DIGITAL ABSTRACTION

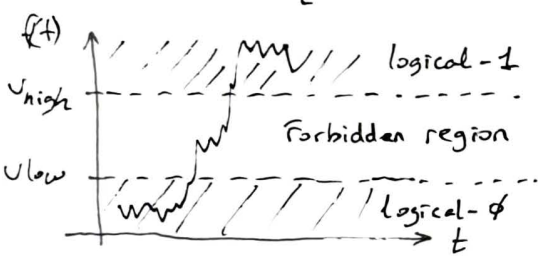
Based on value discretization. The idea is to lump signal values that fall within some interval into a single value.

Analog signal is a real function $f: \mathbb{R} \to \mathbb{R}$ that describes the voltage of a given point as a function of time. Signal is a continuous function.
Digital function is defined as $g: \mathbb{R} \to \{0, 1, \text{non-logical}\}$

Simply: $dig(f(t)) \triangleq \begin{cases} 0 & \text{if } f(t) < v' \\ 1 & \text{if } f(t) \geq v' \end{cases}$

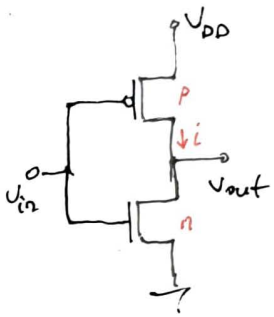
To eliminate the noise effect at $f(t)$ around v', we put a gap:

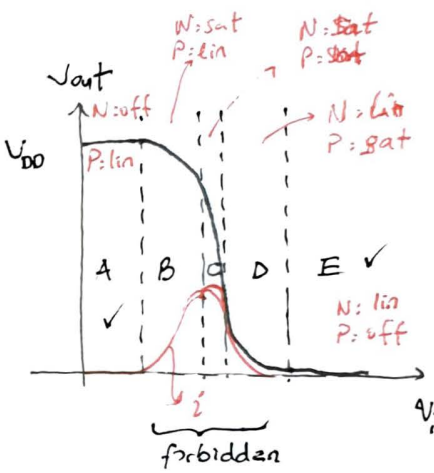
$$dig(f(t)) \triangleq \begin{cases} 0 & \text{if } f(t) < V_{low} \\ 1 & \text{if } f(t) > V_{high} \\ \text{non-logical} & \text{otherwise} \end{cases} \qquad V_{low} < V_{high}!$$

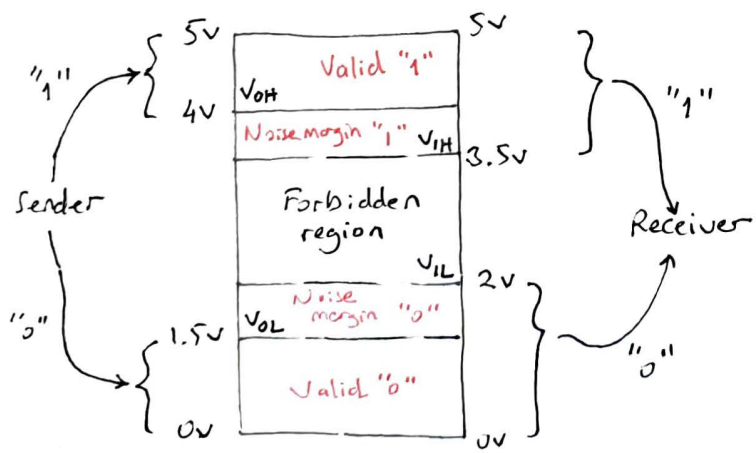


Using CMOS inverter gate

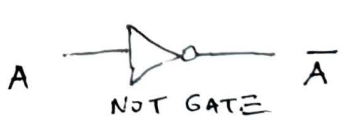
MOSFET transistors



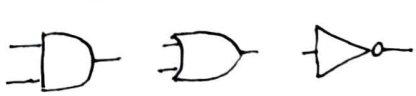




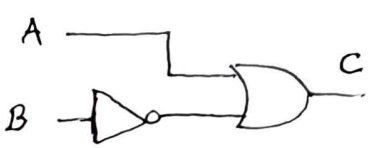
Gate Abstraction



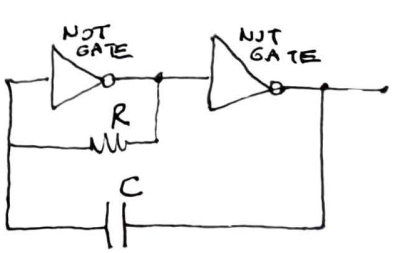
Gates: AND OR NOT ...



The gate-level digital circuit for Boolean expression $C = A + \overline{B}$:



Analyse this circuit:



Continue next: ADC.ppt

Run adc.py