1 - introduction to digital systems

most famous digital system → a genel purpose computer

memory unit + central processing unit + input/output units

↳ programmable = same device, many different purposes

digital system = inputs and outputs come from a set finite number of discrete values

analog system = inputs and outputs come from a continiout (infinite) set

main uses of digital systems

- information processing
- transmission (communication)
- storage
- many forms of information

importance

↳ well suited for both nonnumerical and numerical info.

↳ insensetive to noises (old tv's are not, but now they are not sensetive)

ways of digitization:

how to represent binary information:

CPU → voltage difference

Hard Disk → magnetism

CDs → laser / light (with burning surface)

digital systems

combinational

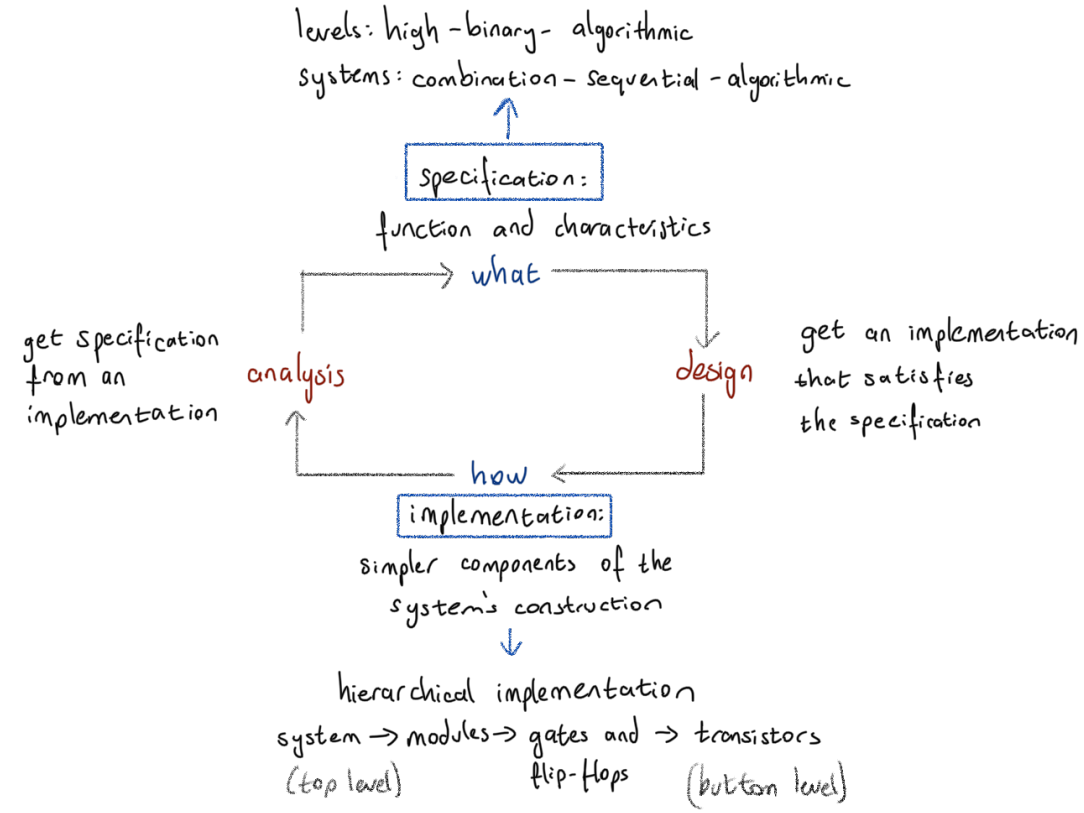
$z(t) = F(x(t))$

- no memory
- the output does not depend on previous inputs

sequential

$z(t) = F(x(0;t))$

- $x(0;t)$: input sequence from 0 to time t (like $x(0), x(1), x(t)$)
- $z(t)$ depends on previous inputs
- the system has a memory



computer aided design tools (CAD)

tools to design digital systems

at high level → hardware - description language (HDL)

at the binary level → to describe the system structure (HDLs)

- they synthesize and optimize tools
- simulate the system for given output
  - ↳ logic simulation
  - ↳ timing simulation