

Software Engineering

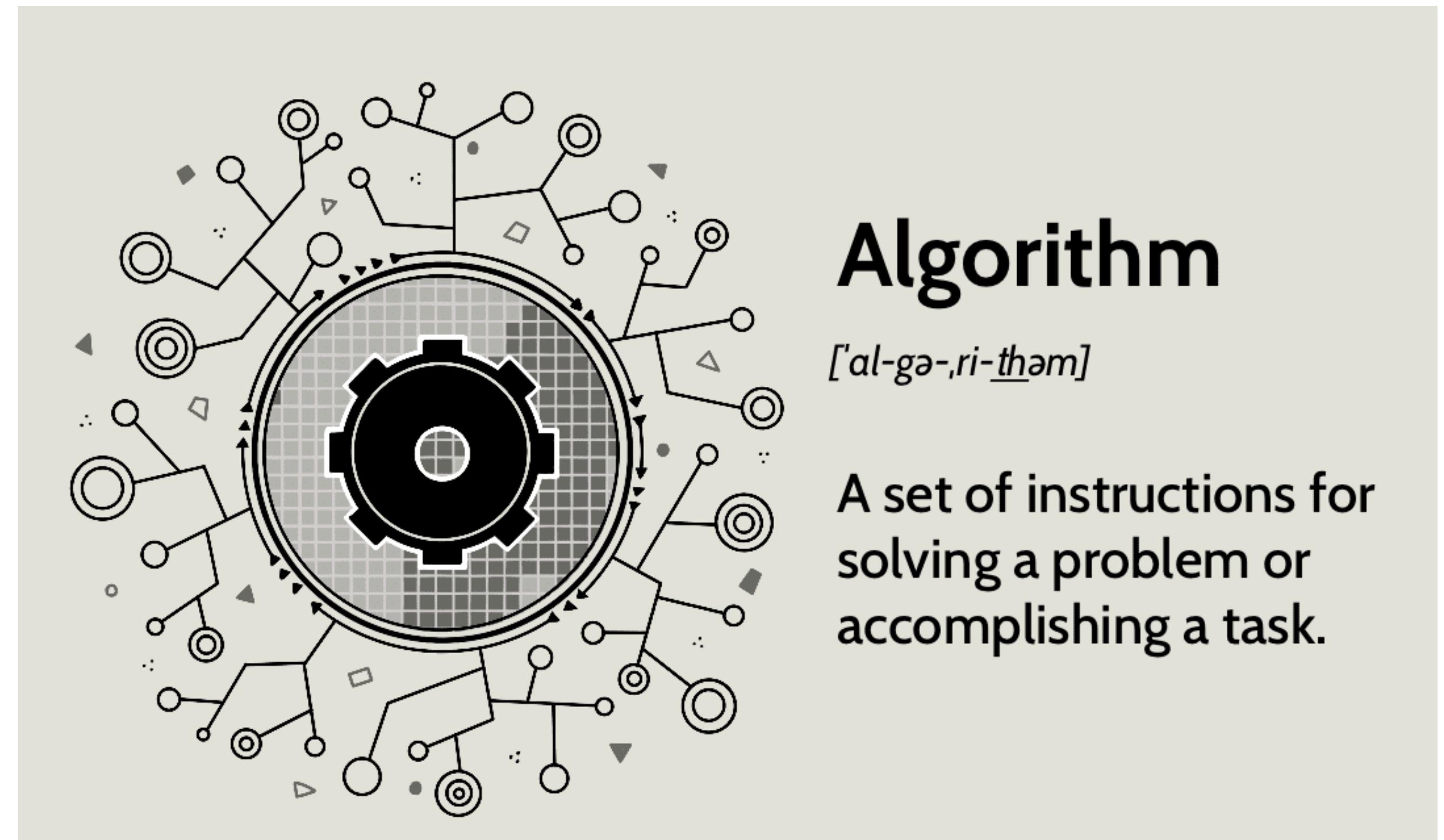
Agenda

- 1. Wstęp
- 2. Dane
- 3. Bezpieczeństwo danych
- 4. Programowanie

sages

Wstęp

- Po co nam języki programowania i jak działają
- Platformy: PaaS, IaaS, SaaS; co to jest i po co?
- Narzędzia programistyczne, czym się różnią, co wybrać aby łatwiej był zacząć
- Co to jest algorytm, podstawy i tematy trochę bardziej zaawansowane
- TLA - czyli o trzyliterowych akronimach w IT



Algorithm

[al-gə-ri-thəm]

A set of instructions for solving a problem or accomplishing a task.

Prawo Moore'a

```
print("Hello, World!")
```



```
section      .text
global       _start
_start:
    mov    edx, len
    mov    ecx, msg
    mov    ebx, 1
    mov    eax, 4
    int    0x80

    mov    eax, 1
    int    0x80

section      .data
msg     db    'Hello, world!',0xa
len      equ   $ - msg
```

;must be declared for linker (ld)

;tell linker entry point

;message length

;message to write

;file descriptor (stdout)

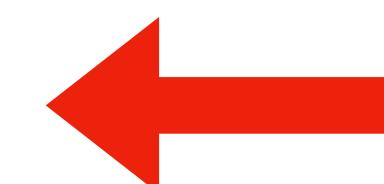
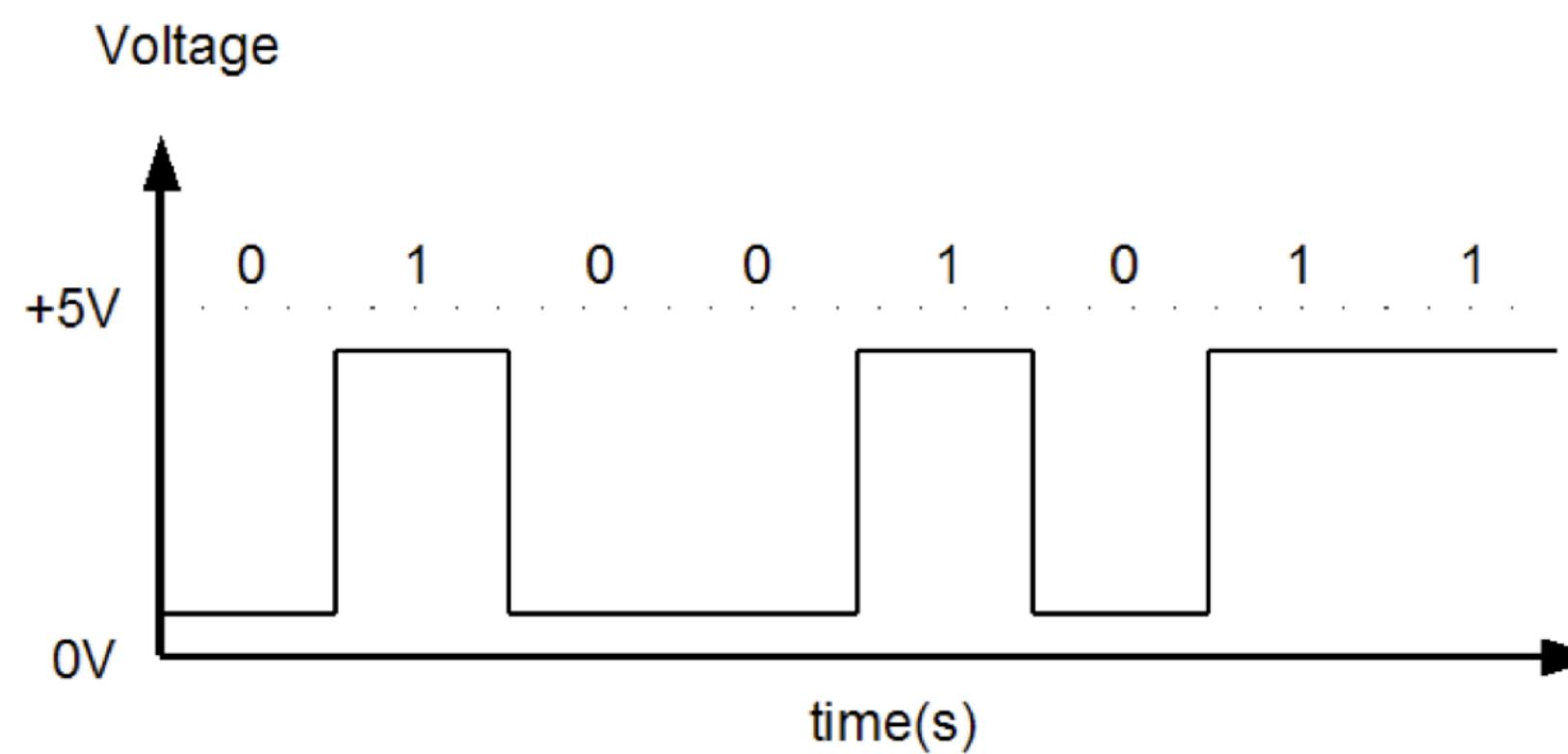
;system call number (sys_write)

;call kernel

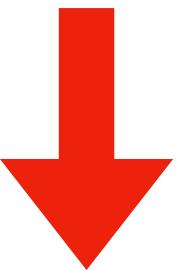
;system call number (sys_exit)

;call kernel

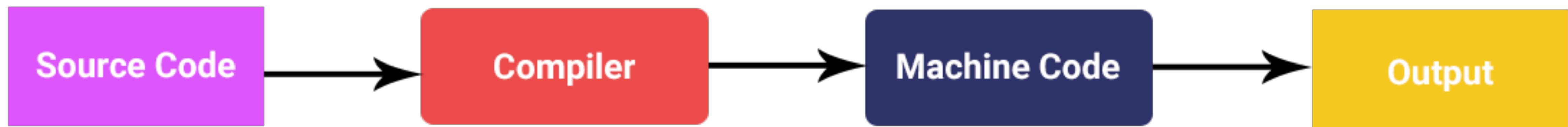
;our dear string
;length of our dear string



00101110 11110011 00101110 00101110 00101110 00111100
01010111 01100011 00101110 00101110 00101110 00101110
00101110 00101110 00101110 00101110 00101110 00101110
01000000 00101110 00101110 00101110 01110011 00101110 00101110
00101110 00101110 01100100 00101110 00101110 01000111 01001000
01100100 00101110 00101110 01010011 00101000 00101110 00101110
00101110 00101110 01110011 00101110 00101110 00101110 00101110
01001000 01100101 01101100 01101100 01101111 00100000 01010111
01101111 01110010 01101100 01100100 01001110 00101000 00101110
00101110 00101110 00101110 00101110 00101110 00101110 00101110
00101110 00101110 00101110 00101110 00101110 00101110 00101110
00101110 00101110 00101110 00101110 01110011 00101110 00101110
00101110 00101110 01101000 01100101 01101100 01101100 01101111
01110111 01101111 01110010 01101100 01100100 00101110 01110000
01111001 01110100 00101110 00101110 00101110 00101110 00111100
01101101 01101111 01100100 01110101 01101100 01100101 00111110
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00101110 00101110



Compiler Works



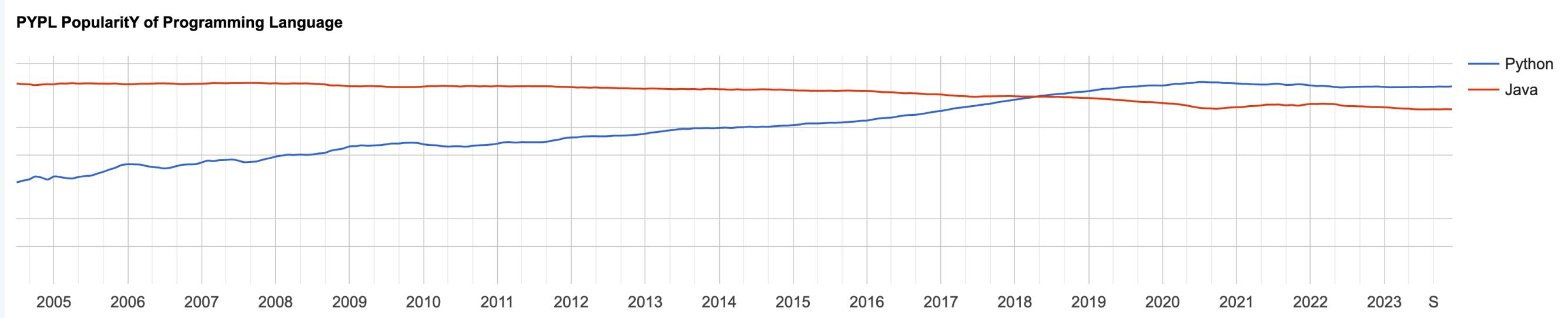
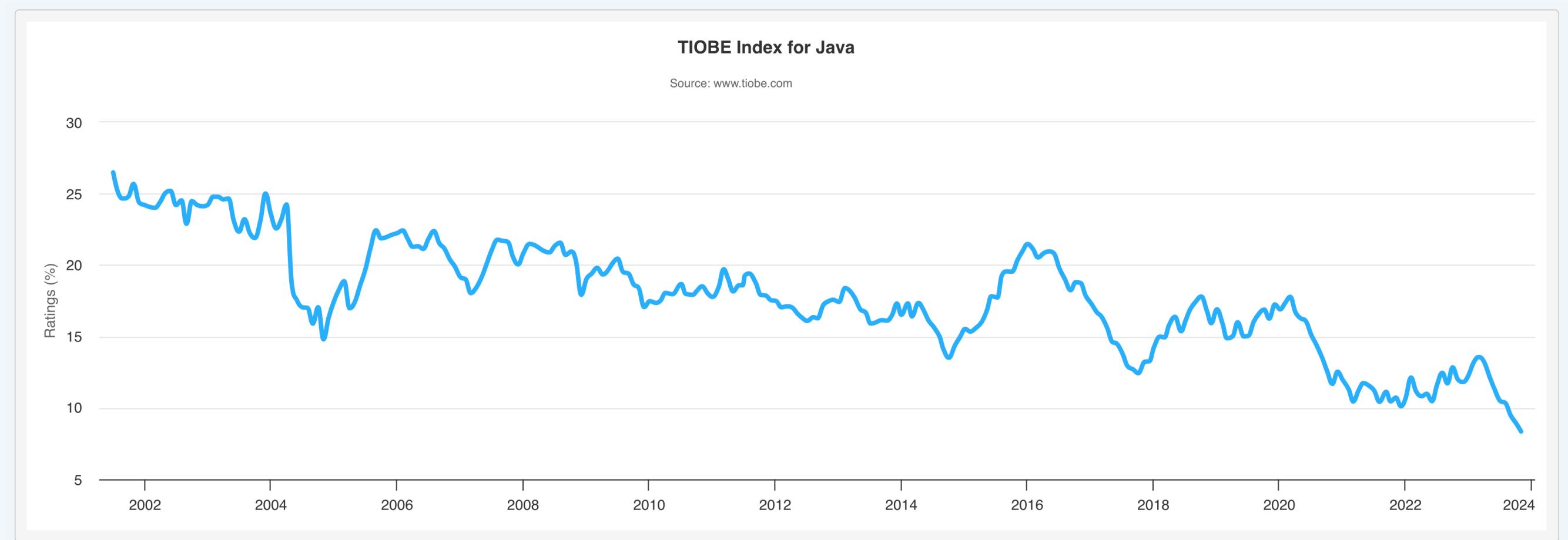
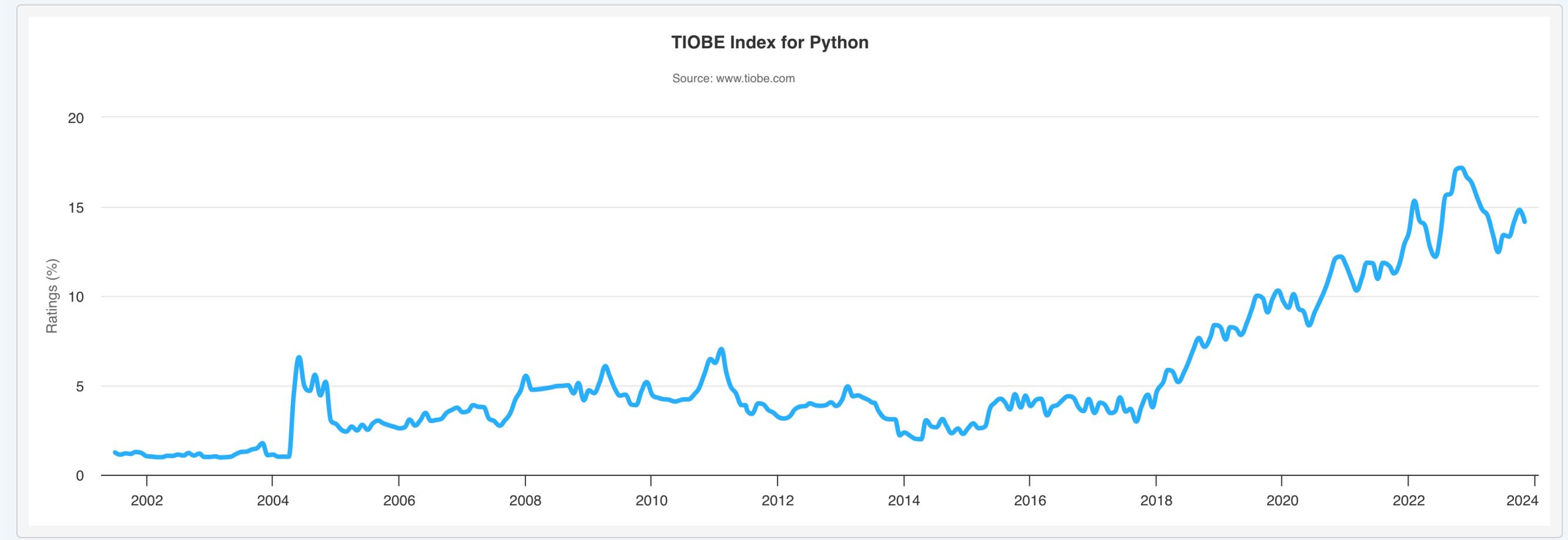
Interpreter Works

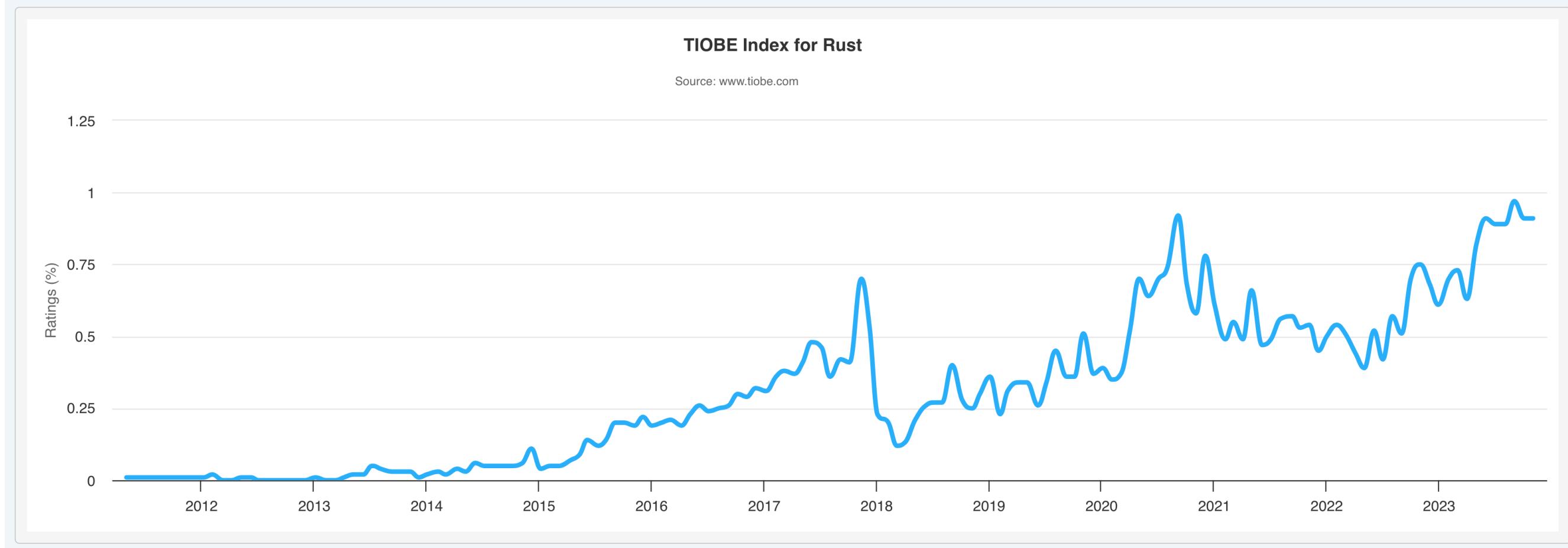


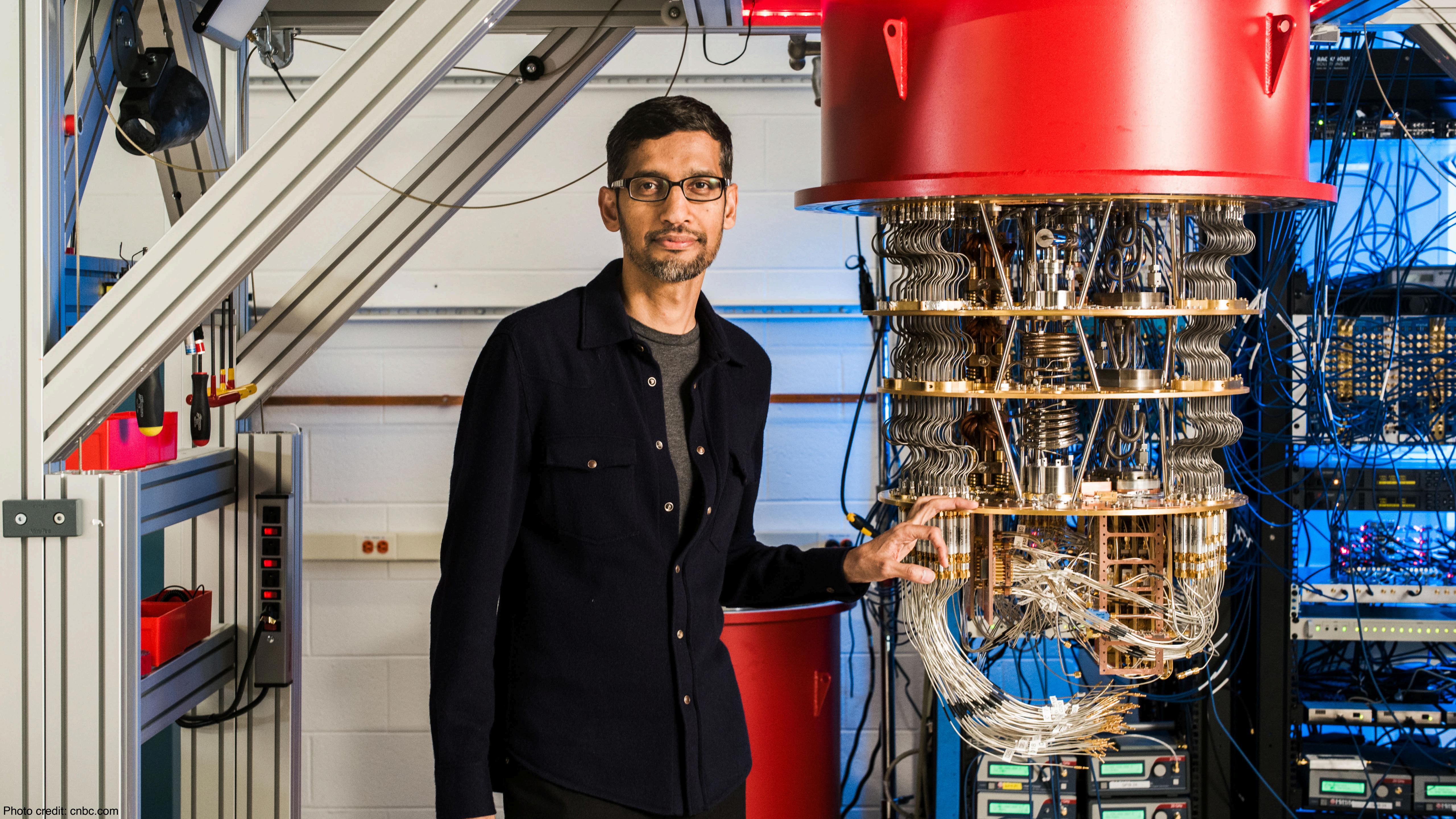
Nov 2023	Nov 2022	Change	Programming Language	Ratings	Change
1	1		 Python	14.16%	-3.02%
2	2		 C	11.77%	-3.31%
3	4		 C++	10.36%	-0.39%
4	3		 Java	8.35%	-3.63%
5	5		 C#	7.65%	+3.40%
6	7		 JavaScript	3.21%	+0.47%
7	10		 PHP	2.30%	+0.61%
8	6		 Visual Basic	2.10%	-2.01%
9	9		 SQL	1.88%	+0.07%
10	8		 Assembly language	1.35%	-0.83%
11	17		 Scratch	1.31%	+0.43%
12	24		 Fortran	1.30%	+0.74%
13	11		 Go	1.19%	+0.05%
14	15		 MATLAB	1.15%	+0.14%
15	28		 Kotlin	1.15%	+0.68%
16	14		 Delphi/Object Pascal	1.14%	+0.07%
17	18		 Swift	1.04%	+0.17%
18	19		 Ruby	0.99%	+0.14%
19	12		 R	0.93%	-0.20%
20	20		 Rust	0.91%	+0.16%

Worldwide, Dec 2023 :

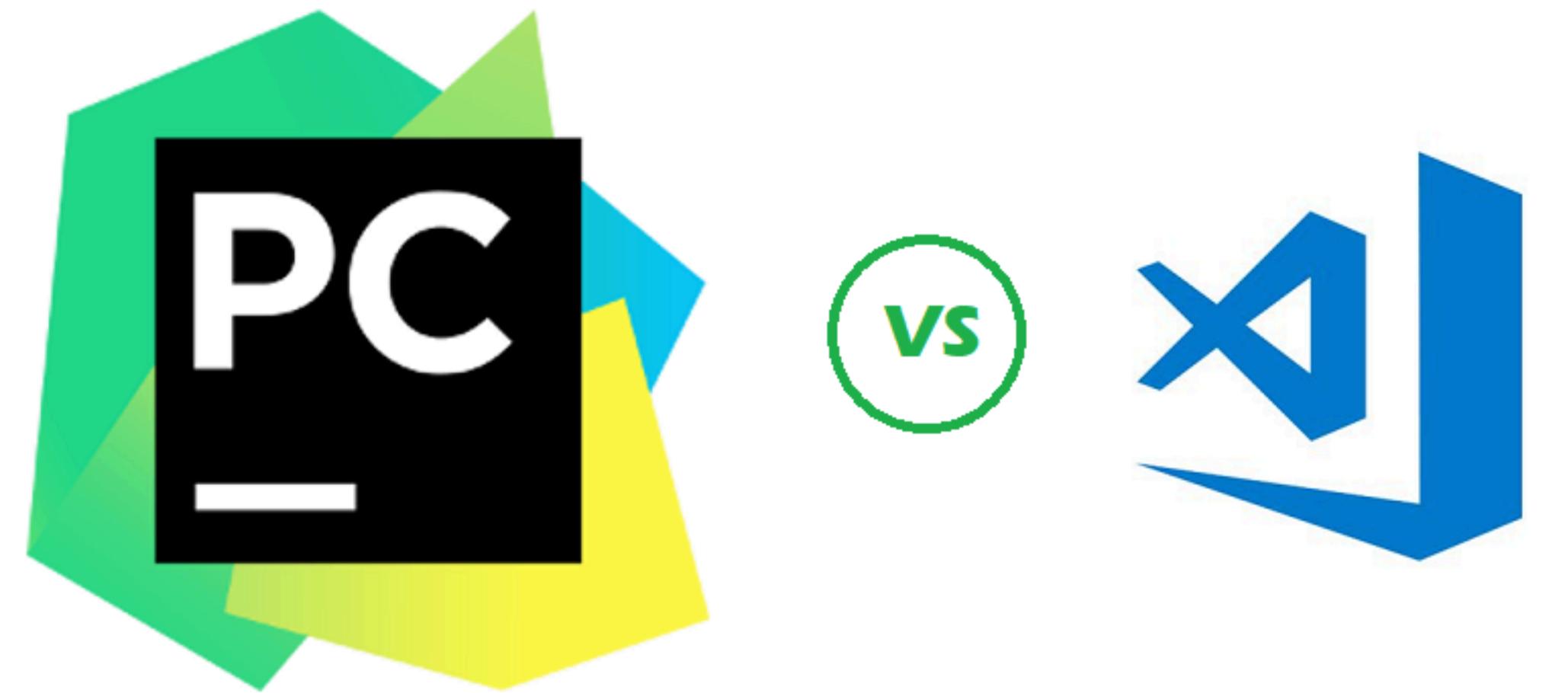
Rank	Change	Language	Share	1-year trend
1		Python	28.09 %	+0.1 %
2		Java	15.81 %	-0.9 %
3		JavaScript	8.93 %	-0.5 %
4	↑	C/C++	6.8 %	+0.1 %
5	↓	C#	6.64 %	-0.3 %
6		PHP	4.6 %	-0.6 %
7		R	4.53 %	+0.5 %
8		TypeScript	2.81 %	+0.0 %
9	↑	Swift	2.8 %	+0.7 %
10	↓	Objective-C	2.33 %	+0.2 %
11	↑↑	Rust	2.13 %	+0.3 %
12	↓	Go	2.03 %	+0.1 %
13	↓	Kotlin	1.76 %	-0.0 %
14		Matlab	1.65 %	+0.0 %
15	↑↑↑	Ada	1.04 %	+0.2 %
16	↓	Ruby	1.02 %	-0.0 %
17	↑↑	Dart	0.99 %	+0.2 %
18	↓	Powershell	0.91 %	-0.0 %
19	↓↓↓	VBA	0.86 %	-0.2 %
20	↑↑	Lua	0.69 %	+0.1 %
21	↑↑	Abap	0.63 %	+0.1 %
22	↓↓	Scala	0.62 %	-0.0 %
23	↓↓	Visual Basic	0.54 %	-0.1 %
24		Julia	0.44 %	+0.1 %
25		Groovy	0.35 %	-0.0 %
26		Perl	0.31 %	-0.0 %
27	↑	Haskell	0.26 %	-0.1 %
28	↓	Cobol	0.23 %	-0.1 %
29		Delphi/Pascal	0.19 %	+0.2 %







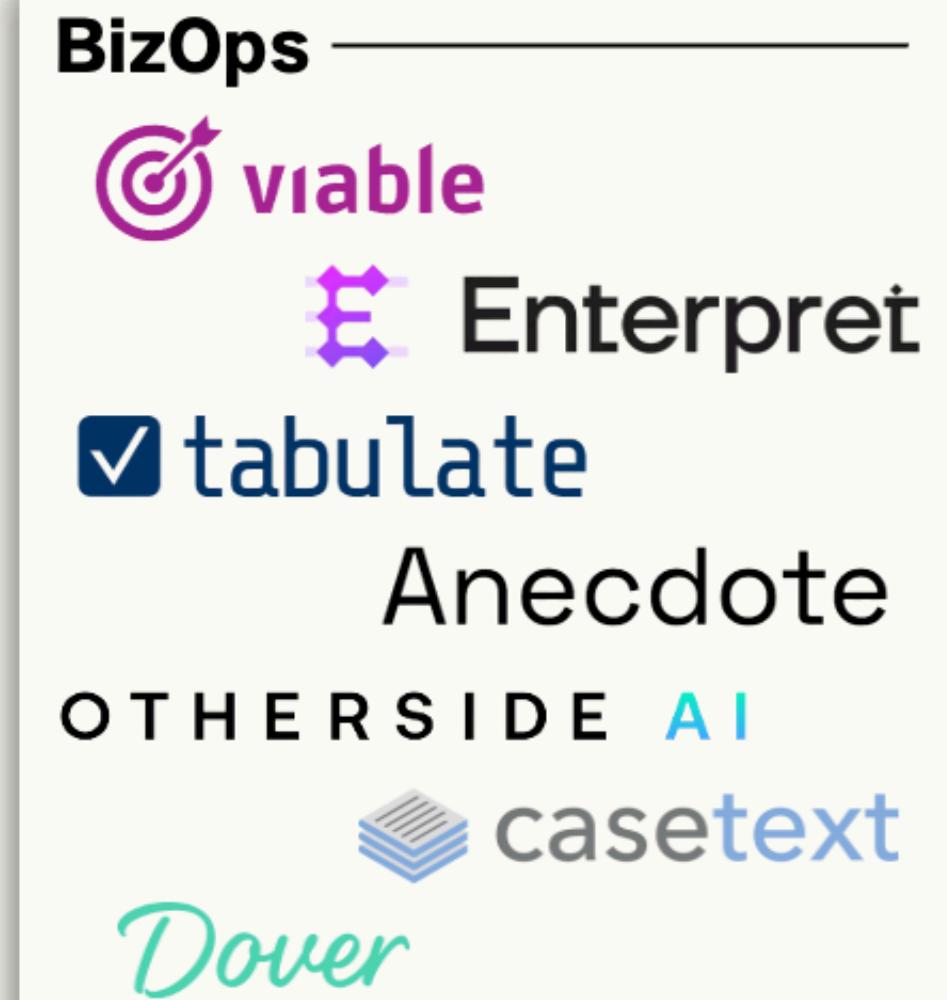
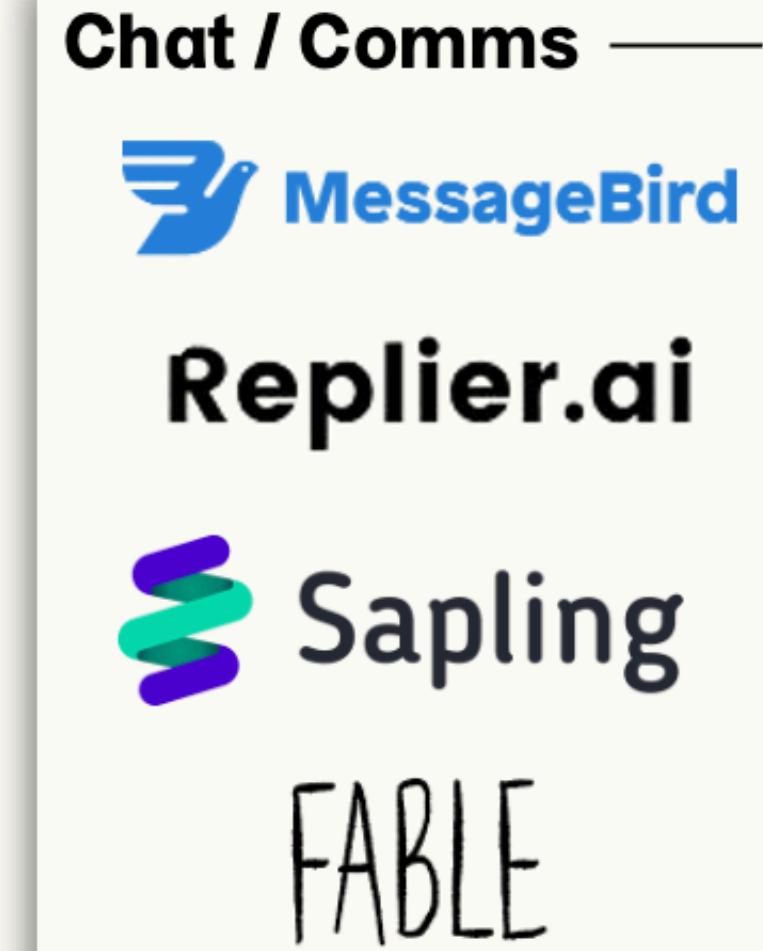
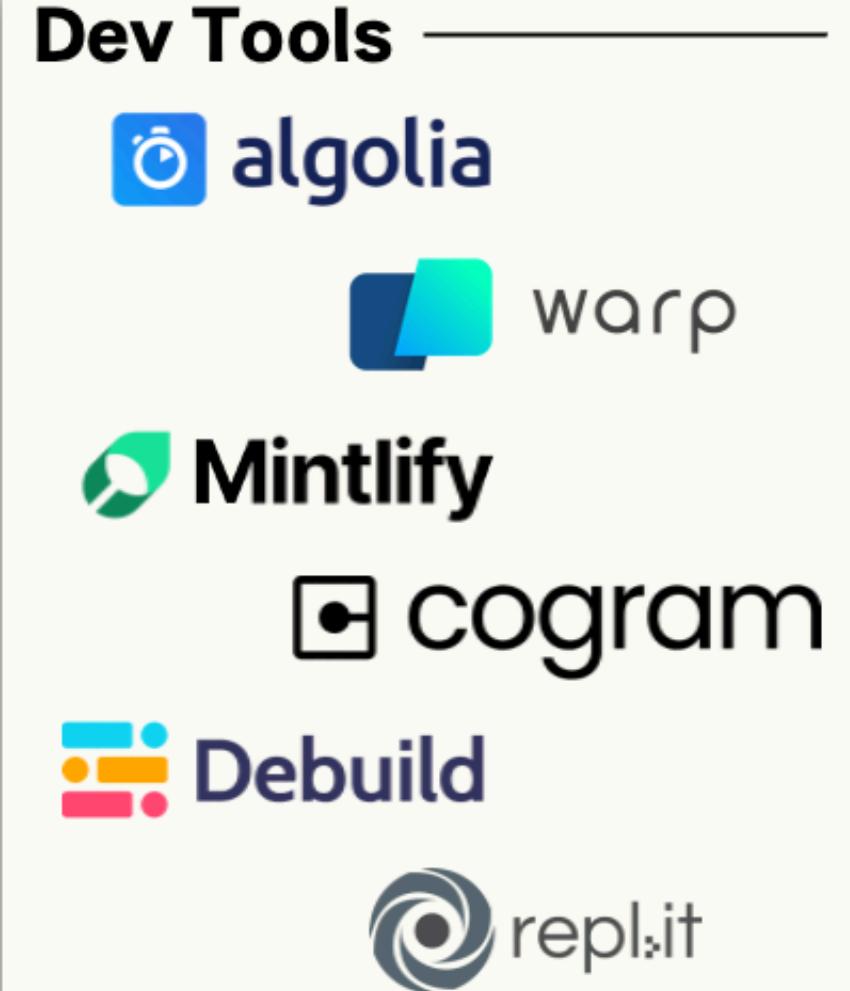
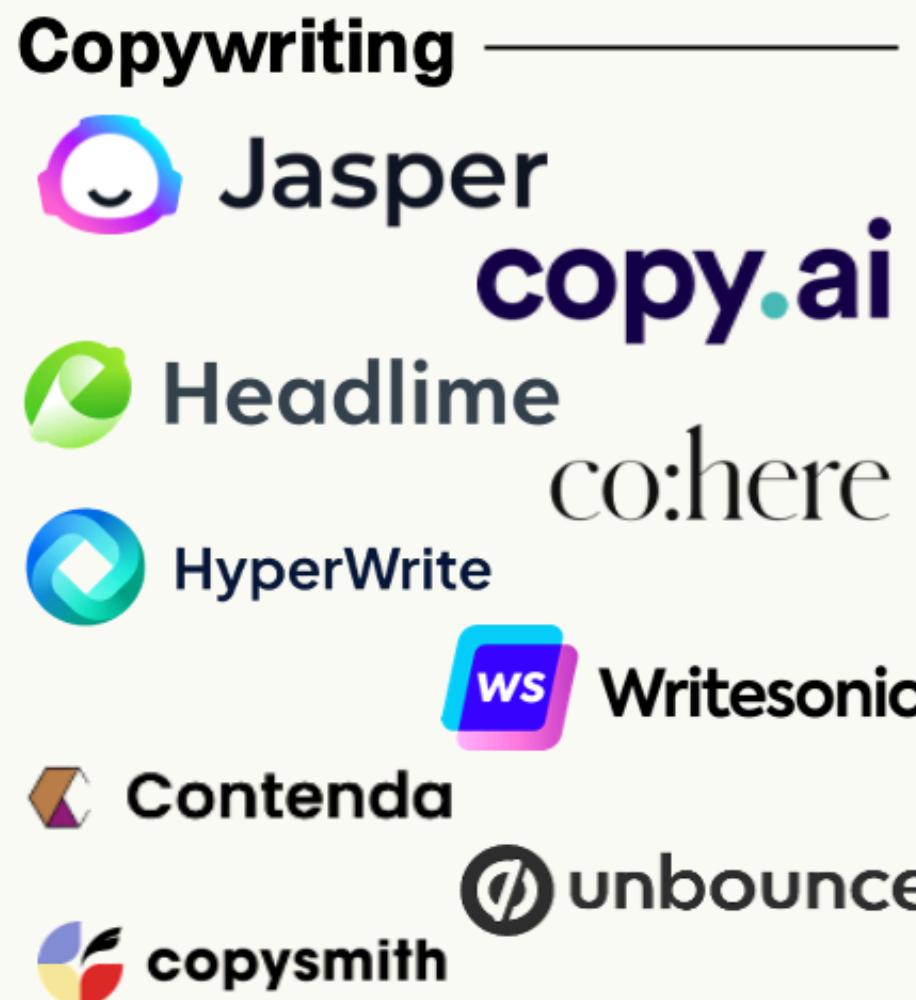




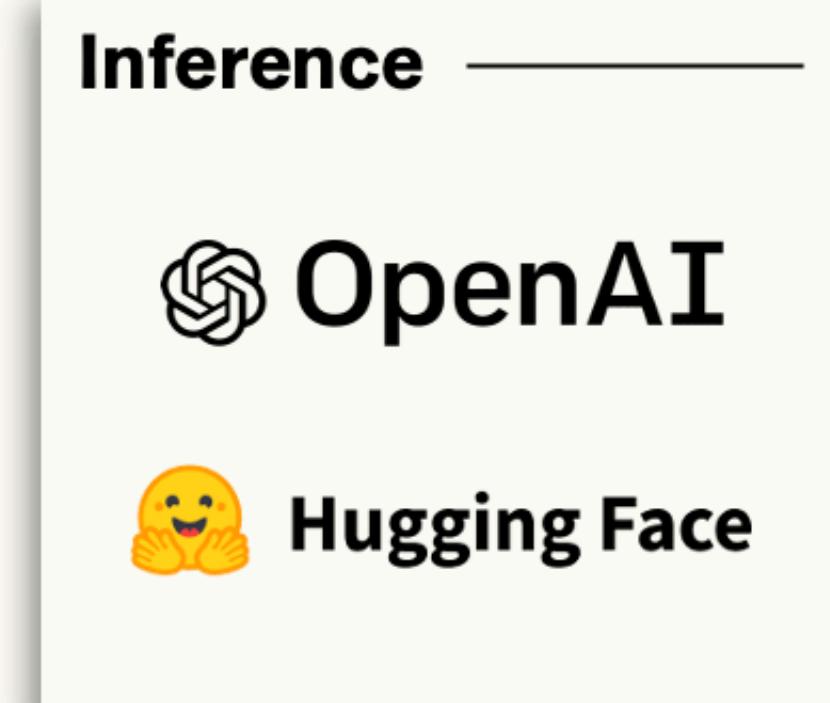
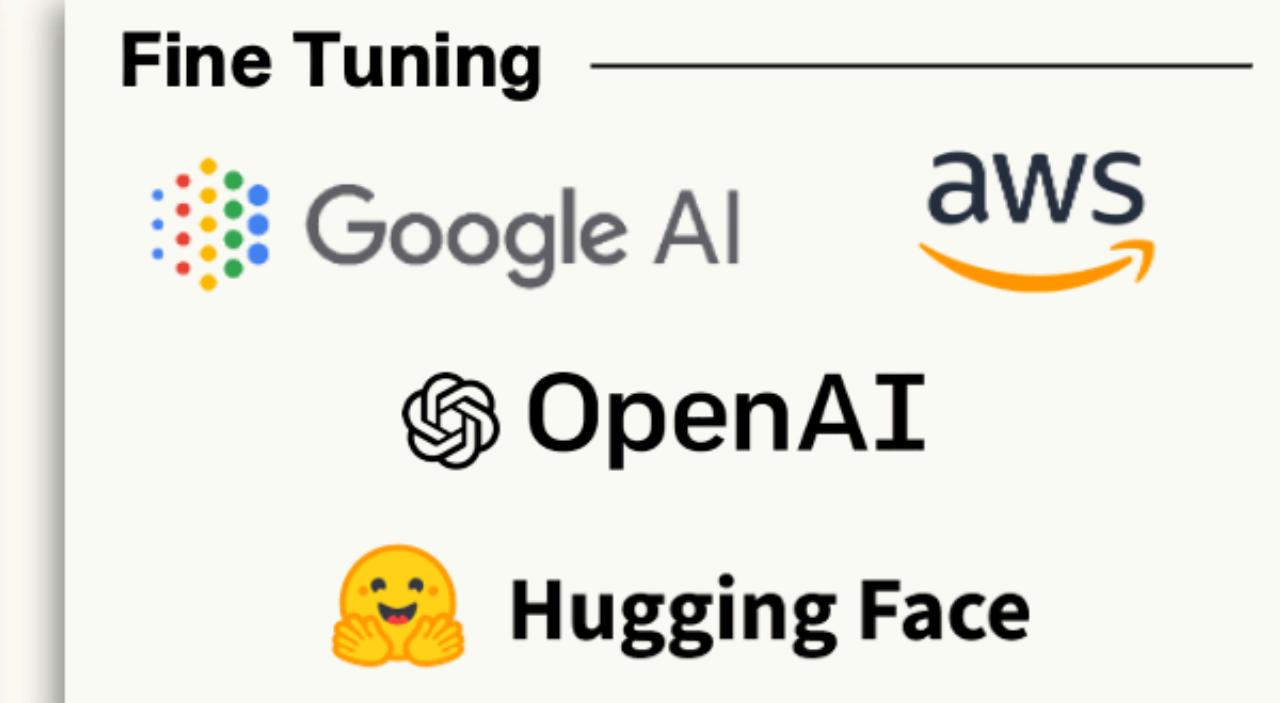
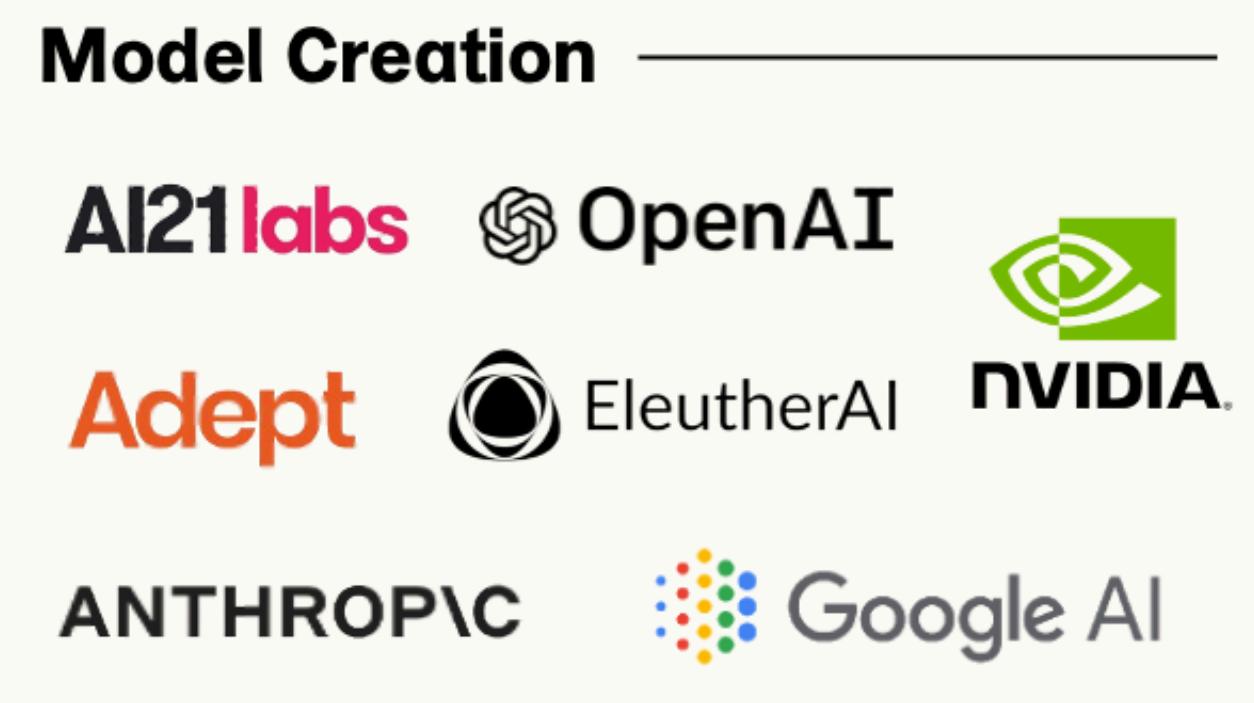
Data Science vs Data Engineering

Large Language Models

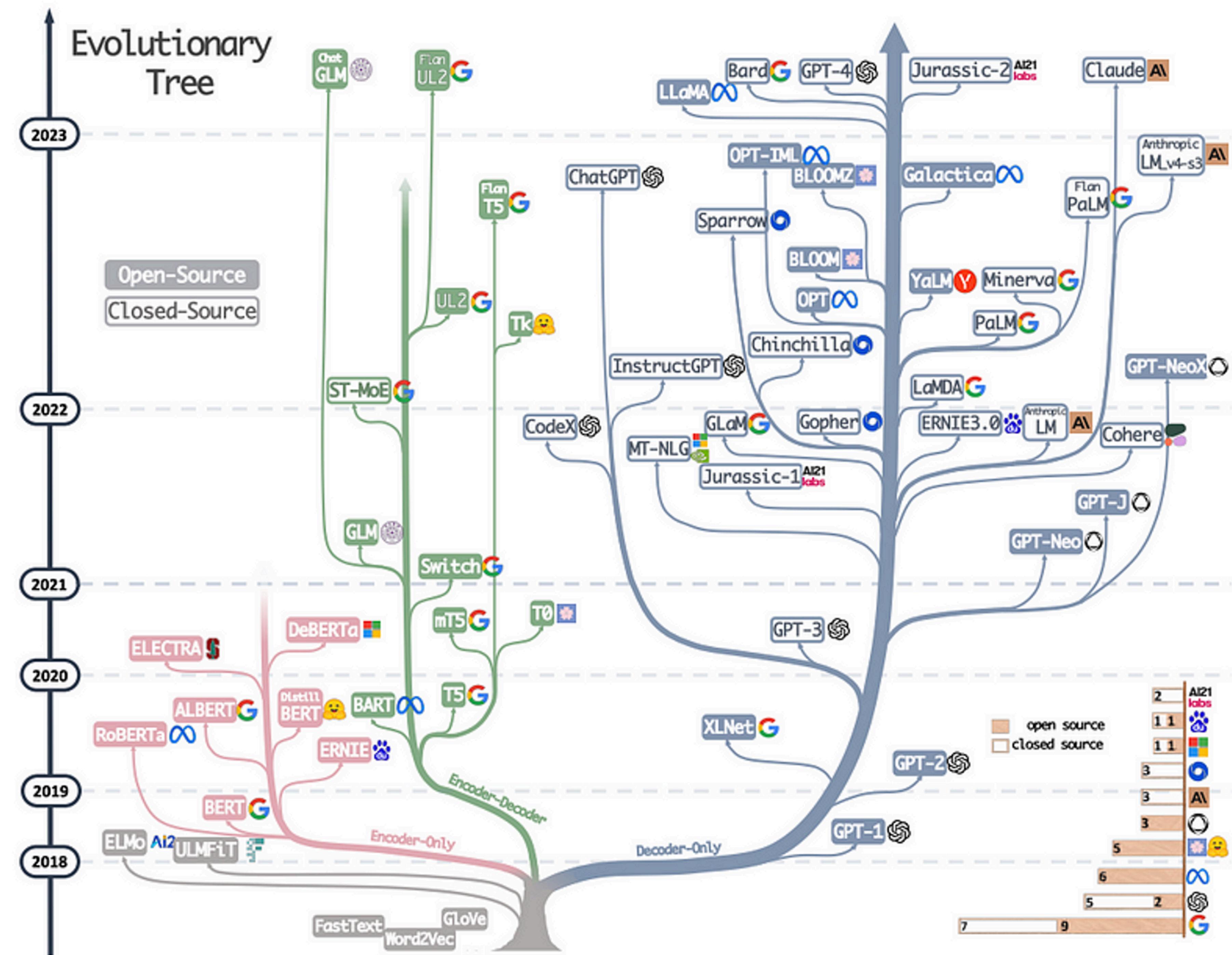
Application Layer



Infrastructure Layer



Evolutionary Tree



On-Premises



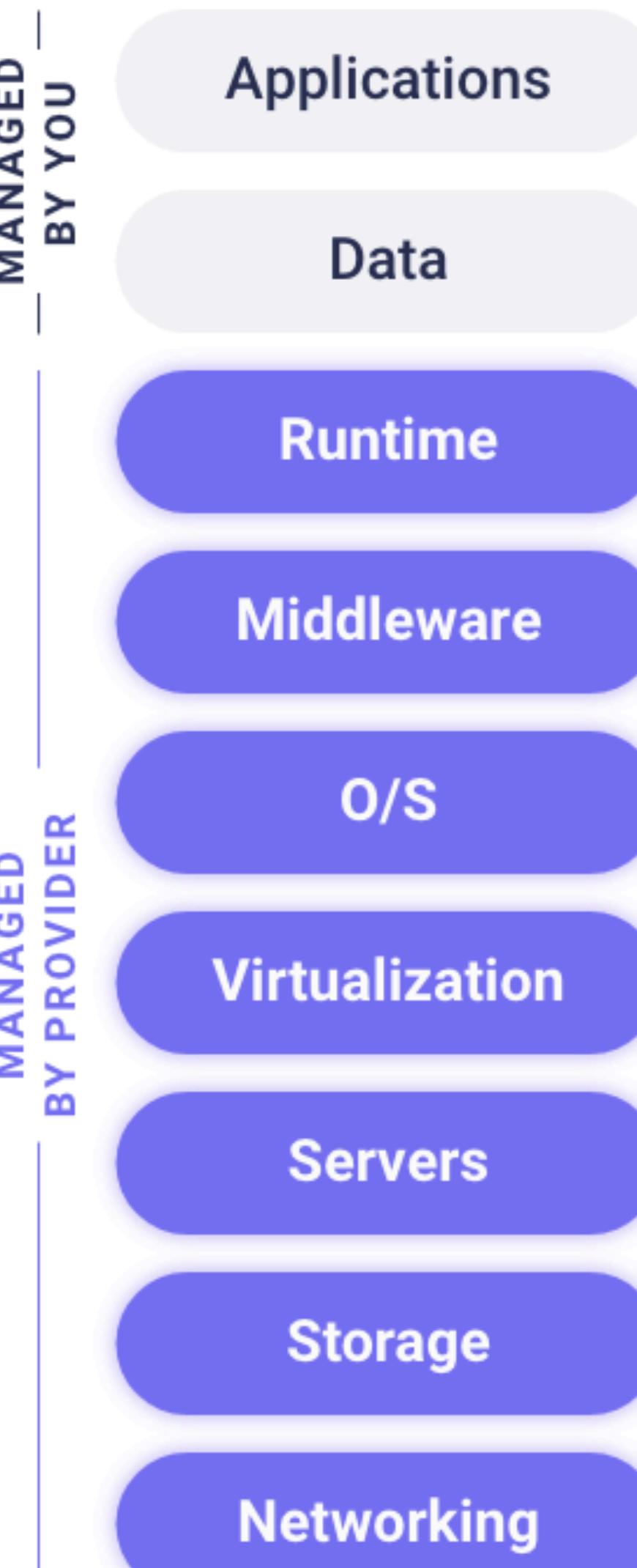
IaaS

Infrastructure as a Service



PaaS

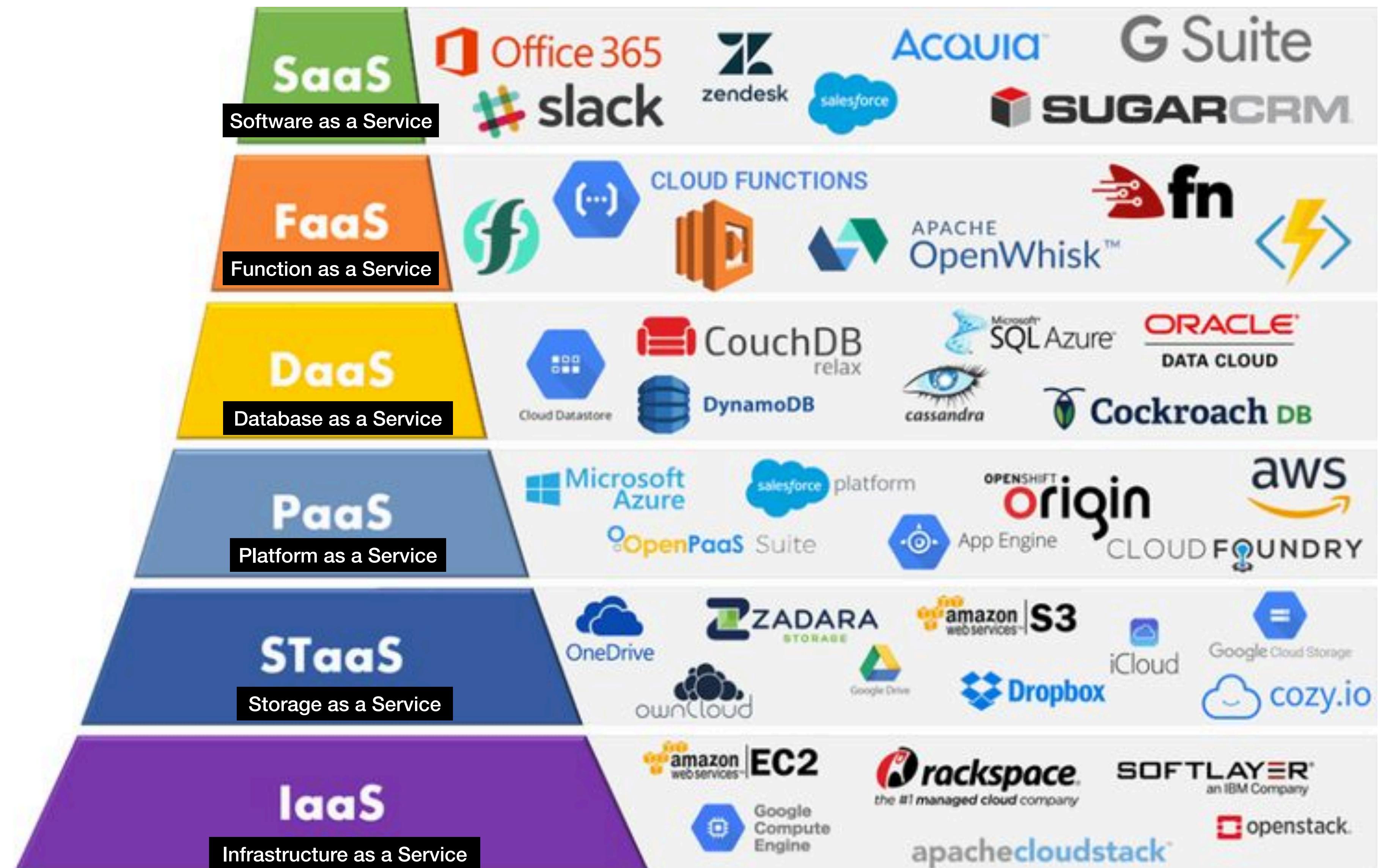
Platform as a Service



SaaS

Software as a Service

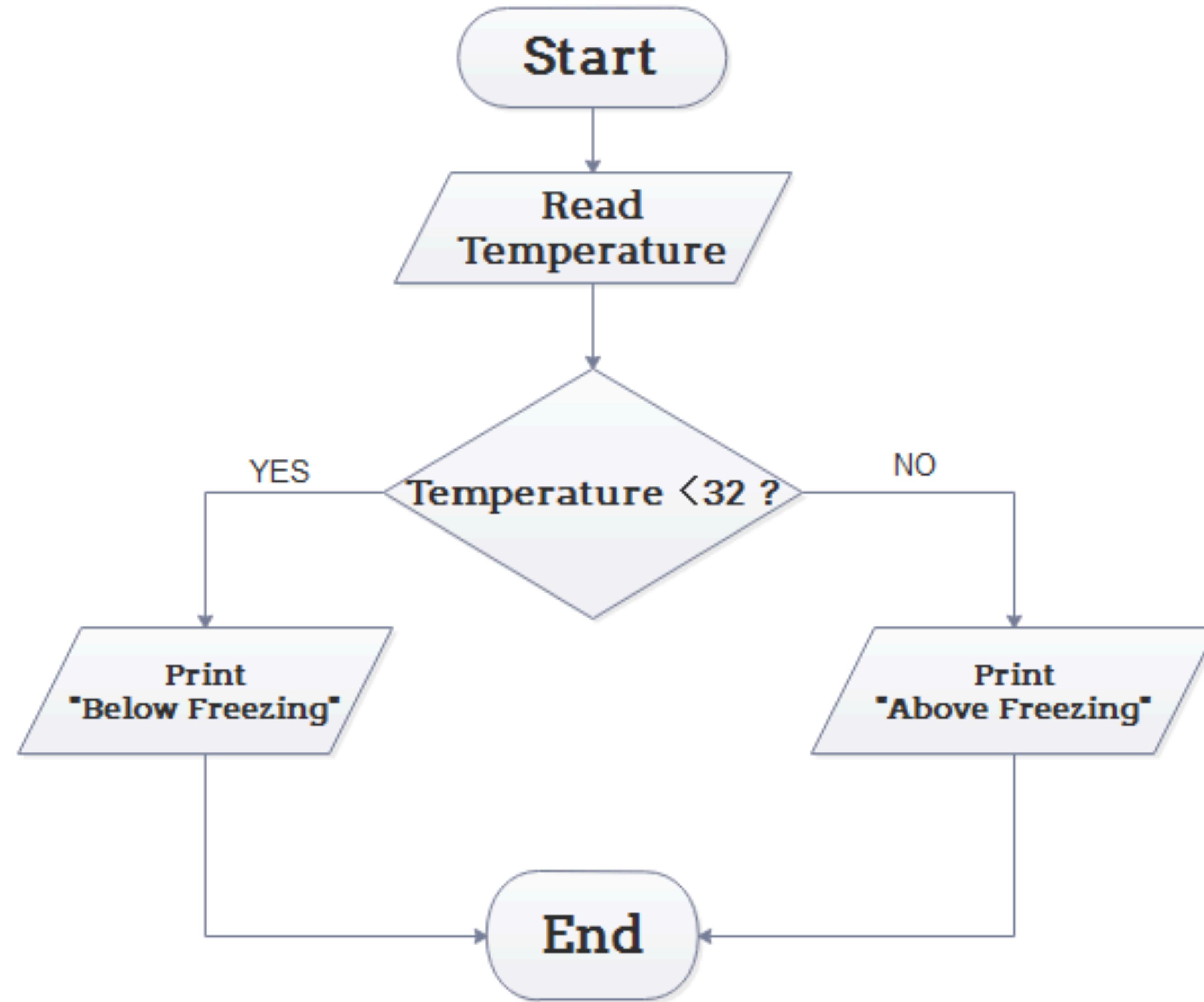


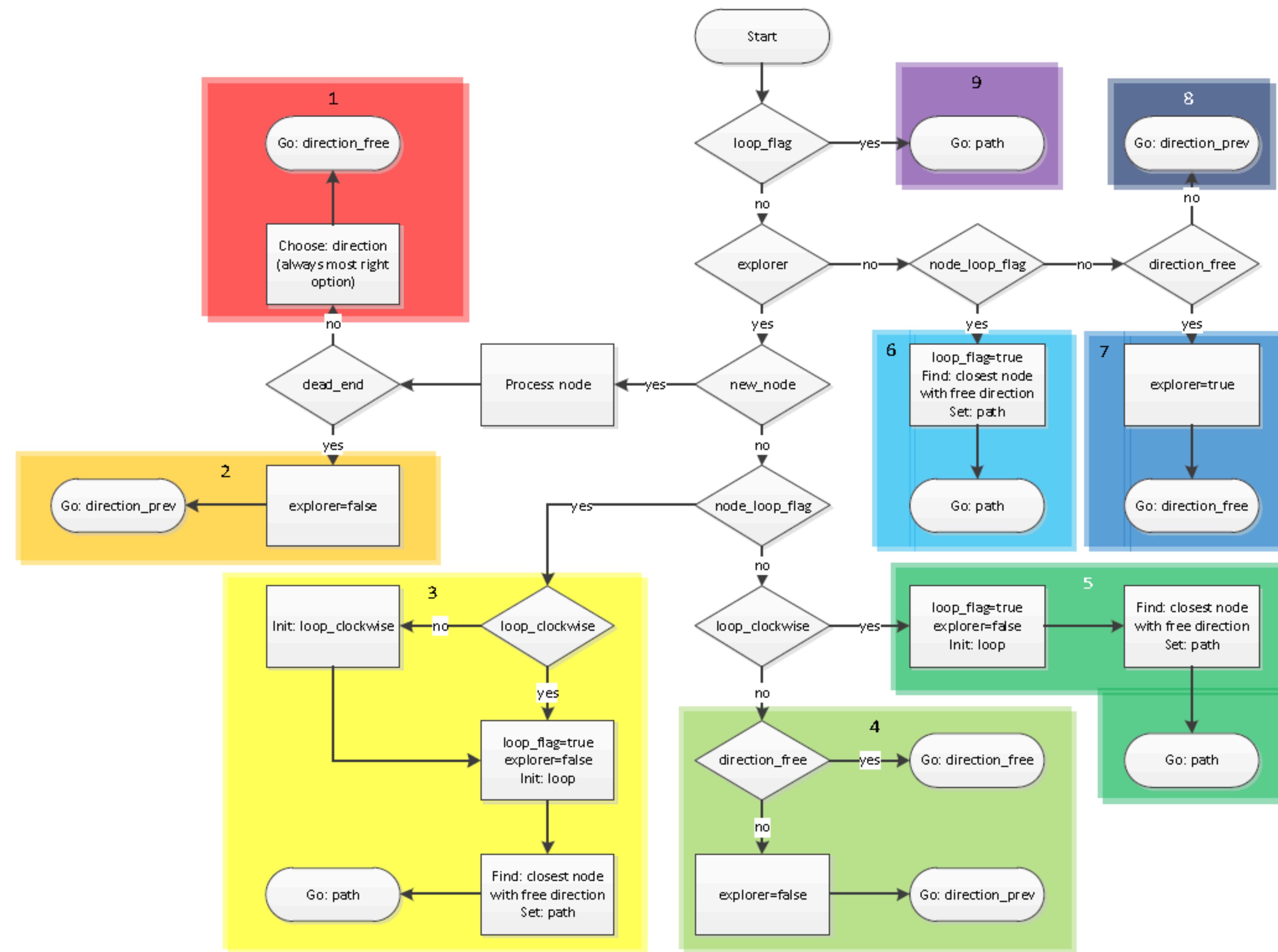


TLA

- https://en.wikipedia.org/wiki/List_of_computing_and_IT_abbreviations
- <https://www.advsyscon.com/blog/it-acronyms-it-abbreviations/>
- <https://patoarchitekci.io/>







Types of algorithms



Search engine
algorithm



Encryption
algorithm



Greedy
algorithm



Recursive
algorithm



Backtracking
algorithm



Divide-
and-conquer
algorithm



Dynamic
programming
algorithm



Brute-force
algorithm



Sorting
algorithm



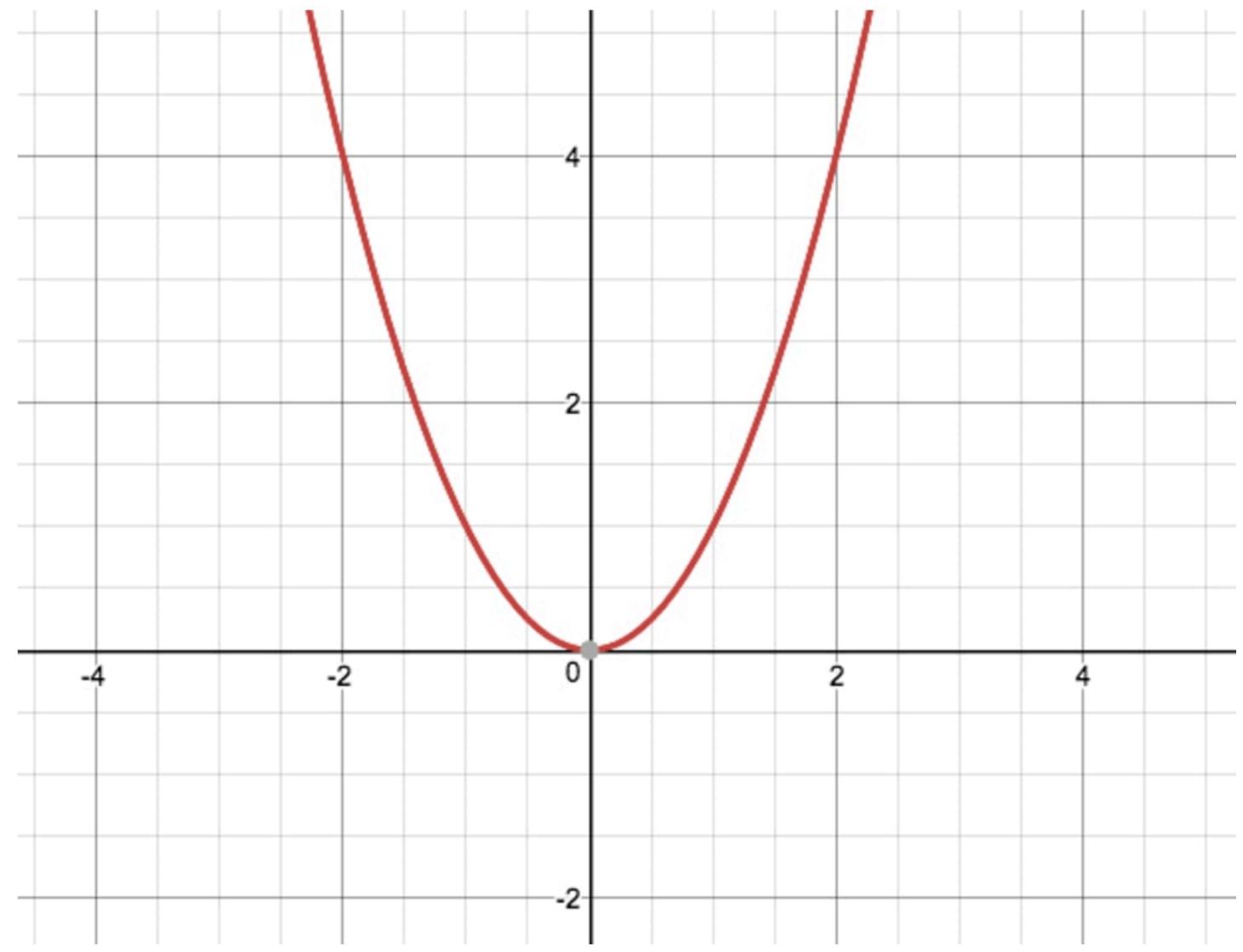
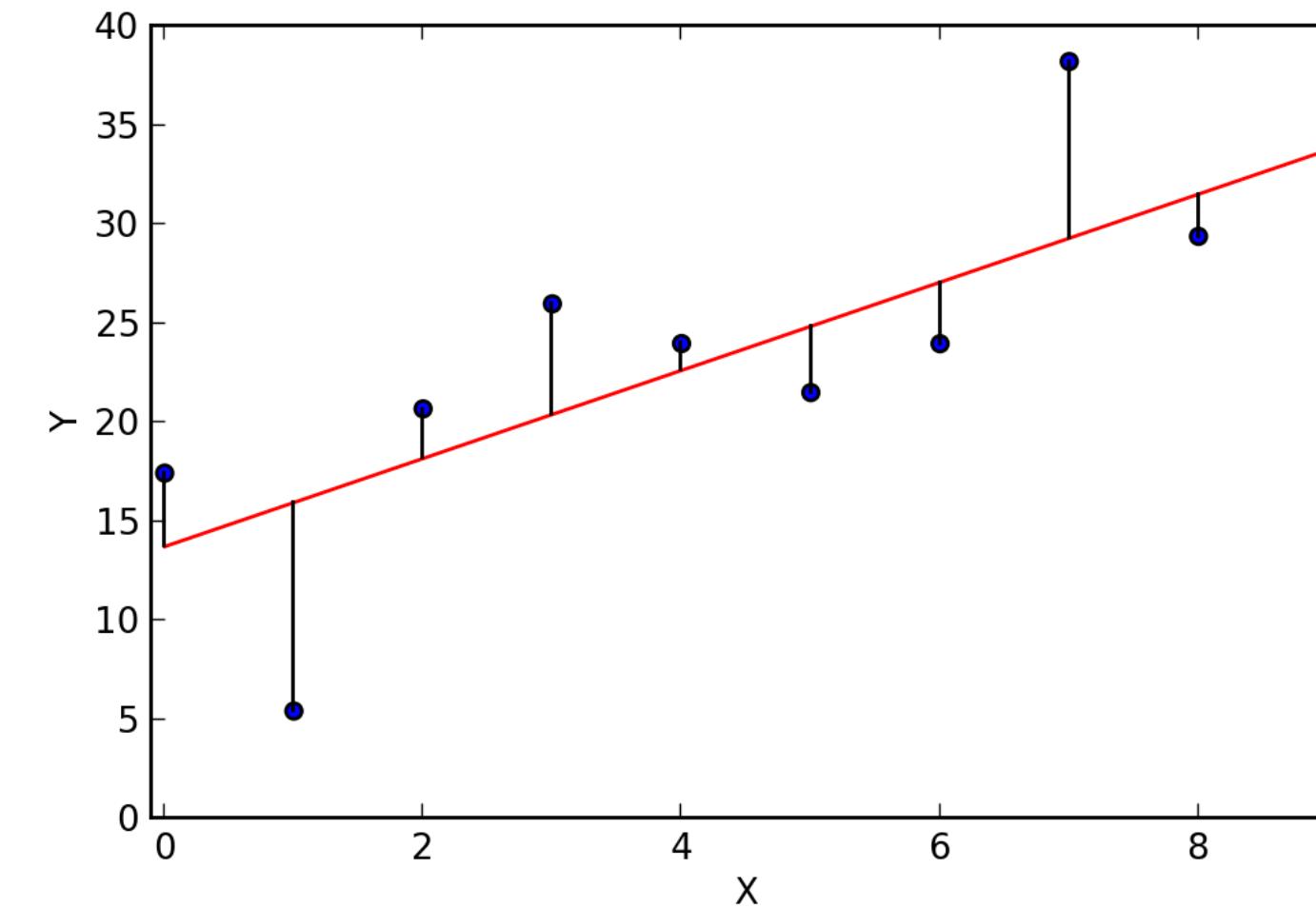
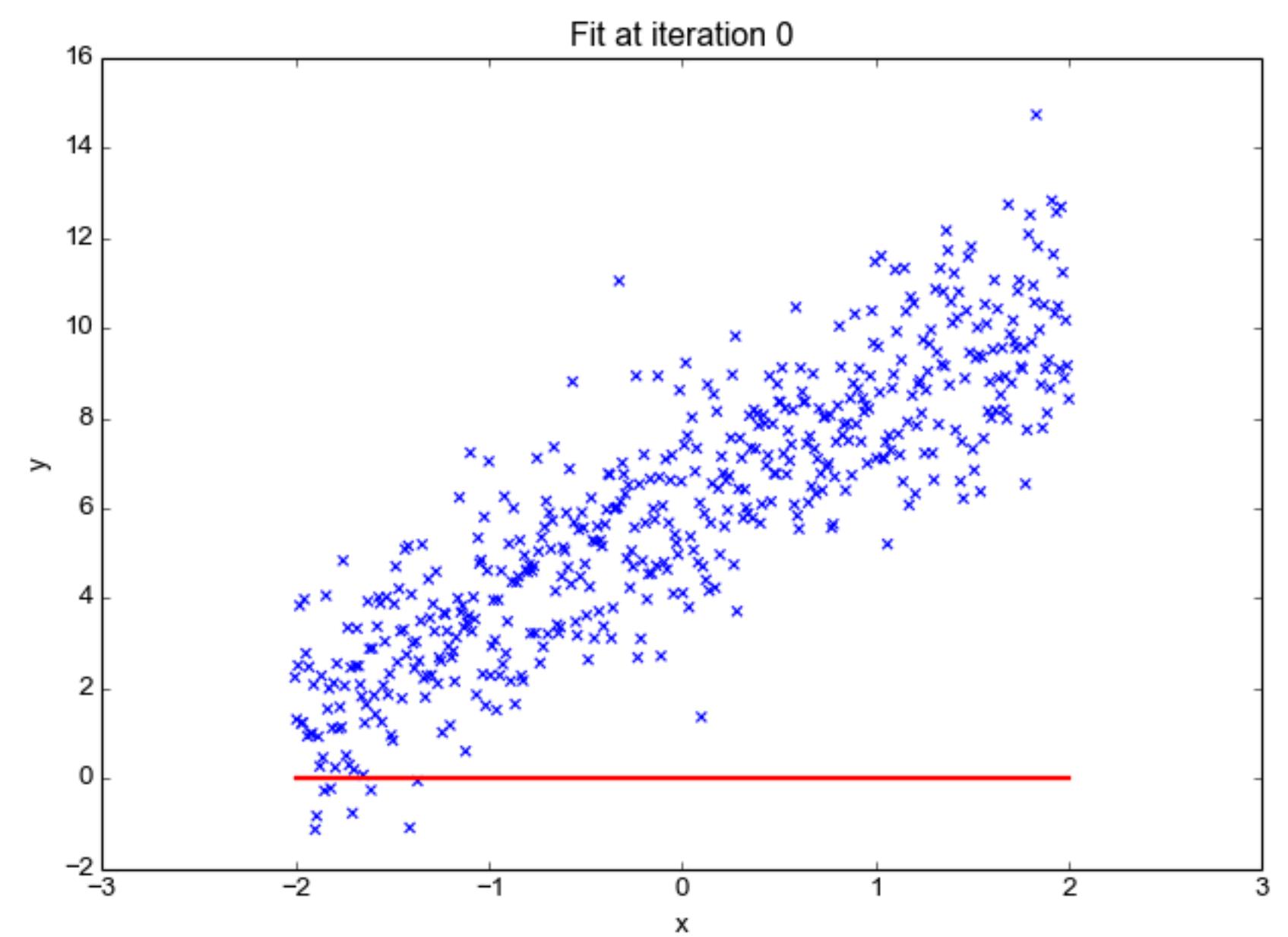
Hashing
algorithm



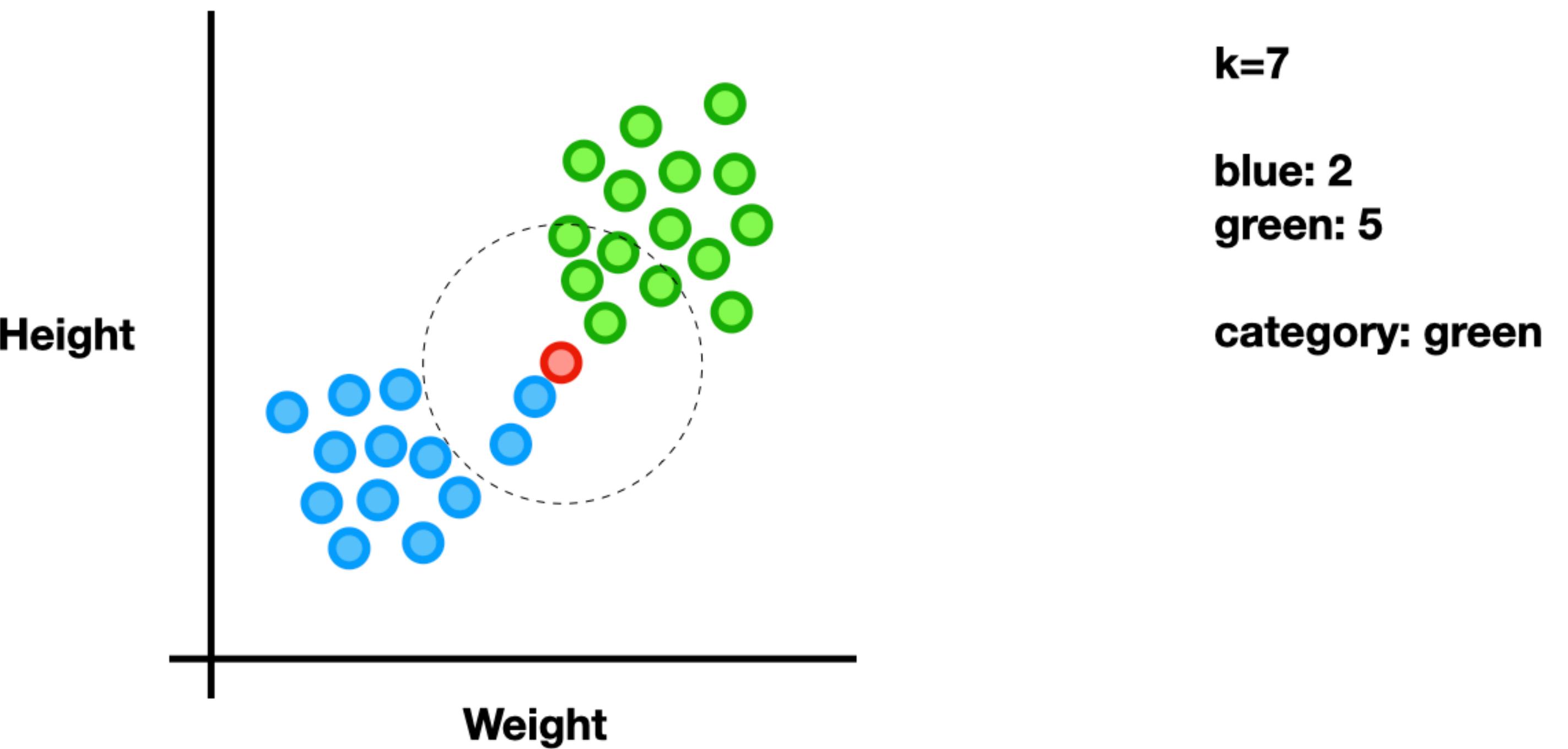
Randomized
algorithm

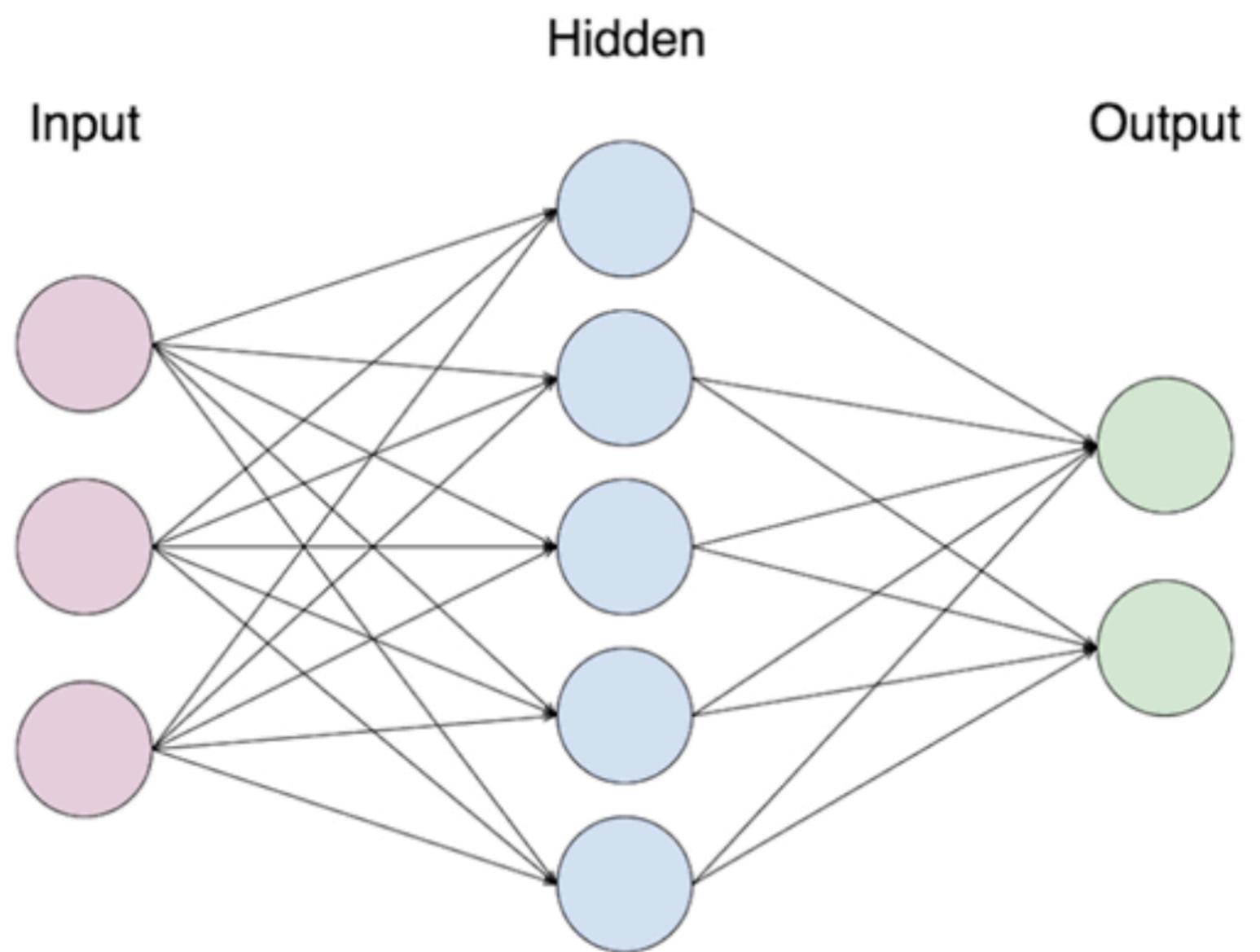
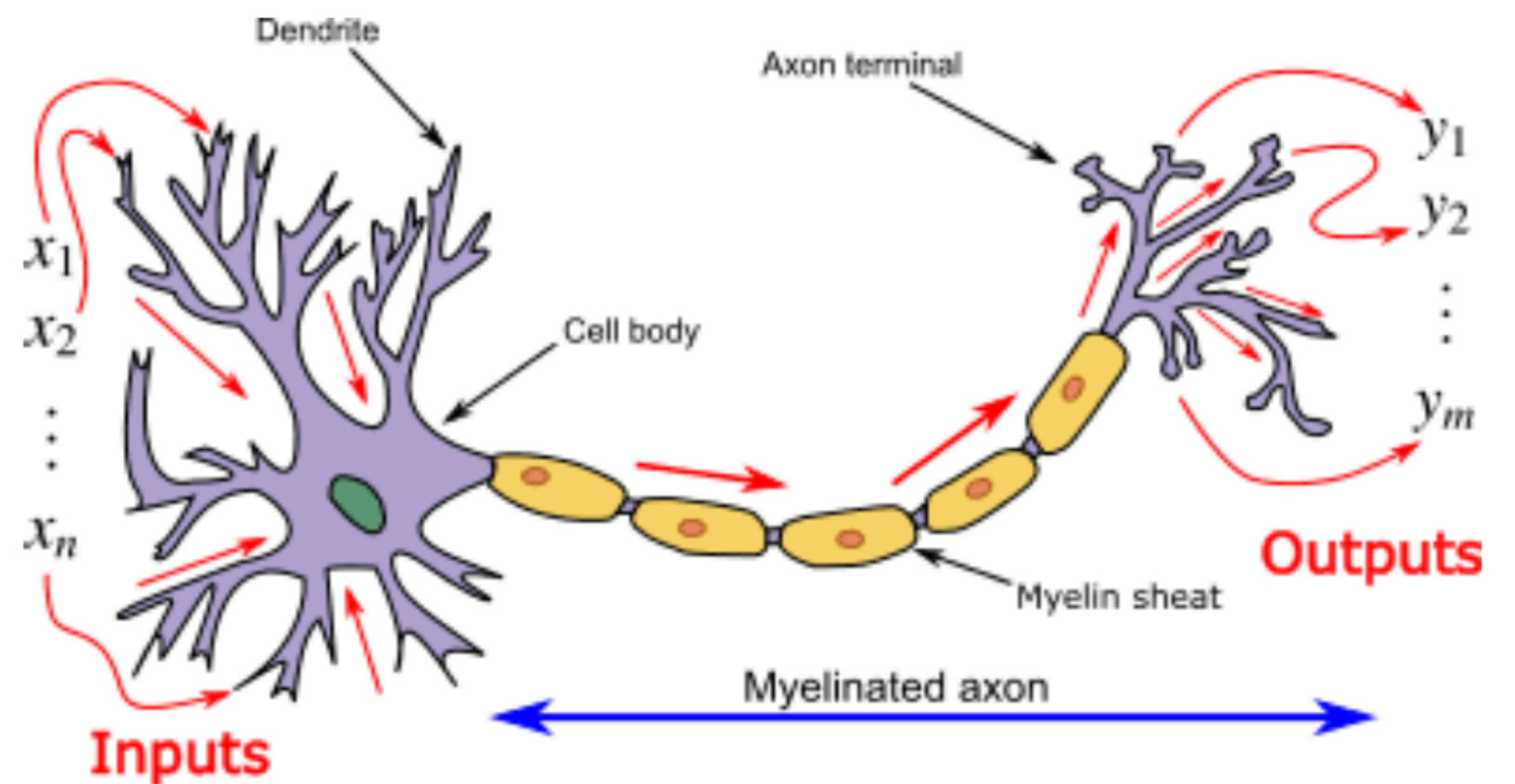


Regresja Liniowa



K-nearest neighbors algorithm





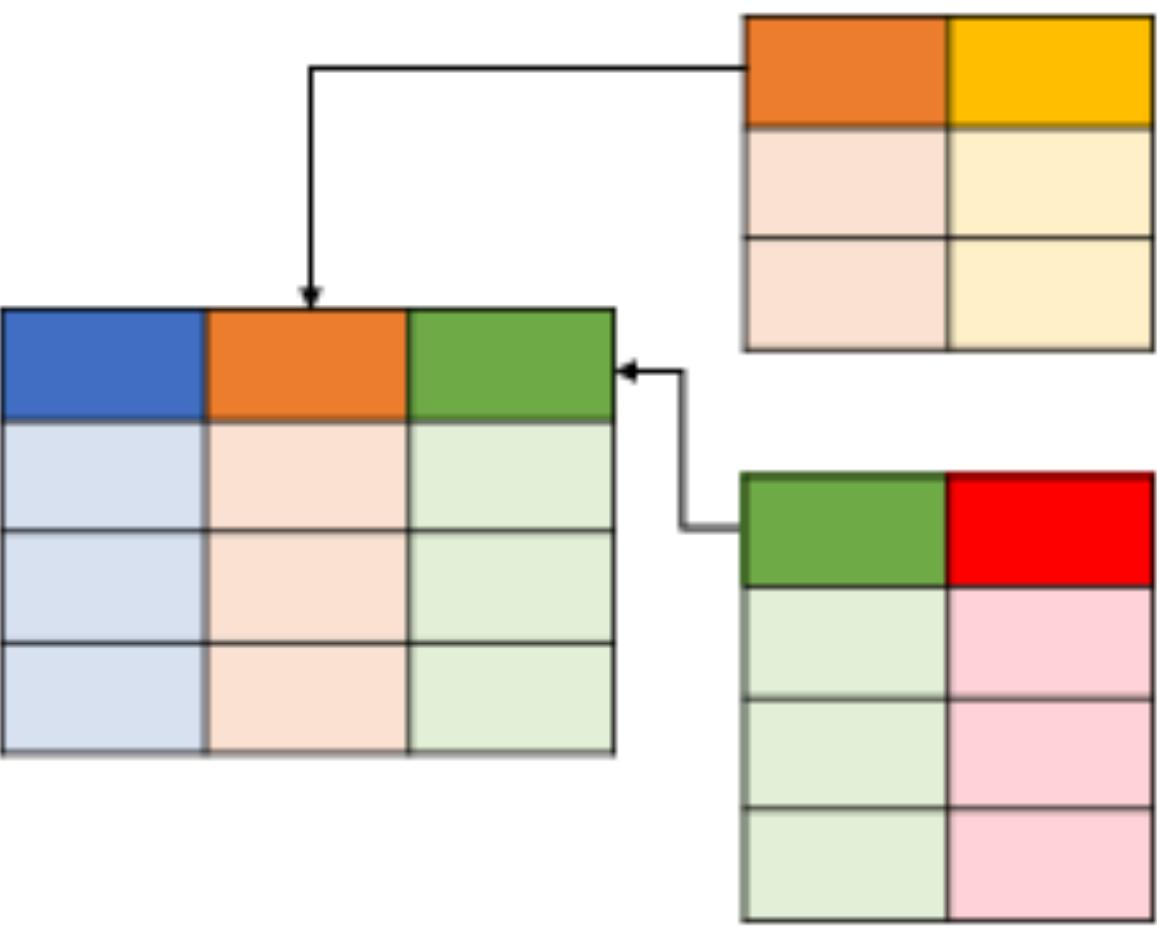
Dane

- SQL zastosowanie, zalety i przykłady baz danych
- NoSQL, zastosowanie, zalety i przykłady baz danych
- SQL vs NoSQL
- Mechanizmy zapewnienia spójności
- Mechanizmy backupu



SQL Databases

- MySQL
- MSSQL
- PostgreSQL
- Oracle
- SQLite3



Relational

NoSQL Databases

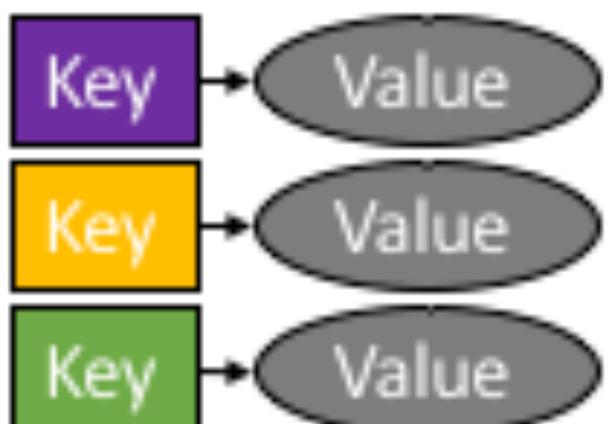
- MongoDB
- Redis
- Neo4j
- Cassandra
- InfluxDB
- Prometheus



Column



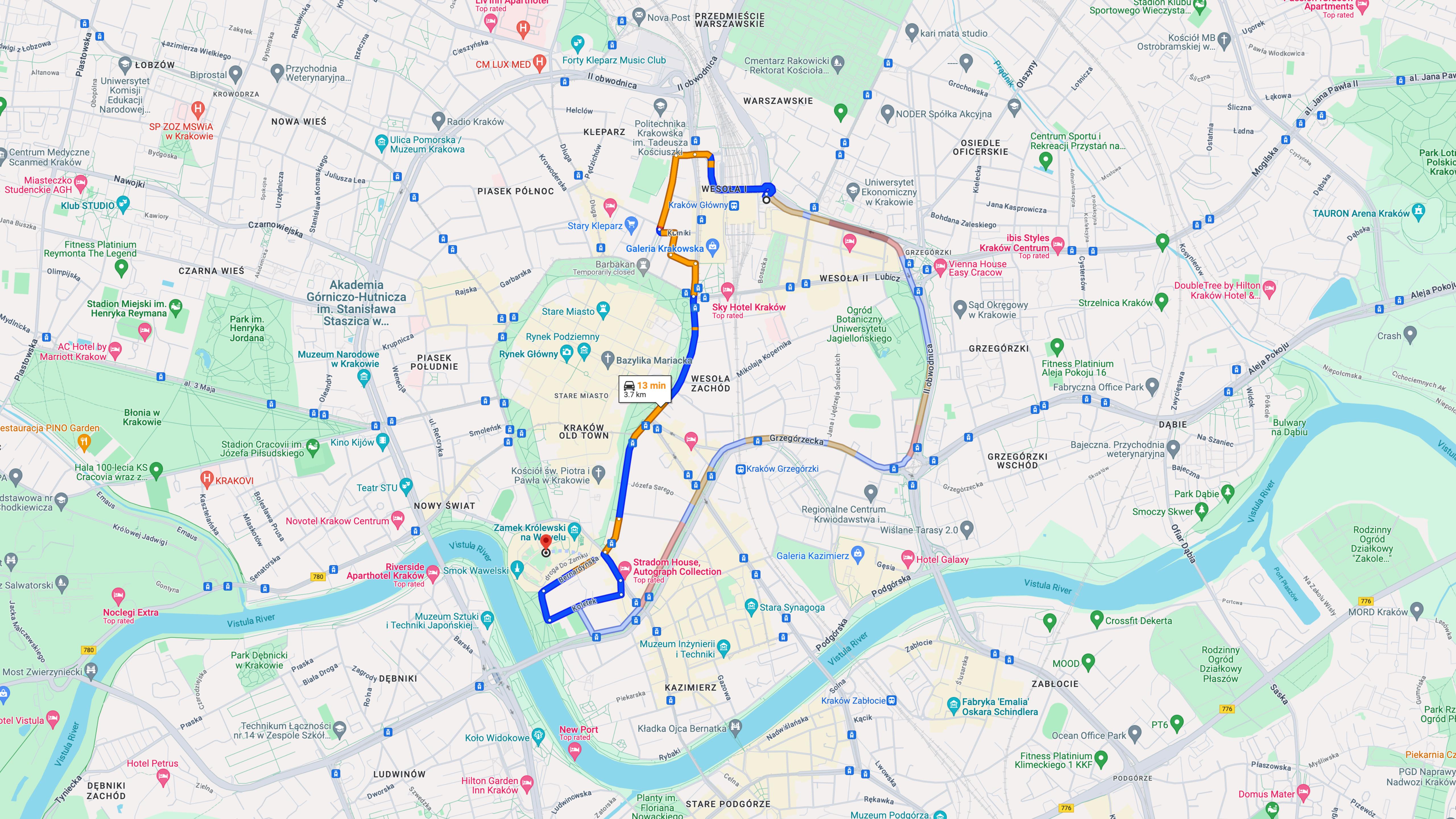
Graph



Key-Value

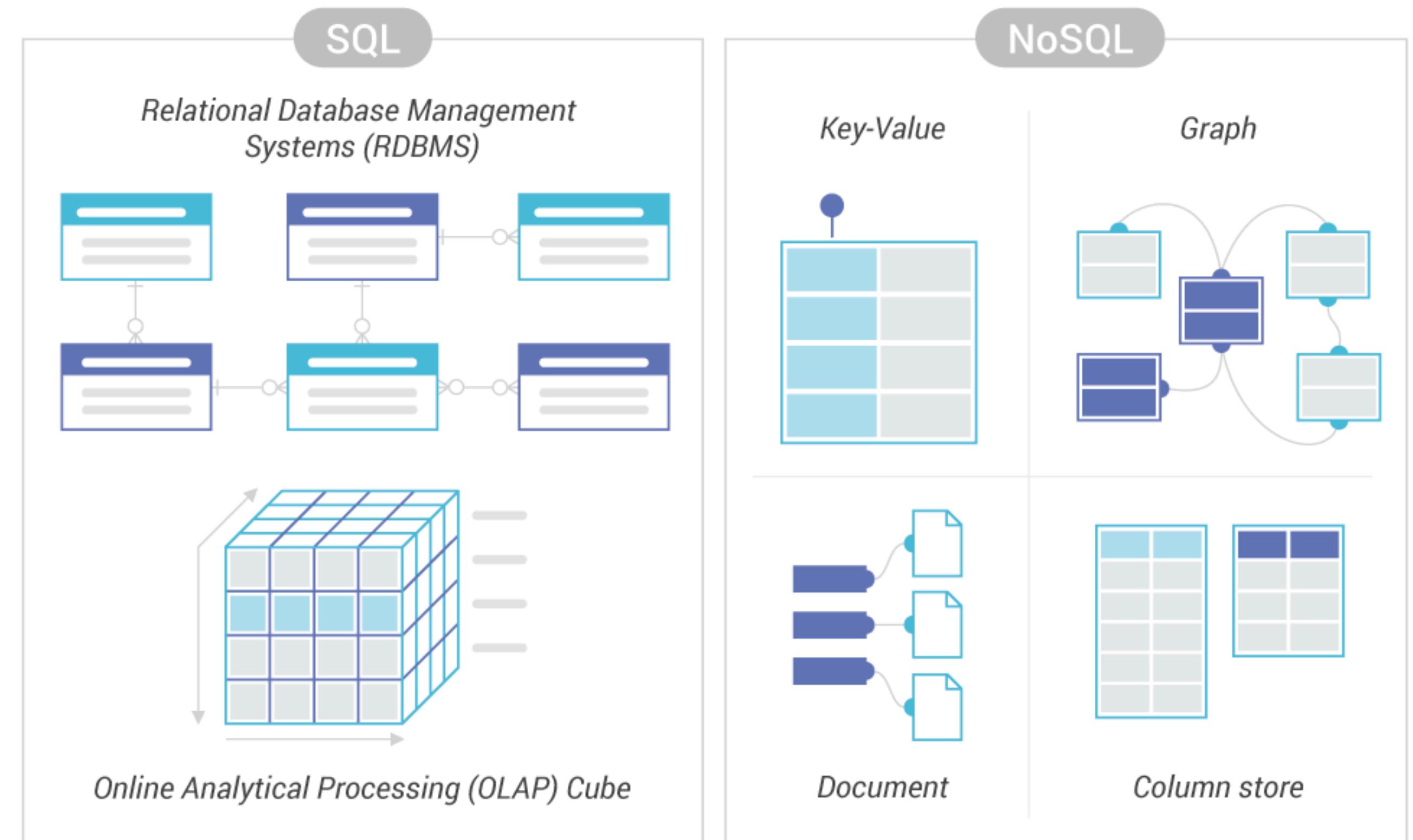


Document



SQL vs NoSQL

	Relational Databases	Non-Relational Databases
Design	Tables and relations	Documents, Graphs, Columns, Key-Value pairs
Scalable	Tough to scale due to its relational nature	Easily scalable big data compared to relational
Model	Detailed database model is needed before creation	No need of detailed database model
Community	Vast community available	Community is growing rapidly, but still smaller compared to RDBMS
Standardization	SQL is standard language	Lacks standard query language
Schema	The schema is rigid	The schema is dynamic
Flexibility	Not very flexible	Very flexible
Insertions	Inserting new columns or fields affect the design	No effect on the design with the insertion of new columns or fields



Bezpieczeństwo

- Zagrożenia i rodzaje ataków
- Zagrożenia techniczne i socjotechniczne
- Kim są atakujący
- Kto jest atrakcyjnym celem
- Co możemy zrobić aby się zabezpieczyć

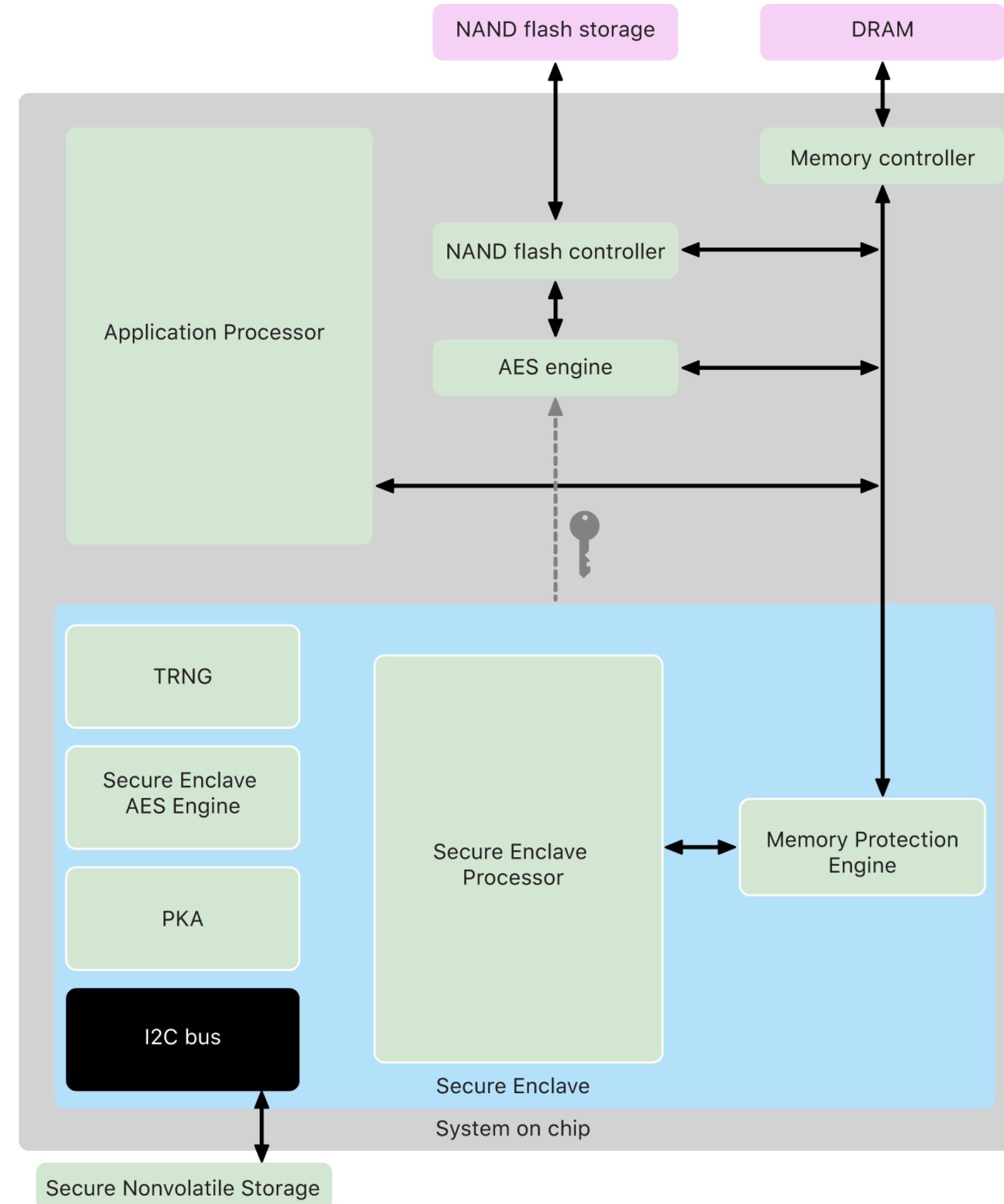


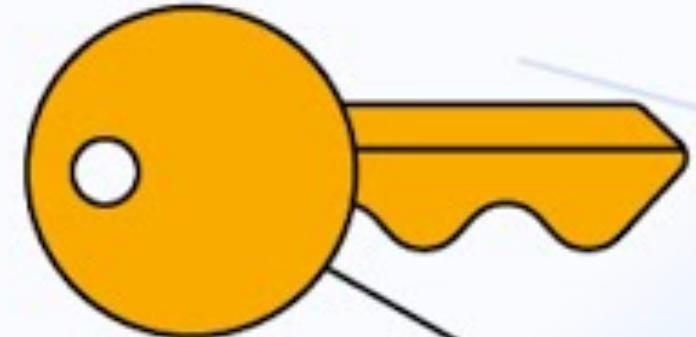
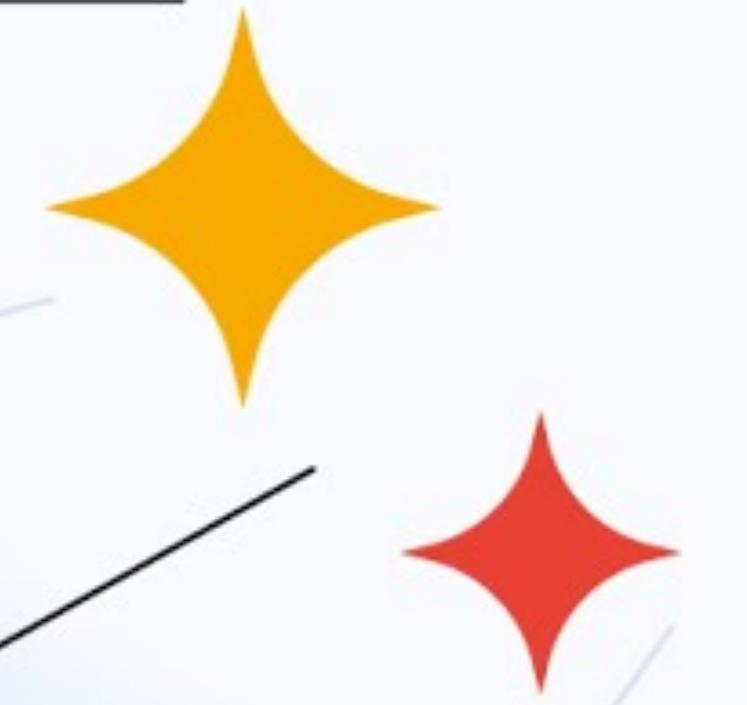
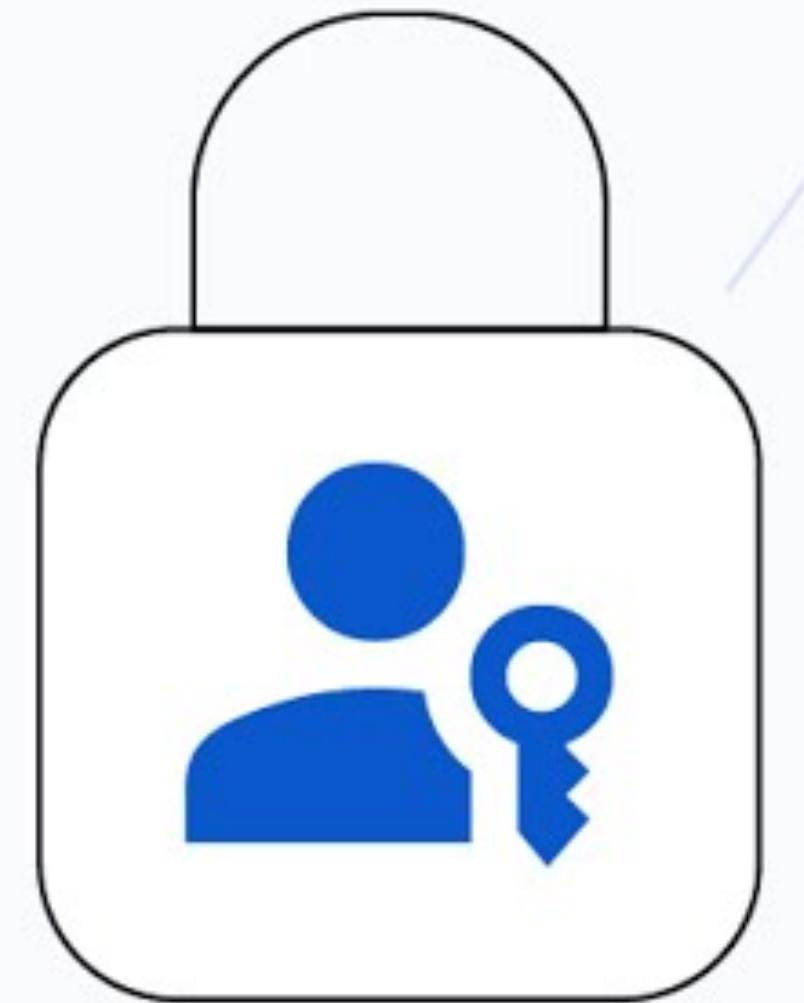
Zagrożenia

- Robaki
- Phishing
- Malware
- Ransomware
- Spyware
- SQL Injection
- Typosquatting
 - aIIegro → allegro (Helvetica)
 - allegro → allgro (Helvetica)



Secure Enclave



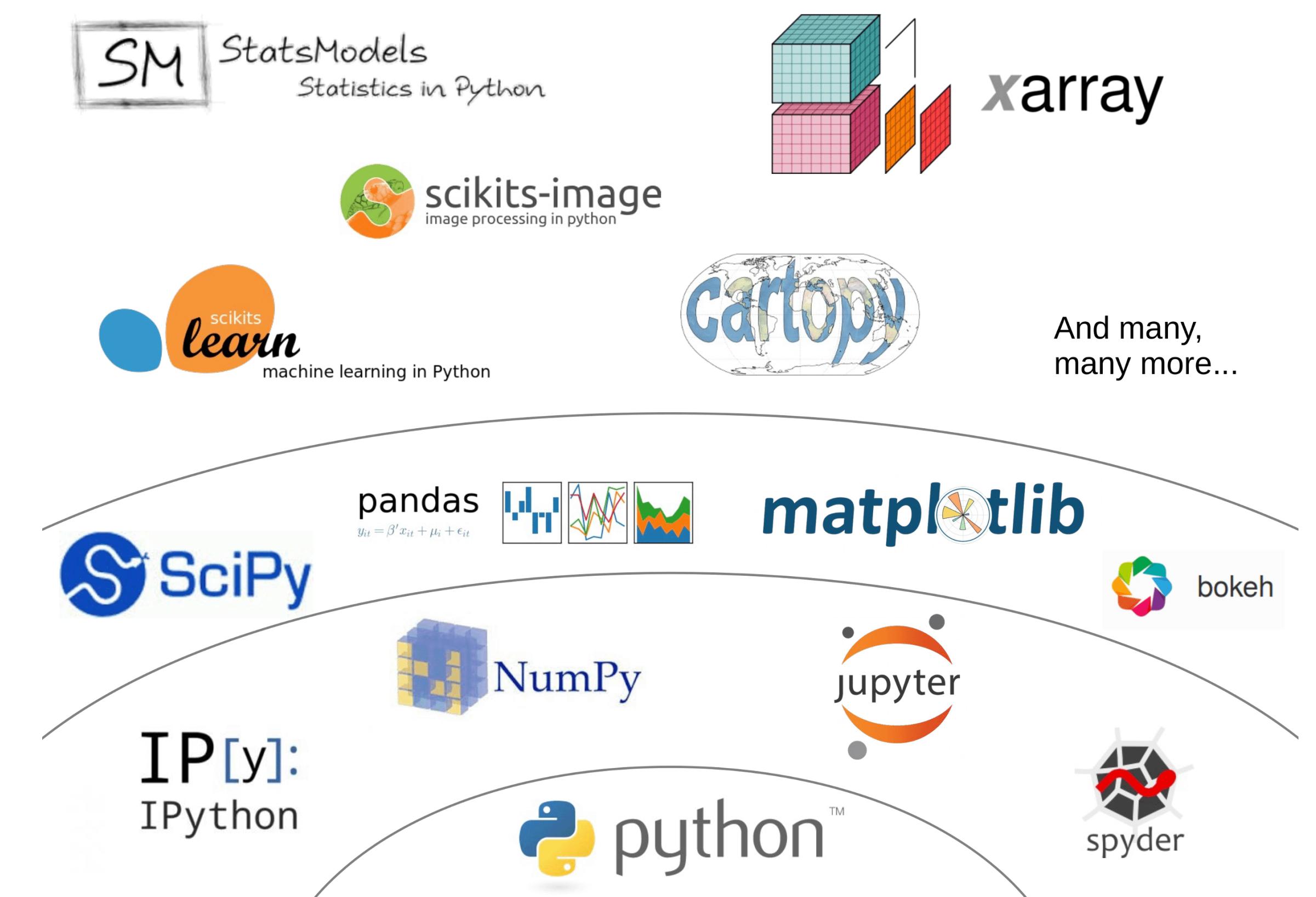


What are passkeys?



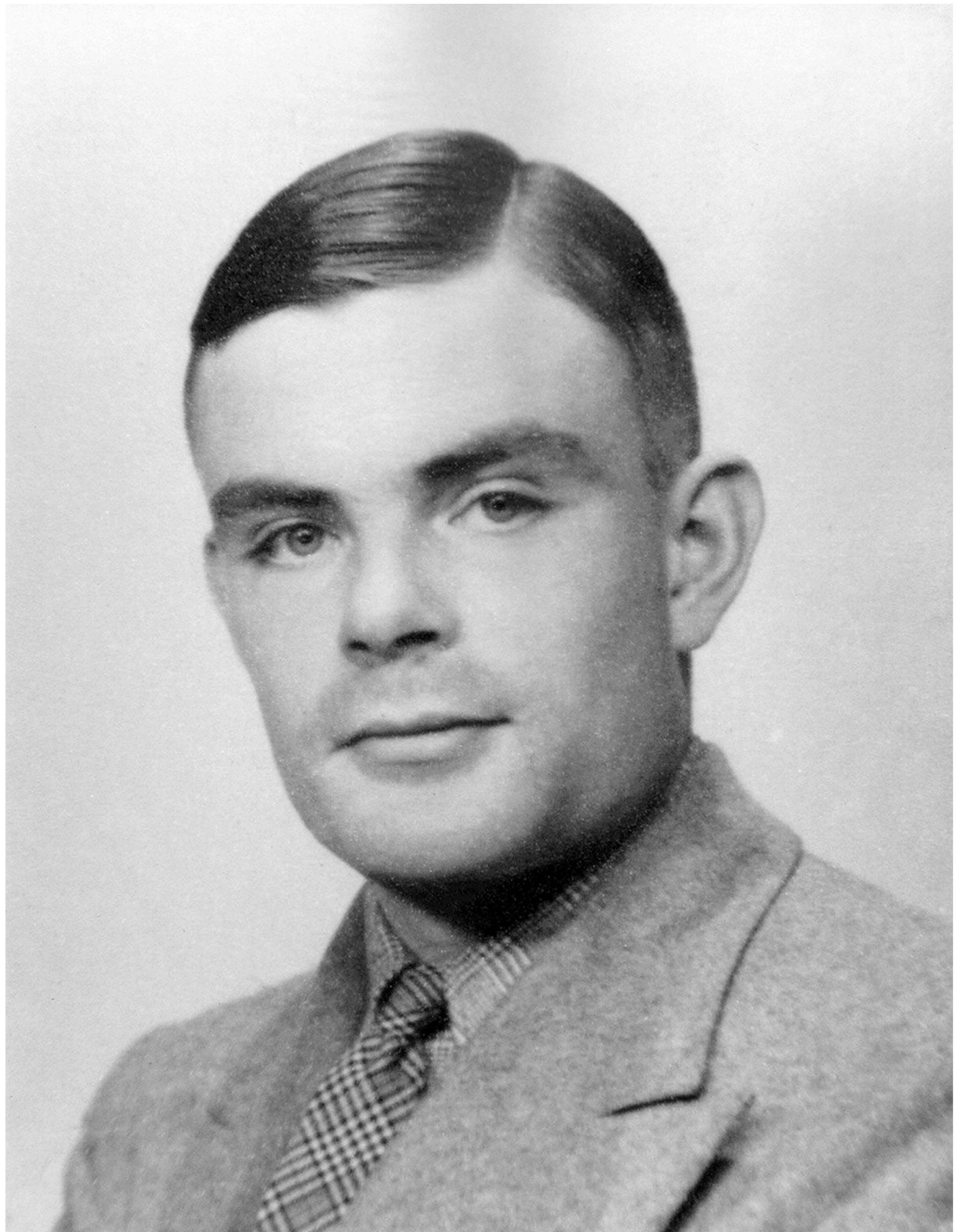
Programowanie

- Wstęp do Pythona
- Instrukcje sterujące
- Ekosystem bibliotek i narzędzi
- Matematyka a programowanie
- <https://python3.info>



Alan Turing

- Złamanie Enigmy
- Pionier informatyki
- Maszyna Turinga
- Test Turinga (wykrywanie AI)



ASCII control characters

00	NULL	(Null character)
01	SOH	(Start of Header)
02	STX	(Start of Text)
03	ETX	(End of Text)
04	EOT	(End of Trans.)
05	ENQ	(Enquiry)
06	ACK	(Acknowledgement)
07	BEL	(Bell)
08	BS	(Backspace)
09	HT	(Horizontal Tab)
10	LF	(Line feed)
11	VT	(Vertical Tab)
12	FF	(Form feed)
13	CR	(Carriage return)
14	SO	(Shift Out)
15	SI	(Shift In)
16	DLE	(Data link escape)
17	DC1	(Device control 1)
18	DC2	(Device control 2)
19	DC3	(Device control 3)
20	DC4	(Device control 4)
21	NAK	(Negative acknowl.)
22	SYN	(Synchronous idle)
23	ETB	(End of trans. block)
24	CAN	(Cancel)
25	EM	(End of medium)
26	SUB	(Substitute)
27	ESC	(Escape)
28	FS	(File separator)
29	GS	(Group separator)
30	RS	(Record separator)
31	US	(Unit separator)
127	DEL	(Delete)

ASCII printable characters

32	space	64	@	96	'
33	!	65	A	97	a
34	"	66	B	98	b
35	#	67	C	99	c
36	\$	68	D	100	d
37	%	69	E	101	e
38	&	70	F	102	f
39	'	71	G	103	g
40	(72	H	104	h
41)	73	I	105	i
42	*	74	J	106	j
43	+	75	K	107	k
44	,	76	L	108	l
45	-	77	M	109	m
46	.	78	N	110	n
47	/	79	O	111	o
48	0	80	P	112	p
49	1	81	Q	113	q
50	2	82	R	114	r
51	3	83	S	115	s
52	4	84	T	116	t
53	5	85	U	117	u
54	6	86	V	118	v
55	7	87	W	119	w
56	8	88	X	120	x
57	9	89	Y	121	y
58	:	90	Z	122	z
59	;	91	[123	{
60	<	92	\	124	
61	=	93]	125	}
62	>	94	^	126	~
63	?	95	_		

Extended ASCII characters

128	ç	160	á	192	ł	224	ó
129	ü	161	í	193	ł	225	ß
130	é	162	ó	194	ł	226	ô
131	â	163	ú	195	ł	227	ò
132	ä	164	ñ	196	—	228	ö
133	à	165	ň	197	ł	229	ô
134	â	166	º	198	ä	230	µ
135	ç	167	º	199	å	231	þ
136	è	168	¿	200	ł	232	þ
137	ë	169	®	201	ł	233	ú
138	è	170	¬	202	ł	234	ø
139	ï	171	½	203	ł	235	ù
140	î	172	¼	204	ł	236	ý
141	í	173	ı	205	—	237	ÿ
142	ä	174	«	206	ł	238	—
143	å	175	»	207	ł	239	—
144	É	176	¤	208	ø	240	Ξ
145	æ	177	¤	209	đ	241	±
146	Æ	178	¤	210	ê	242	≡
147	ö	179	—	211	ë	243	¾
148	ö	180	—	212	ë	244	¶
149	ò	181	À	213	í	245	§
150	ó	182	Ã	214	ł	246	÷
151	ù	183	À	215	ł	247	·
152	ÿ	184	©	216	ł	248	°
153	ö	185	—	217	ł	249	—
154	Ü	186	—	218	ł	250	·
155	ø	187	—	219	—	251	¹
156	£	188	—	220	—	252	³
157	Ø	189	¢	221	—	253	²
158	×	190	¥	222	—	254	■
159	f	191	₼	223	—	255	nbsp