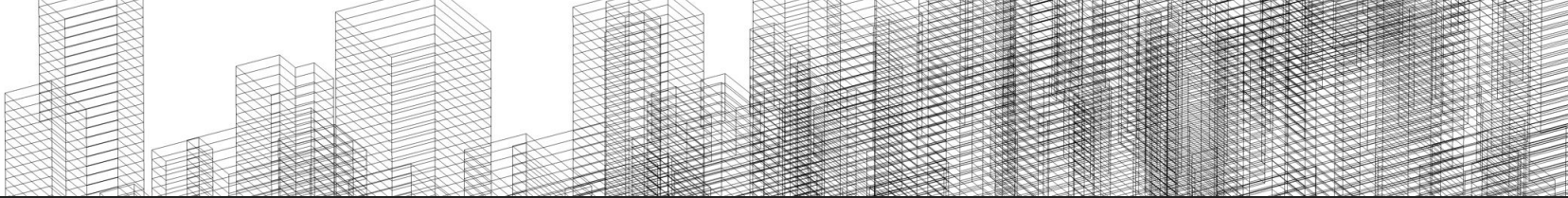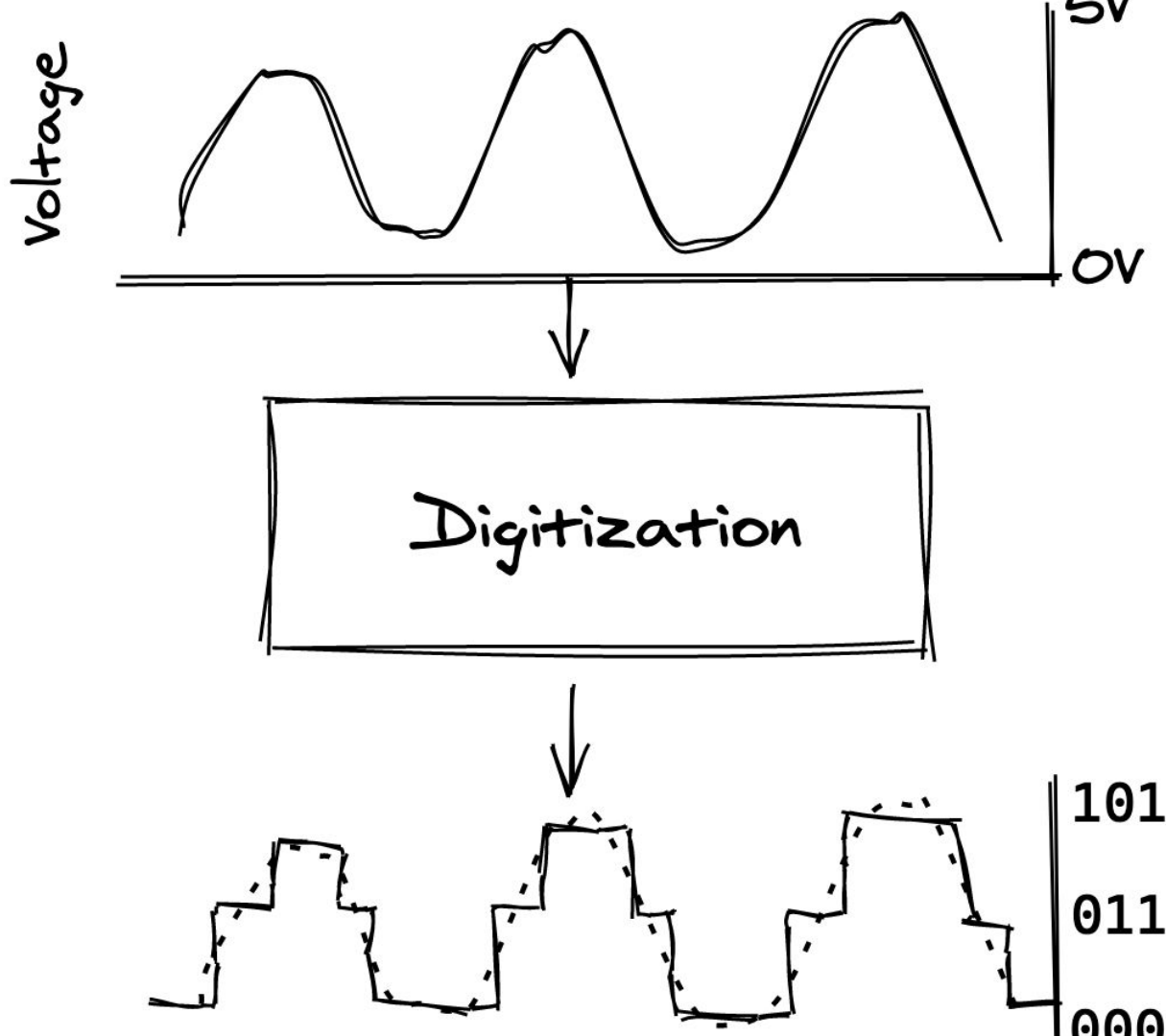# Python Curriculum

Part 00 - Background

From Voltage to Language

1. Digitization
2. Encoding
3. Programming languages

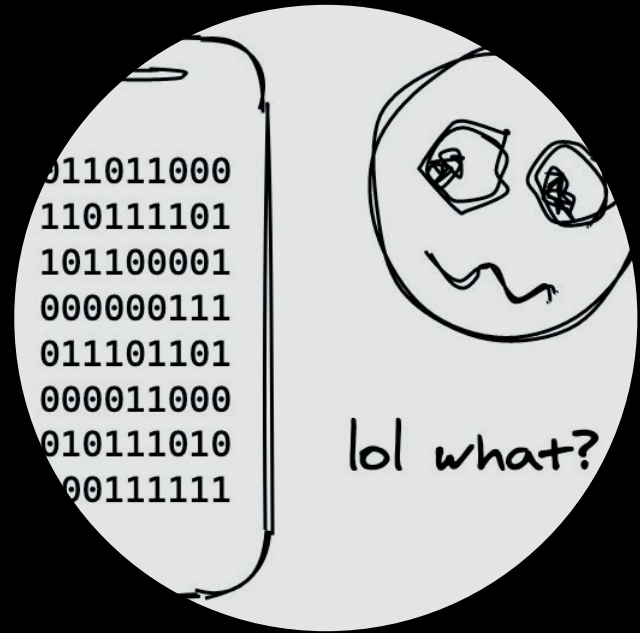# Digitization - first abstraction

Digitization - trade-offs

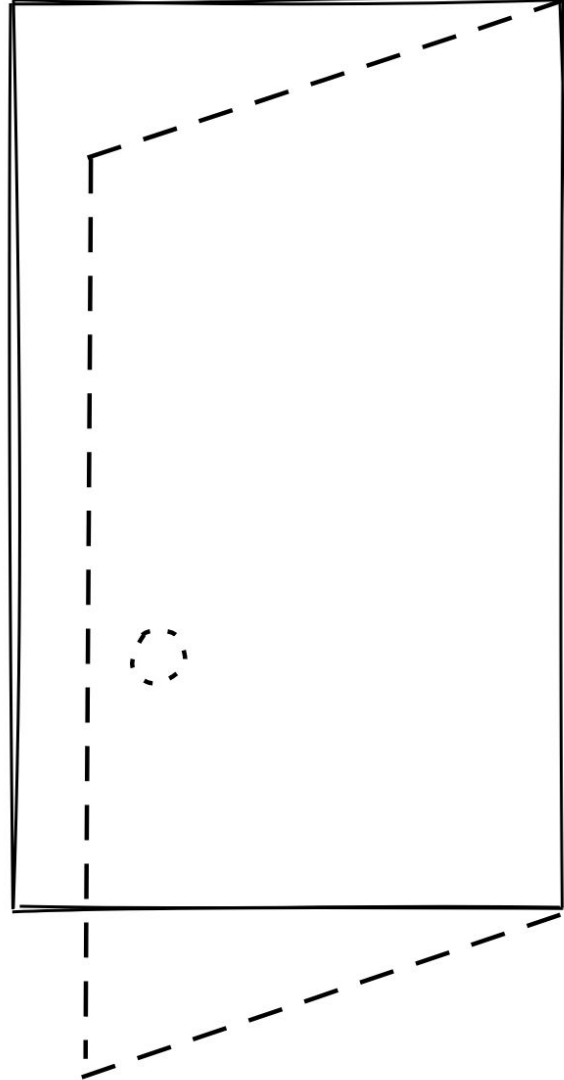| Photography	Scalability	Vividness	Operability	Storage	Feedback
Film	Infinite	Close to nature	Needs some expertise	Limited	After being developed
Digital	Limited by hardware	Limited by hardware	Got a smartphone?	Indefinite*	Usually instantaneous

Encoding

Encoding

Alohomora

↓

011000010
110110001
101111011
010000110
111101101
101011011
110111001
001100001

Encoding - Instruction Set Architectures

Programming Languages

Language	Percentage
JavaScript	67.7%
HTML/CSS	63.1%
SQL	54.7%
Python	44.1%
Java	40.2%
Bash/Shell/PowerShell	33.1%
C#	31.4%
PHP	26.2%
TypeScript	25.4%
C++	23.9%
C	21.8%
Go	8.8%
Kotlin	7.8%
Ruby	7.1%
Assembly	6.2%
VBA	6.1%
Swift	5.9%
R	5.7%
Rust	5.1%
Objective-C	4.1%
Dart	4.0%
Scala	3.6%
Perl	3.1%
Haskell	2.1%
Julia	0.9%
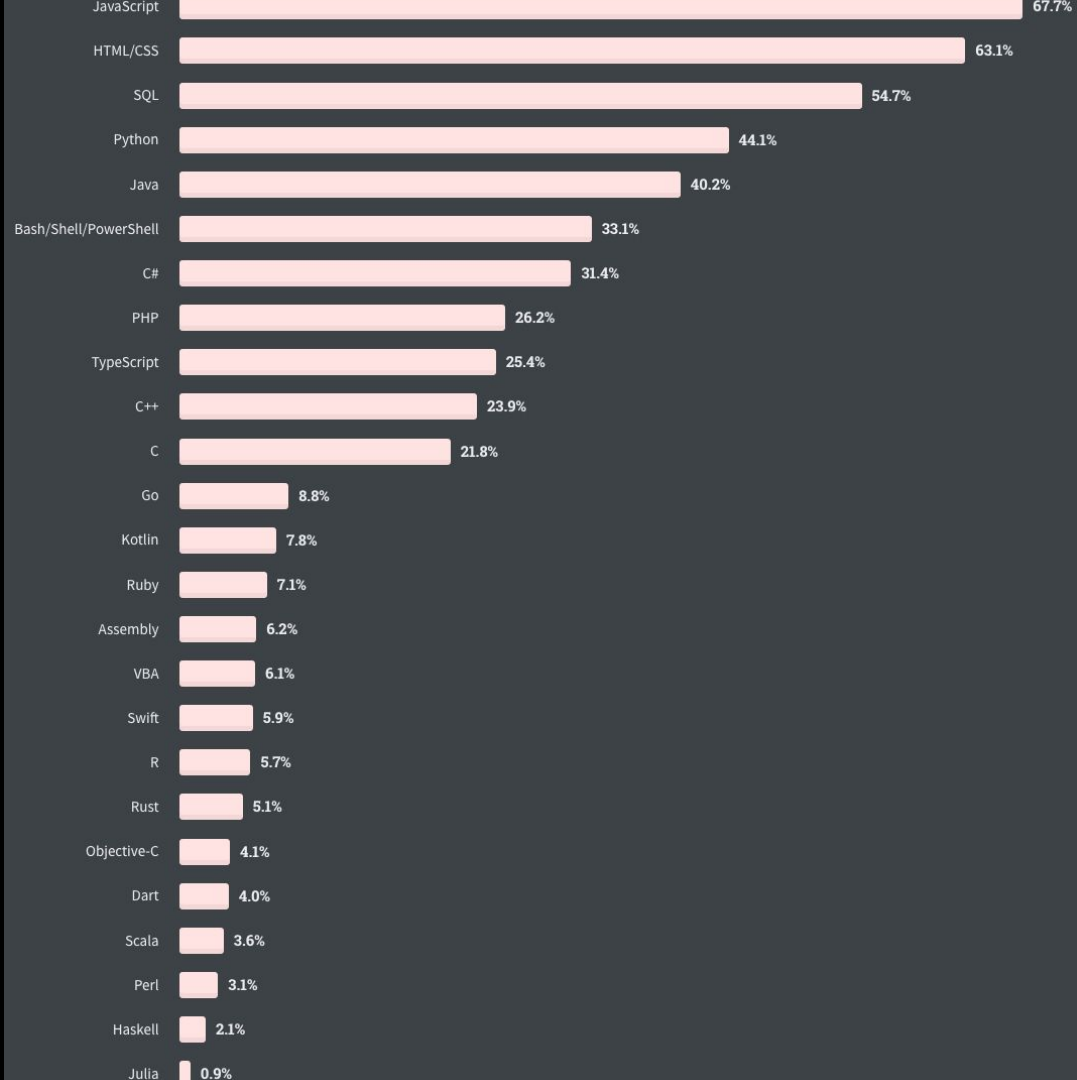
# Programming Languages

1. Trade-offs between useful pros and cons that can be compromised
2. Ecosystem of community, support, and shared codebases (libraries/packages)

3. Personal or collective preferences

Natures of Programming

A program is a set of instructions defined through a programming language that we can often utilize flowcharts to visualize.

2

yes

B = 0?

no

3

yes

A > B?

no (< or =)

4

B ← B - A

5

GOTO 2

6

A ← A - B

7

GOTO 2
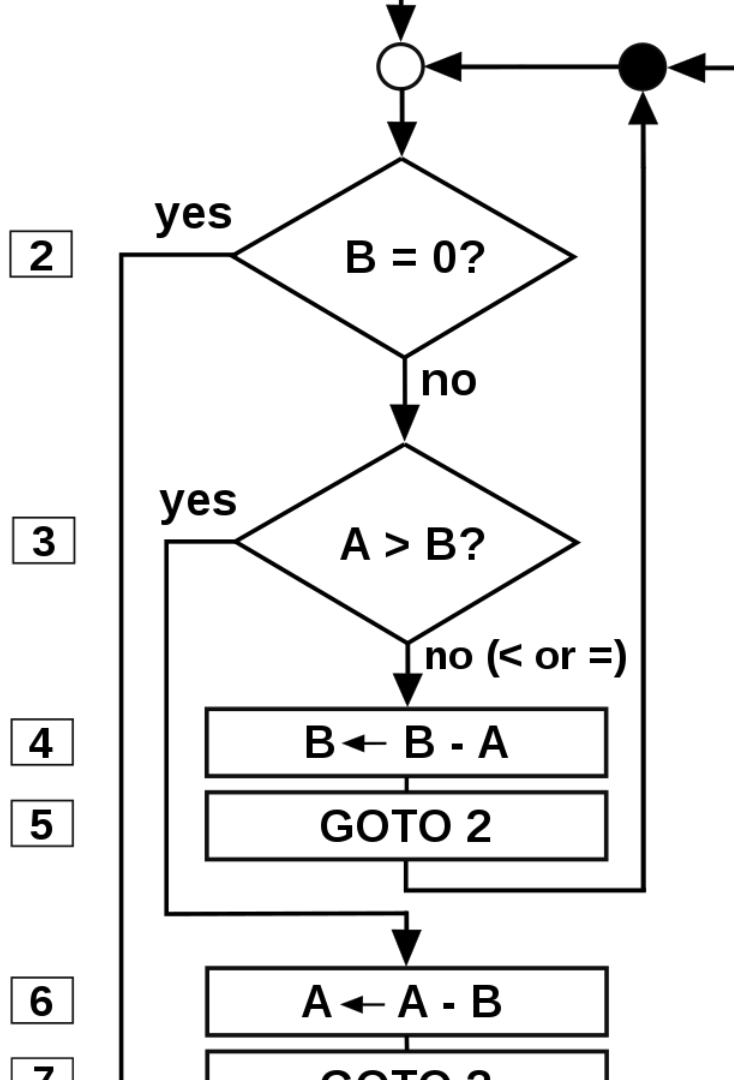
Natures of Programming

Objective centric   Logical   Creative

```c
#include <time.h> //  Robert Nystrom
#include <stdio.h> // @munificentbob
#include <stdlib.h> //     for Ginny
#define  r return    //    2008-2019
#define  l(a, b, c, d) for (i y=a;y\
<b; y++) for (int x = c; x < d; x++)
typedef int i;const i H=40;const i W
=80;i m[40][80];i g(i x){r rand()%x;
}void cave(i s){i w=g(10)+5;i h=g(6)
+3;i t=g(W-w-2)+1;i u=g(H-h-2)+1;l(u
-1,u+h+2,t-1               ,t+w+2)if(m[
y][x]=='.'                  )r;i d=0
;i e,f        ;if(!s){l(       u-1,u+
h+2,t-   1,t+w+2){i s=x<t       ||x>t
+w;i    t=y<u||         y>    u+h;
if(s    ^t&&         m[       y]
[x    ]=='#'    ){d++;    if(g    (d
)    ==0)     e=x,f=y;    }}if     (d
==     0)r;    }l(u-1,u    +h+2    ,t
-1    ,t+w    +2){i s=     x< t    ||
x>    t+w;    i t= y<u    ||y>    u+
h;    m[y]         [x]= s    &&t?    '!'
:s^t    ?'#'                  :'.'
;}if    (d>0)m                  [f][
e]=g(2    )?'\'':'+';for(i j=0;j<(s?
1:g(6)      +1);j++)m[g(h)+u][g(w)
+t]=s?'@'             :g(4) ==0?
'$':65+g(62)             ;}i main(i
argc, const char* argv[]) {srand((i)
time(NULL));l(0, H, 0,W)m[y][x]=' ';
for(i j=0;j<1000;j++)cave(j==0);l(0,
H,0,W) {i c=m[y][x]; putchar(c=='!'?
'#':c);if(x==W-1)printf("\n");}r 0;}
```

Natures of Programming

Natures of Programming

Questions?