 Keypunch Card Punching Demonstration*, 取自Youtube網站 https://www.youtube.com/watch?v=YnnGbcM-H8c&t=27s



資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

001

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

010

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

011

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

100

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

101

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

110

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

111

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

123

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

1

123

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

10 1

123

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

100 10 1

123

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

100 10 1

123

100 × 1

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

100 10 1

123

100 × 1 + 10 × 2

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

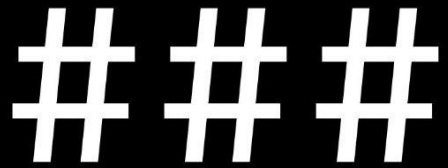
100 10 1

123

100 × 1 + 10 × 2 + 1 × 3

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

100 10 1



資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

10^2 10^1 10^0

###

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

2^2 2^1 2^0

# # #

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

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資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

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資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

001

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

0 1 0

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

011

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

100

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

101

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

110

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

4 2 1

111

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

A

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

65

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

01000001

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

ASCII

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

American **S**tandard **C**ode for **I**nformation **I**nterchange

ASCII TABLE

Decimal	Hexadecimal	Binary	Octal	Char
0	0	0	0	[NULL]
1	1	1	1	[START OF HEADING]
2	2	10	2	[START OF TEXT]
3	3	11	3	[END OF TEXT]
4	4	100	4	[END OF TRANSMISSION]
5	5	101	5	[ENQUIRY]
6	6	110	6	[ACKNOWLEDGE]
7	7	111	7	[BELL]
8	8	1000	10	[BACKSPACE]
9	9	1001	11	[HORIZONTAL TAB]
10	A	1010	12	[LINE FEED]
11	B	1011	13	[VERTICAL TAB]
12	C	1100	14	[FORM FEED]
13	D	1101	15	[CARRIAGE RETURN]
14	E	1110	16	[SHIFT OUT]
15	F	1111	17	[SHIFT IN]
16	10	10000	20	[DATA LINK ESCAPE]
17	11	10001	21	[DEVICE CONTROL 1]
18	12	10010	22	[DEVICE CONTROL 2]
19	13	10011	23	[DEVICE CONTROL 3]
20	14	10100	24	[DEVICE CONTROL 4]
21	15	10101	25	[NEGATIVE ACKNOWLEDGE]
22	16	10110	26	[SYNCHRONOUS IDLE]
23	17	10111	27	[ENG OF TRANS. BLOCK]
24	18	11000	30	[CANCEL]
25	19	11001	31	[END OF MEDIUM]
26	1A	11010	32	[SUBSTITUTE]
27	1B	11011	33	[ESCAPE]
28	1C	11100	34	[FILE SEPARATOR]
29	1D	11101	35	[GROUP SEPARATOR]
30	1E	11110	36	[RECORD SEPARATOR]
31	1F	11111	37	[UNIT SEPARATOR]
32	20	100000	40	[SPACE]
33	21	100001	41	!
34	22	100010	42	"
35	23	100011	43	#
36	24	100100	44	$
37	25	100101	45	%
38	26	100110	46	&
39	27	100111	47	'
40	28	101000	50	(
41	29	101001	51	)
42	2A	101010	52	*
43	2B	101011	53	+
44	2C	101100	54	,
45	2D	101101	55	-
46	2E	101110	56	.
47	2F	101111	57	/
48	30	110000	60	0
49	31	110001	61	1
50	32	110010	62	2
51	33	110011	63	3
52	34	110100	64	4
53	35	110101	65	5
54	36	110110	66	6
55	37	110111	67	7
56	38	111000	70	8
57	39	111001	71	9
58	3A	111010	72	:
59	3B	111011	73	;
60	3C	111100	74	<
61	3D	111101	75	=
62	3E	111110	76	>
63	3F	111111	77	?
64	40	1000000	100	@
65	41	1000001	101	A
66	42	1000010	102	B
67	43	1000011	103	C
68	44	1000100	104	D
69	45	1000101	105	E
70	46	1000110	106	F
71	47	1000111	107	G
72	48	1001000	110	H
73	49	1001001	111	I
74	4A	1001010	112	J
75	4B	1001011	113	K
76	4C	1001100	114	L
77	4D	1001101	115	M
78	4E	1001110	116	N
79	4F	1001111	117	O
80	50	1010000	120	P
81	51	1010001	121	Q
82	52	1010010	122	R
83	53	1010011	123	S
84	54	1010100	124	T
85	55	1010101	125	U
86	56	1010110	126	V
87	57	1010111	127	W
88	58	1011000	130	X
89	59	1011001	131	Y
90	5A	1011010	132	Z
91	5B	1011011	133	[
92	5C	1011100	134	\
93	5D	1011101	135	]
94	5E	1011110	136	^
95	5F	1011111	137	_
96	60	1100000	140	`
97	61	1100001	141	a
98	62	1100010	142	b
99	63	1100011	143	c
100	64	1100100	144	d
101	65	1100101	145	e
102	66	1100110	146	f
103	67	1100111	147	g
104	68	1101000	150	h
105	69	1101001	151	i
106	6A	1101010	152	j
107	6B	1101011	153	k
108	6C	1101100	154	l
109	6D	1101101	155	m
110	6E	1101110	156	n
111	6F	1101111	157	o
112	70	1110000	160	p
113	71	1110001	161	q
114	72	1110010	162	r
115	73	1110011	163	s
116	74	1110100	164	t
117	75	1110101	165	u
118	76	1110110	166	v
119	77	1110111	167	w
120	78	1111000	170	x
121	79	1111001	171	y
122	7A	1111010	172	z
123	7B	1111011	173	{
124	7C	1111100	174	|
125	7D	1111101	175	}
126	7E	1111110	176	~
127	7F	1111111	177	[DEL]

資料來源:取自Wiki網站
https://en.wikipedia.org/wiki/File:ASCII-Table.svg

...	A	B	C	D	E	F	G	H	I	...
...	65	66	67	68	69	70	71	72	73	...

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

H	I	!
72	73	33

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf

H	I	!
01001000	01001001	00100001

資料來源：
HavardX CS50x(2022), *CS50's Introduction to Computer Science*, 取自edX網站
https://cdn.cs50.net/2021/fall/lectures/0/lecture0.pdf