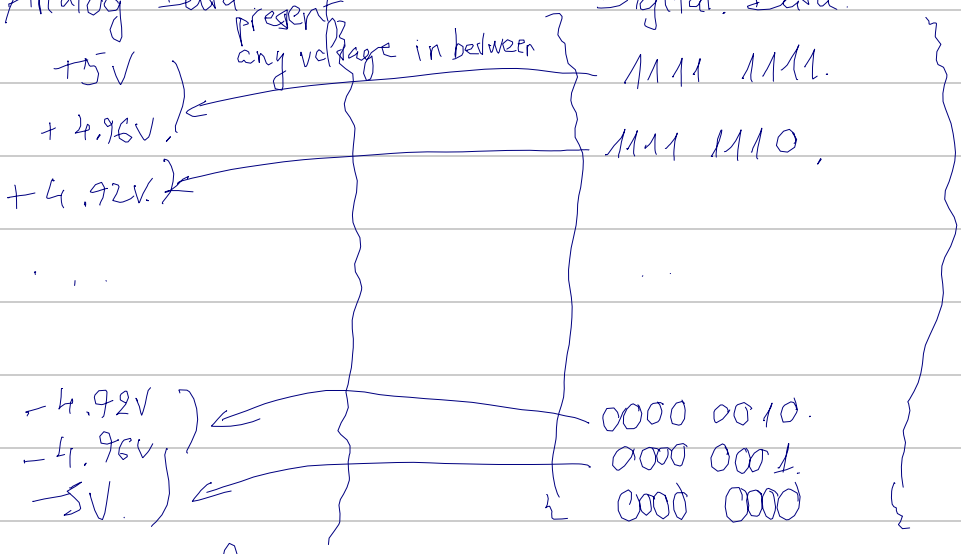
Jul 23rd

Infinite values → map to → 8 bit : finite values

Analog Data → Digital Data ⇒ losing info



input voltage range:

$= (+5) - (-5) = 10V$

Total no. of digital value $= 2^8$

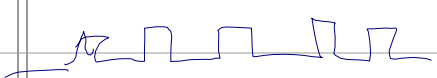
Voltage step $= \frac{10}{2^8} = \frac{10}{256} = .04$ vol →

5V
4.96V
4.92V

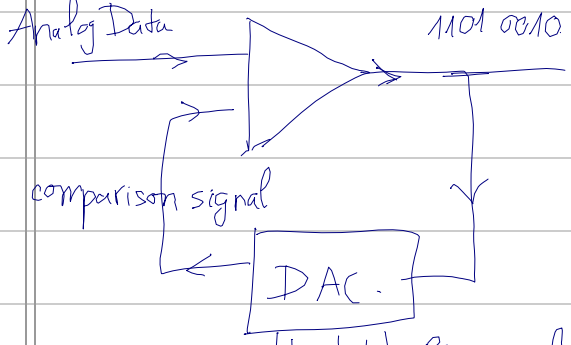
When we have the digital value, convert to analog taking the value in the middle (avg) of the range, for lowest error margin. (already divide 2)

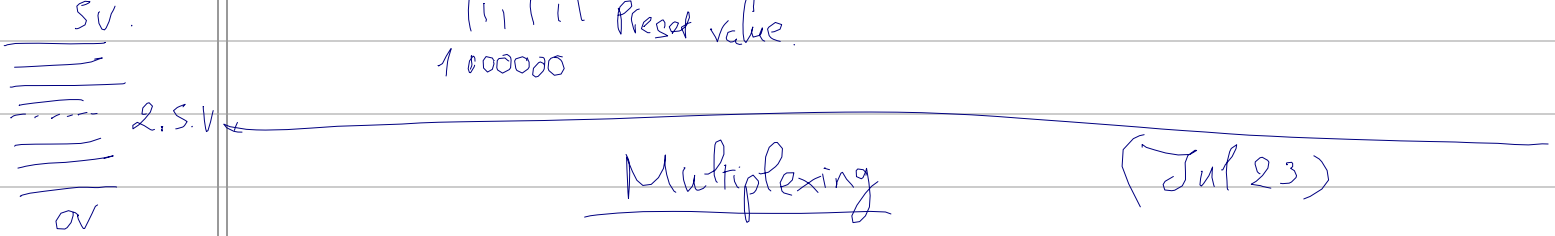
So quantization error $\frac{\delta}{2} = \pm 0.02V$.

each has 8 bits

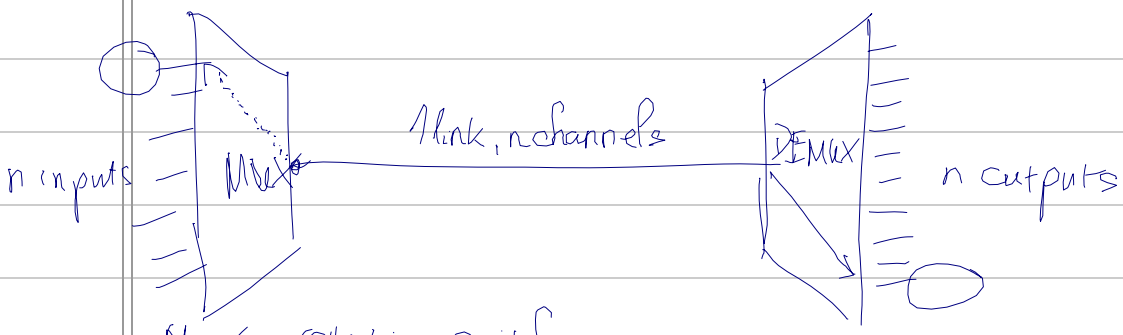


Analog to Digital converter (ADC)





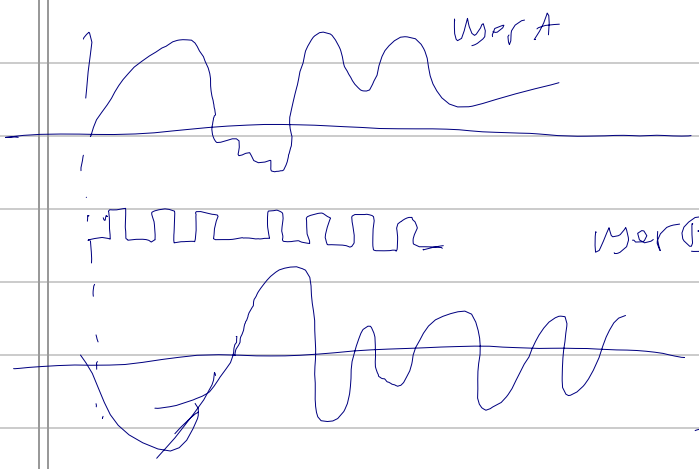
Multiplexing (Jul 23)



Mux = rotating switch.

only 1 connection at a time ⇒ time division multiplexing to.
↘ freq

have multiple connections at a time



time division: send 2nd signal during the gap of the 1st signal.

Mux: at alternate clock, the data from different inputs is sent out. The Rx knows which clock pertaining to which source.

Freq Multiplexing

- add up all freq of different sources and send out at the same time.
- at the receiver, big freq is decomposited into smaller freqs ← using a freq (band) filter (extract each freq from the whole bandwidth)

Time division Multiplexing

Given

Sampling = 8 khz, $T = \frac{1}{8 \times 10^3}$ (sec) $= \frac{10^6}{8 \times 10^3}$ μs.

$= .125$ μs.

each slot for time division occupies 125 μs.

Wavelength Division Multiplexing. similar to Freq MUX.