

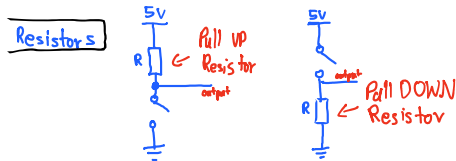
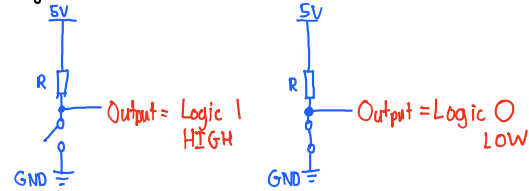
Unit 10: Digital Electronics

Thursday, 15 May 2025 12:39

Signals

- Analogue Signals
 - ↳ Continuous Varying Voltages / Current levels
- Digital Signals (LOW/OFF) (HIGH/ON)
 - ↳ Only take 2 distinct Voltage Levels (Logic 0 and Logic 1)

Logic switches



Why do you need Pullup / Pull down Resistors

- ↳ Without them, the output will not be connected to any power rails when switch is open
- ↳ Resulting in Floating Output → Picks up unwanted signals
- ↳ Logic levels change unpredictably

How to decide which Resistor?

- ↳ If you want HIGH when switch is OPEN, Pull UP
- ↳ If you want LOW when switch is OPEN, Pull DOWN

Analogue & Digital Systems

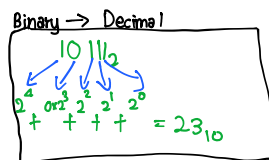
- ↳ Digital Signals
 - ↳ Less affected by Electronic Interference
 - ↳ Repeaters Restore distorted signals to original signal
 - ↳ Easier to design as slight variations in voltage do not matter
- But!
 - ↳ Most information is analogue, need to convert for processing
 - ↳ Most outputs wanted are analogue, need to convert for output

Binary Number System

↳ Base-2 system

- $1_{10} \rightarrow 01_2$
- $2_{10} \rightarrow 10_2$
- $3_{10} \rightarrow 11_2$
- $4_{10} \rightarrow 100_2$
- $5_{10} \rightarrow 101_2$
- $6_{10} \rightarrow 110_2$
- $7_{10} \rightarrow 111_2$
- $8_{10} \rightarrow 1000_2$
- $9_{10} \rightarrow 1001_2$
- $10_{10} \rightarrow 1010_2$
- ...

↳ Need to know How to convert



Binary - Coded - Decimal

- ↳ Uses chunks of 4 Bits to store information

0010_2 $1001_2 \rightarrow 00101001_{BCD}$

↳ Advantages

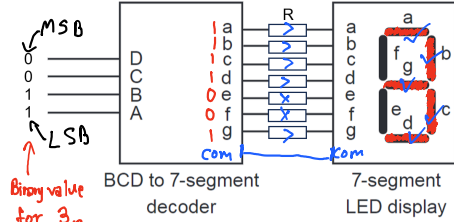
- ↳ Easier to store and send data for displaying (Chunks of 4 bits)
- ↳ Easier to convert to Decimal form

↳ Disadvantages

- ↳ Uses more bits than Decimal & Binary → Requires more memory

Displaying Digital Values

Common Cathode



Binary value for 3₁₀

[BCD split into 4-bit chunks representing 1 Digit]

Input: BCD

Common Anode [opposite!]

