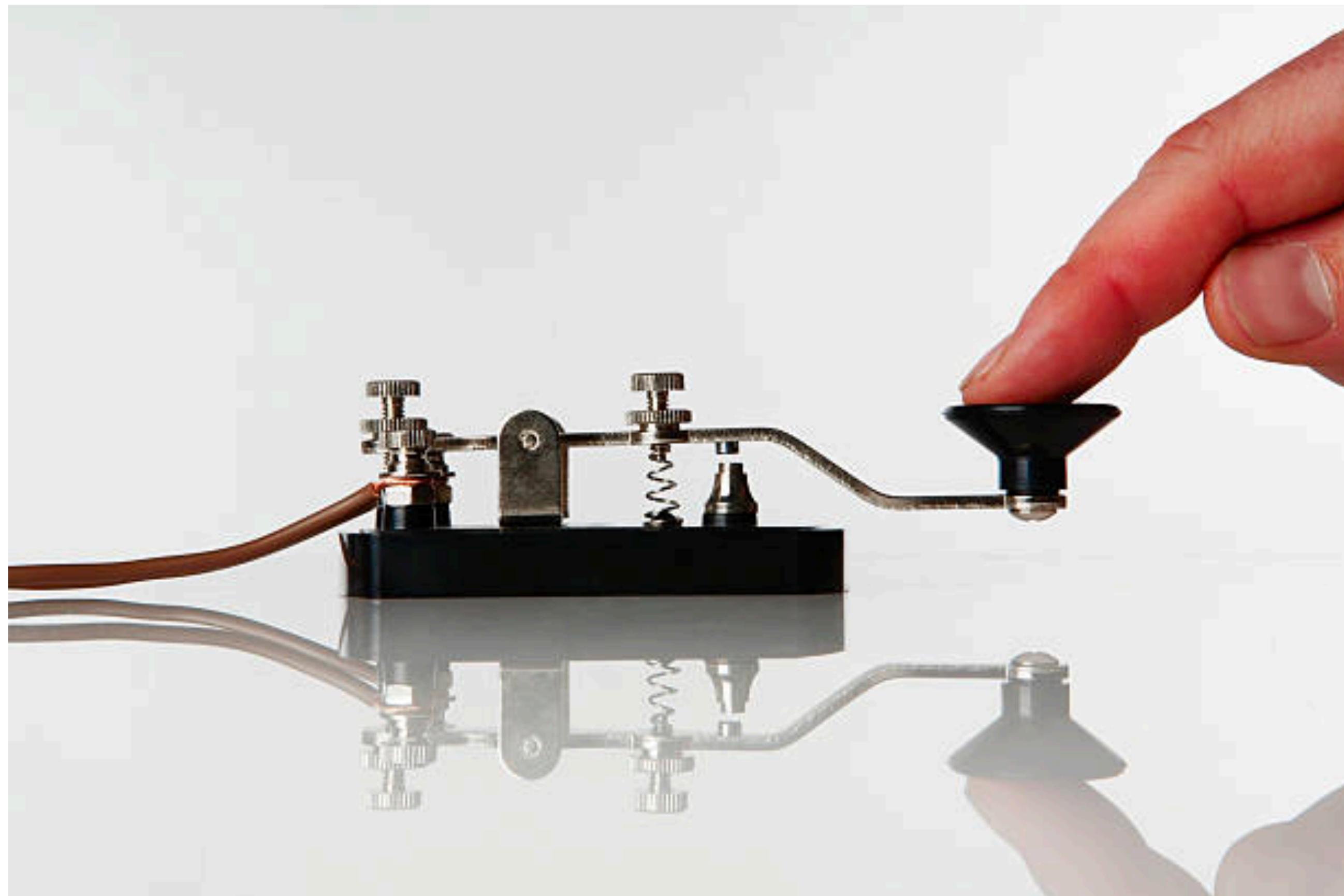


Coding and Binary!

Codierung und Binär

25.01.2024, Lili Wilson

What are some examples of “codes” that you know of?



A • -
B - • . .
C - • - .
D - • .
E •
F . . - - :
G - - - :
H
I . . .
J . - - - -
K - . - -
L . - . .
M - - -
N - .
O - - -
P . - - - .
Q - - - . -
R . - - .
S . . .
T - - -

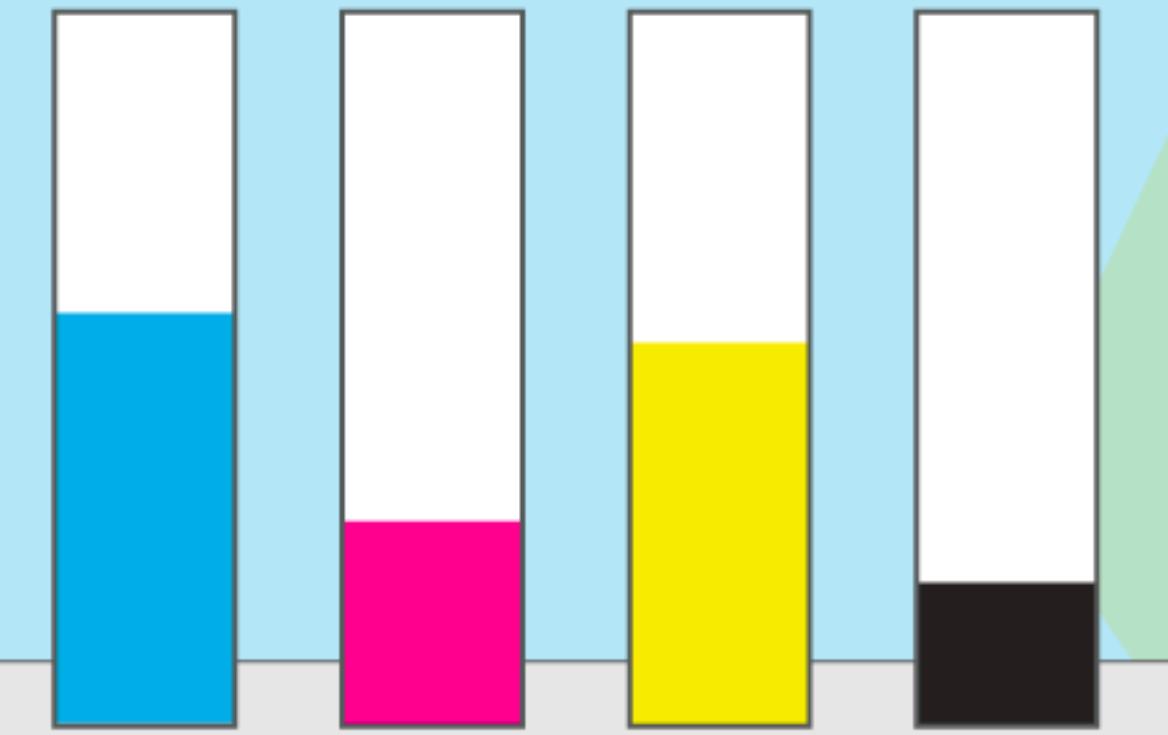
U • . . -
V . . - -
W . - - -
X - - . -
Y - - . - -
Z - - . .

1 • - - - -
2 • . - - -
3 • . . - -
4 • . . . -
5 •
6 - - . . .
7 - - . . .
8 - - . . .
9 - - . . .
0 - - - -





Ink is running low

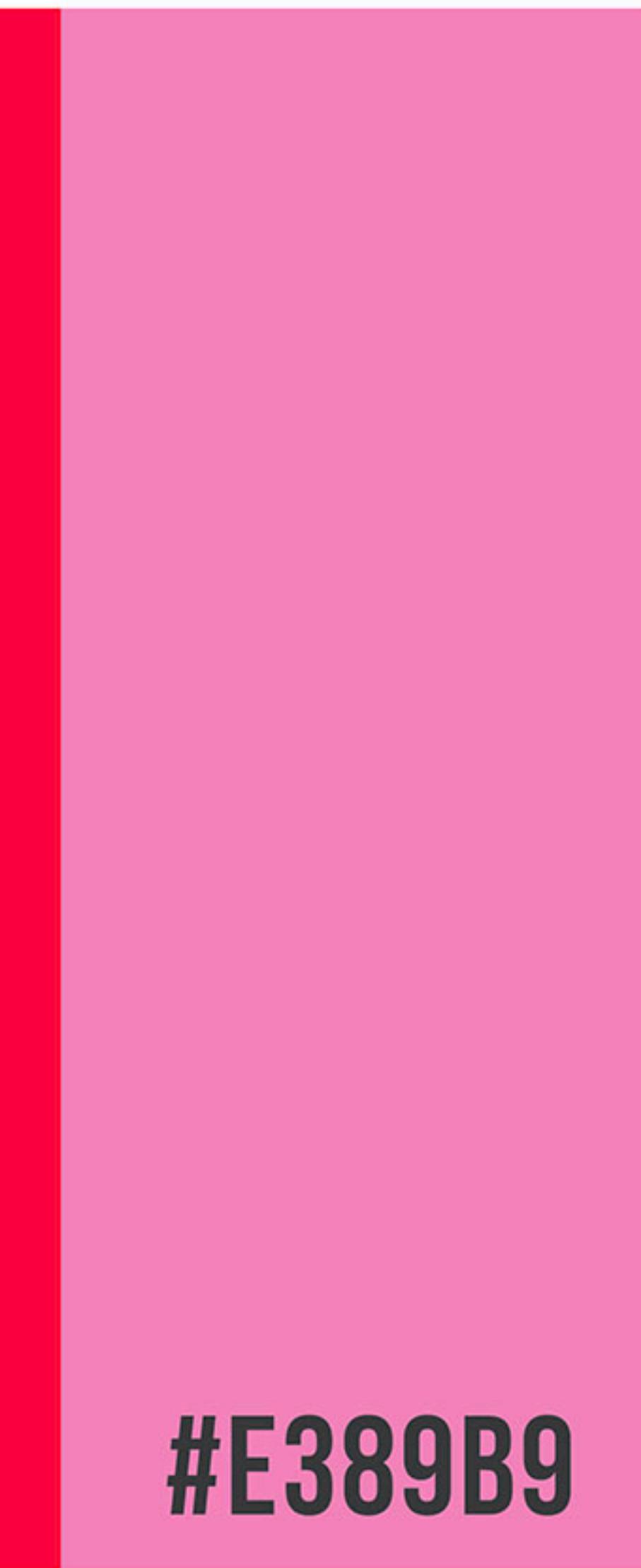




#FFCE30



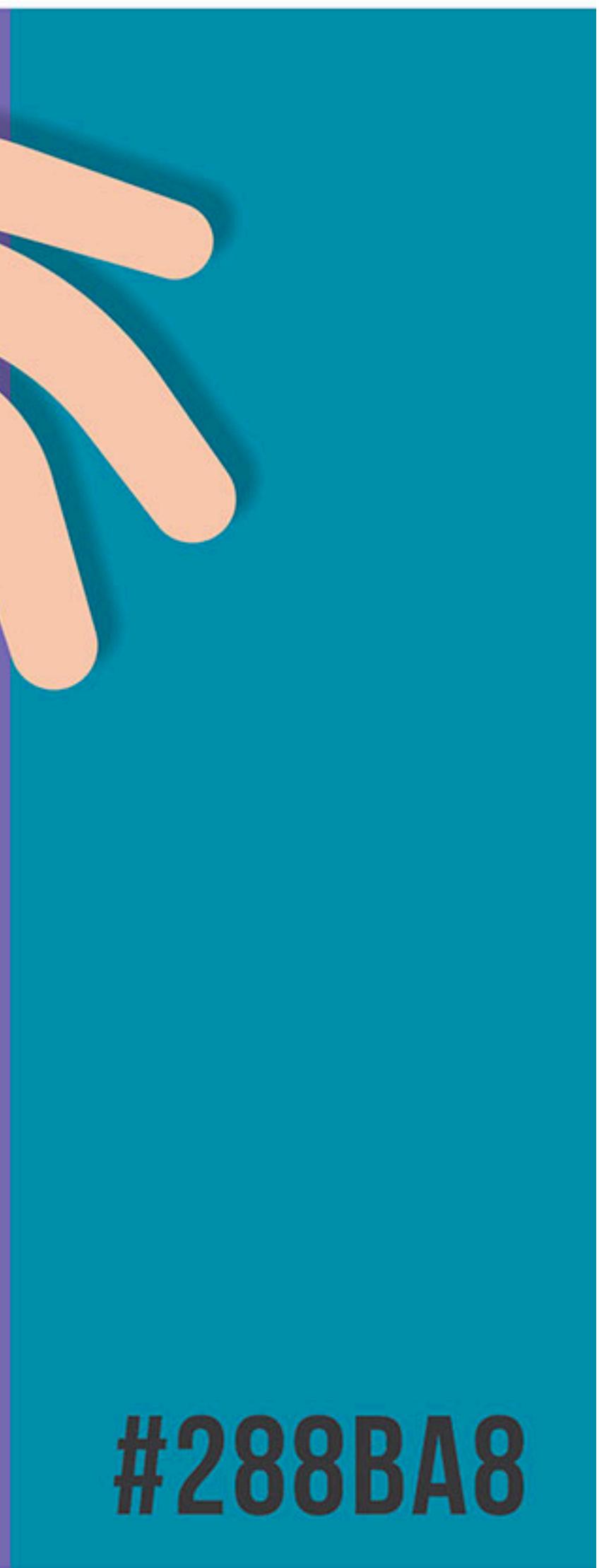
#E83845



#E389B9



#746AB0

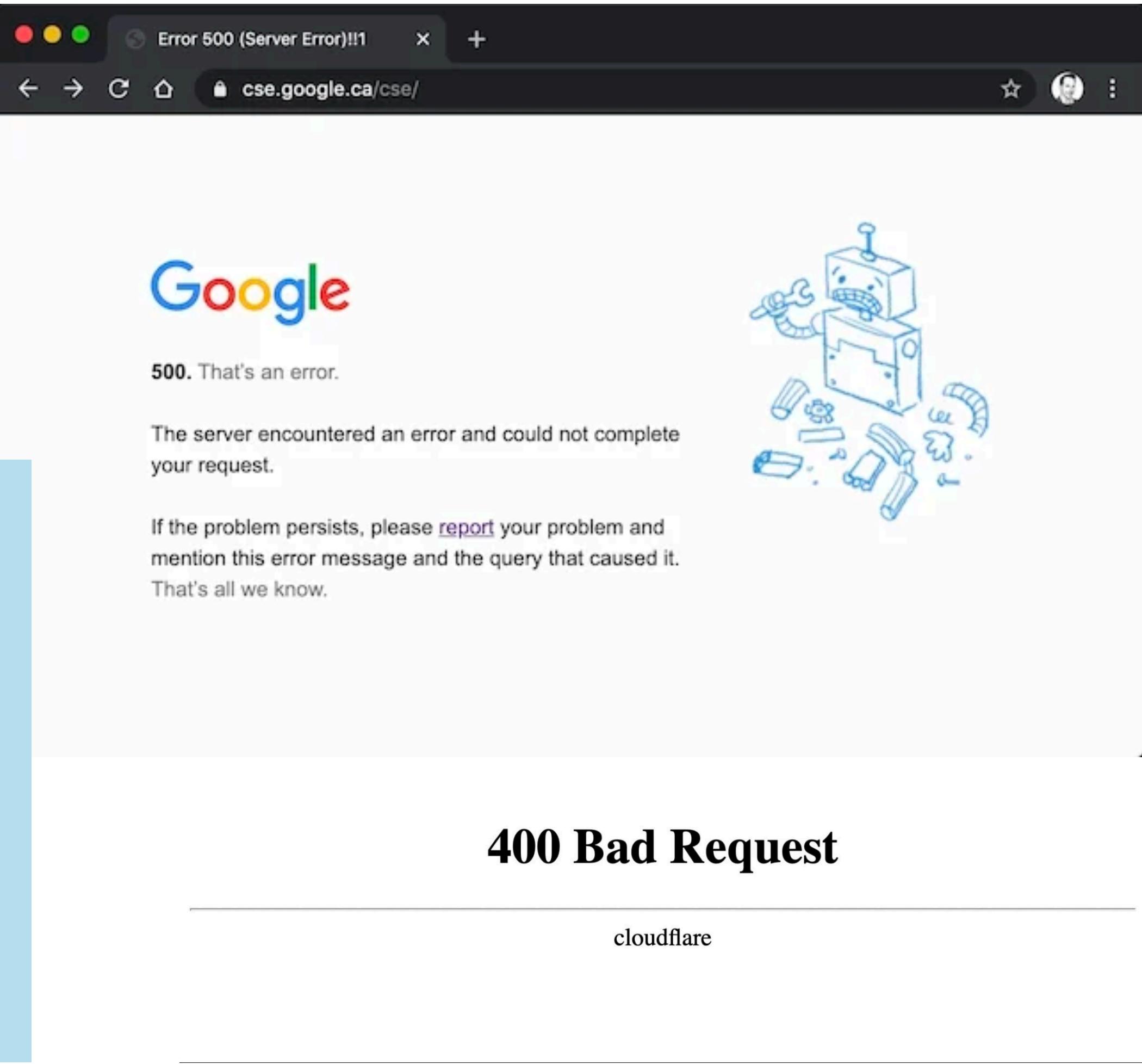
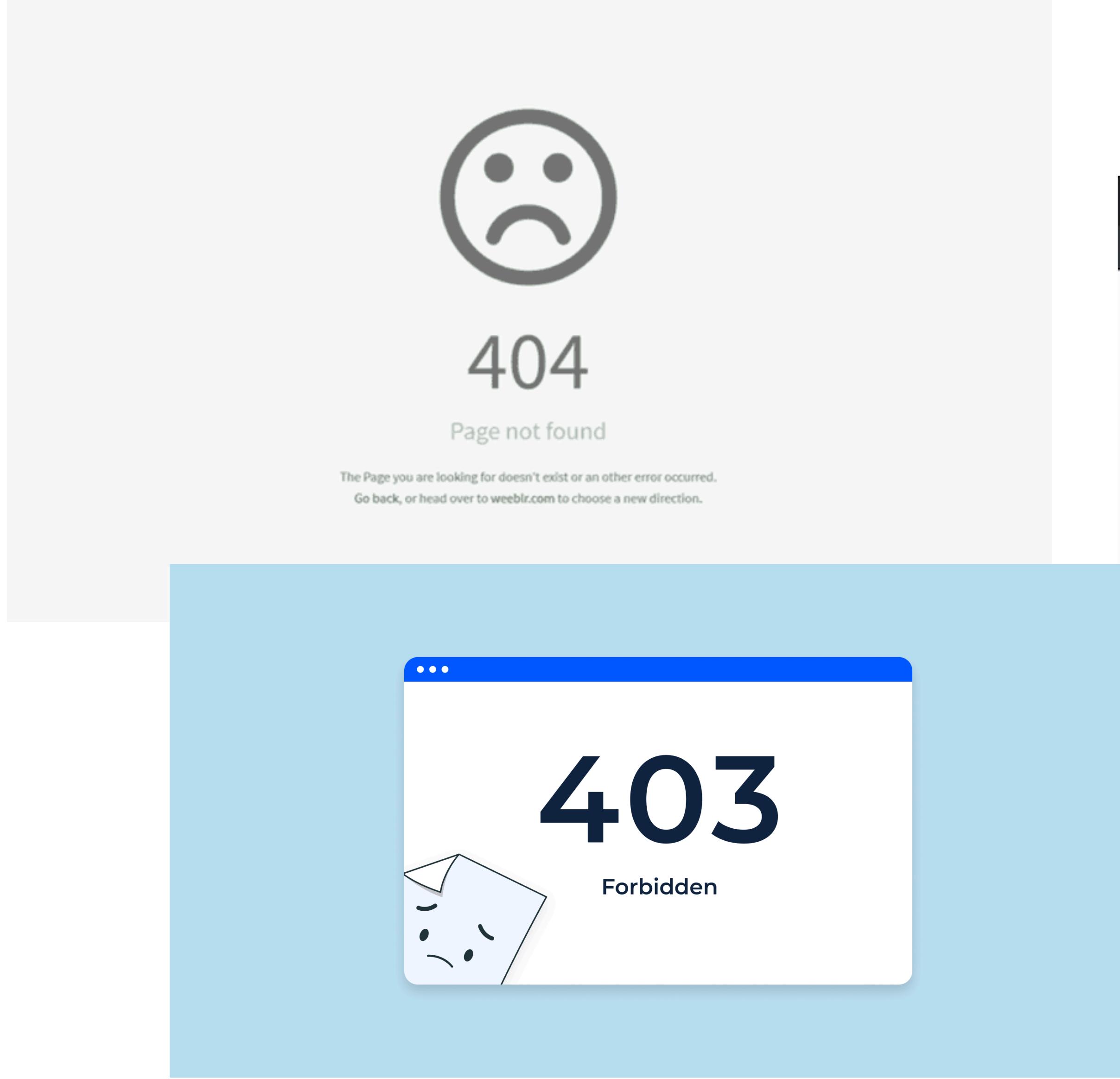


#288BA8









Why do we encode information?

- Make information easier to transport and store
- Convert information into different forms so it can be understood
- Security, when the encoding/decoding method is kept secret
 - Encryption (Verschlüsselung)
- Error checking and correction

How is all data encoded in computer science?

How is all data encoded in computer science?

- Binary code (Binärcode)



A large grid of binary code characters (0s and 1s) forming a pattern of vertical bars of varying widths. The grid is composed of approximately 10 columns and 15 rows of binary digits. The pattern creates a visual representation of digital data.

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Binary and Hexadecimal Systems

Binary and Hexadecimal Systems

Letter	ASCII Value	Binary
A	65	1000001
B	66	1000010
C	67	1000011
D	68	1000100
E	69	1000101
F	70	1000110
G	71	1000111
H	72	1001000
I	73	1001001
J	74	1001010
K	75	1001011
L	76	1001100
M	77	1001101

Letter	ASCII Value	Binary
N	78	1001110
O	79	1001111
P	80	1010000
Q	81	1010001
R	82	1010010
S	83	1010011
T	84	1010100
U	85	1010101
V	86	1010110
W	87	1010111
X	88	1011000
Y	89	1011001
Z	90	1011010

Binary and Hexadecimal Systems

Letter	ASCII Value	Binary	Hexadecimal
A	65	1000001	41
B	66	1000010	42
C	67	1000011	43
D	68	1000100	44
E	69	1000101	45
F	70	1000110	46
G	71	1000111	47
H	72	1001000	48
I	73	1001001	49
J	74	1001010	4A
K	75	1001011	4B
L	76	1001100	4C
M	77	1001101	4D

Letter	ASCII Value	Binary	Hexadecimal
N	78	1001110	4E
O	79	1001111	4F
P	80	1010000	50
Q	81	1010001	51
R	82	1010010	52
S	83	1010011	53
T	84	1010100	54
U	85	1010101	55
V	86	1010110	56
W	87	1010111	57
X	88	1011000	58
Y	89	1011001	59
Z	90	1011010	5A

Binary and Hexadecimal Systems

Letter	ASCII Value	Binary	Hexadecimal
A	65	1000001	41
B	66	1000010	42
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T	84	1010100	54
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V	86	1010110	56
W	87	1010111	57
X	88	1011000	58
Y	89	1011001	59
Z	90	1011010	5A

ASCII represents the encoding for possible characters (*Zeichen*) in the Decimal, Binary, and Hexadecimal systems.

Number systems (Zahlensystem)

Definition: Zahlensystem

Die *Basis* eines *Zahlensystems* ist die Anzahl der insgesamt verfügbaren Ziffern.

- In the Decimal system (Dezimalsystem), the *Basis* is 10
 - 0, 1, 2, ..., 9
- Binary system (Binär-/Dual-System), the *Basis* is 2
 - 0 and 1
- Hexadecimal system (Hexadezimalsystem), the *Basis* is 16
 - 0, 1, 2, ..., 9, A (=10), B (=11), ..., F (=15)

Addition in Binary

$$\begin{array}{r} 199 \\ + \quad 1 \\ \hline \end{array}$$

$$\begin{array}{r} 1011 \\ + 0001 \\ \hline \end{array}$$

$$\begin{array}{r} 285 \\ + 767 \\ \hline \end{array}$$

$$\begin{array}{r} 1111 \\ + 0110 \\ \hline \end{array}$$

General tips

- Addition and subtraction in *binary* and *hexadecimal* is similar to decimal, but you must remember the **number of symbols** you are working with
- If you are not sure about how to do something in binary or hexadecimal, try working it out in decimal first, then ask yourself how you might deal with the limited symbols

Aufgabe

- S. 75/ 4b (Begin with Binary)