BUILDING A 3-BIT FLASH ANALOG TO DIGITAL CONVERTER

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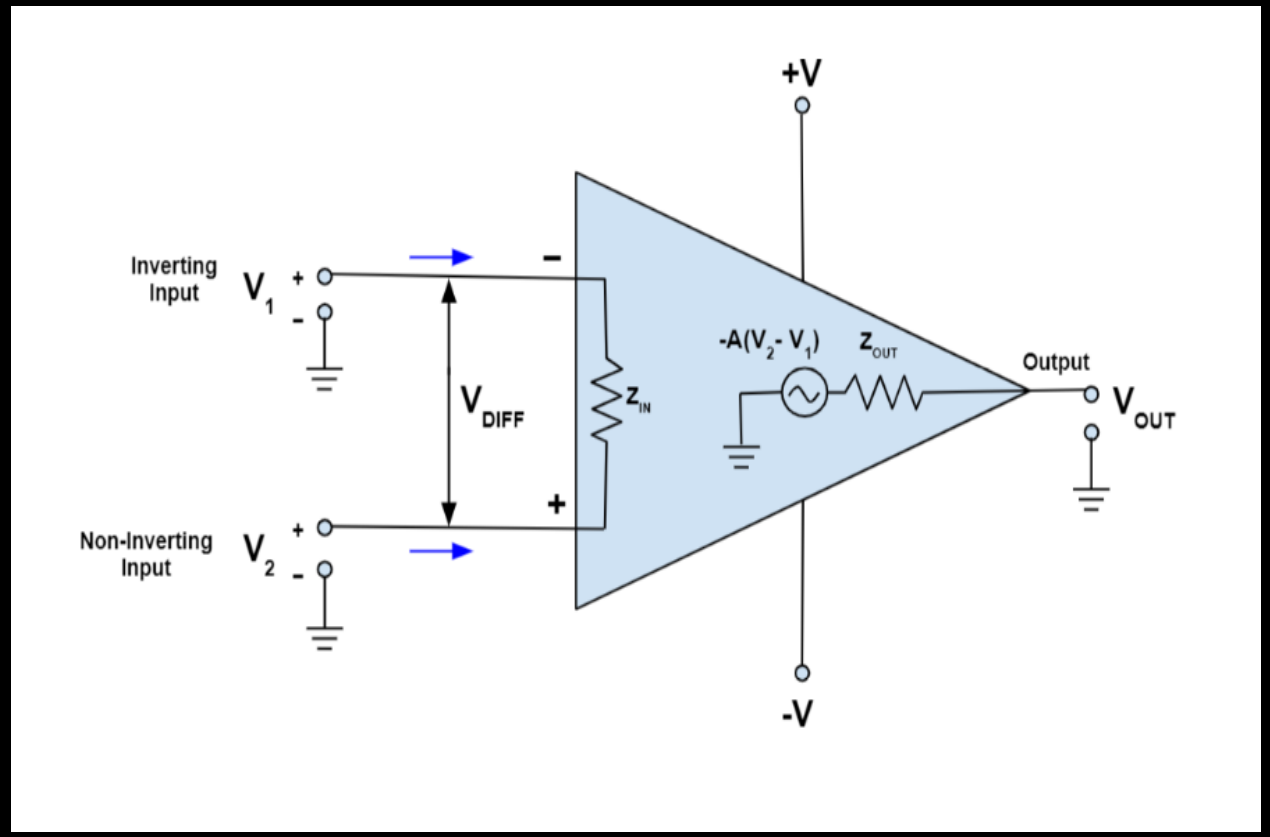
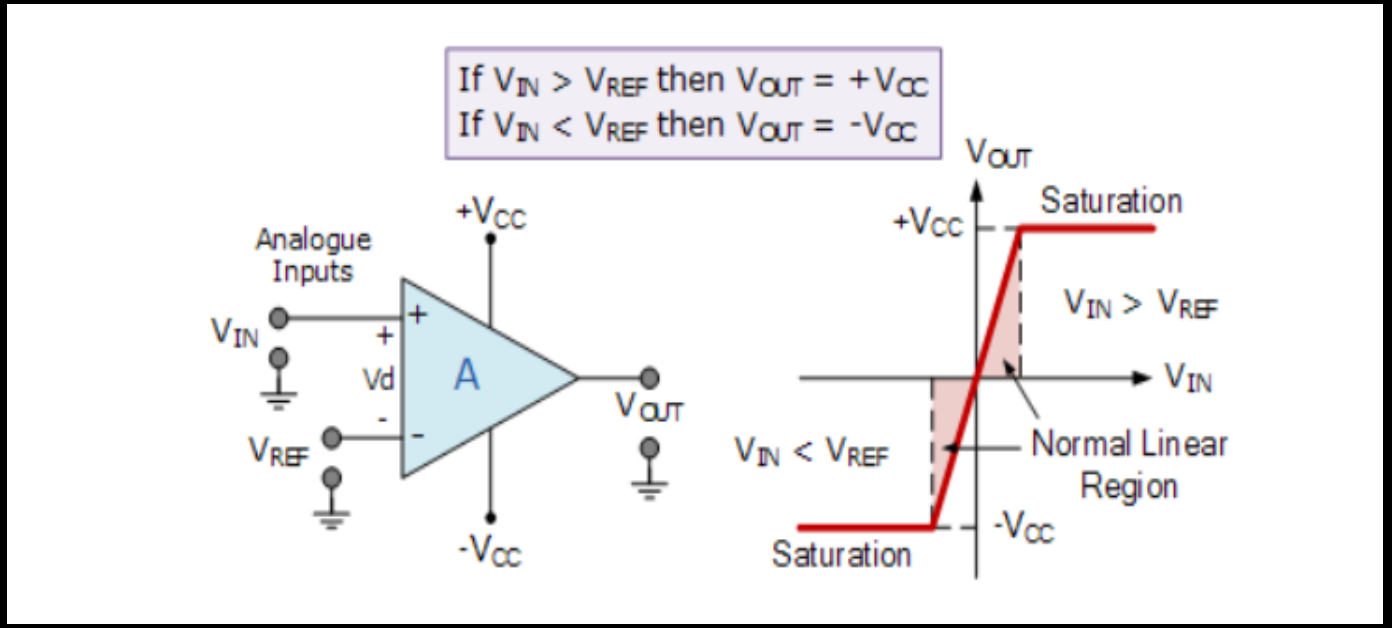
OP-AMP

- Op-Amp is a amplifier with high gain and stability.
- Can perform mathematical operations .
- Consists of two input (inverting , non-inverting), one amplified output and two voltage supply(+v, -v) where the op-amp works.



COMPARATOR (OP-AMP)

- Comparators are a type of circuits which compares two voltages and outputs either a 1 or 0 to indicate which is larger.
- If voltage on the non-inverting input is higher, the output will create a positive voltage that amplifies the difference in input voltages.



PRIORITY ENCODER

- Priority encoder contains 2^n input lines and n output lines.
- When multiple input lines are active high at the same time, then the input that has the highest priority is considered first to generate the output.

INPUT								OUTPUT		
D0	D1	D2	D3	D4	D5	D6	D7	Y1	Y2	Y3
1	0	0	0	0	0	0	0	0	0	0
X	1	0	0	0	0	0	0	0	0	1
X	X	1	0	0	0	0	0	0	1	0
X	X	X	1	0	0	0	0	0	1	1
X	X	X	X	1	0	0	0	1	0	0
X	X	X	X	X	1	0	0	1	0	1
X	X	X	X	X	X	1	0	1	1	0
X	X	X	X	X	X	X	X	1	1	1

X indicates input will not have any effect on output

COMPONENTS

- Operational Amplifier (Op-Amp) (2XLM324)
- Analog input signal (5V)
- Breadboard
- Jumper Wires
- Resistor (11 X 1kohm)
- Priority Encoder (CD4532)
- Multimeter
- LEDs (3)
- DC power supply

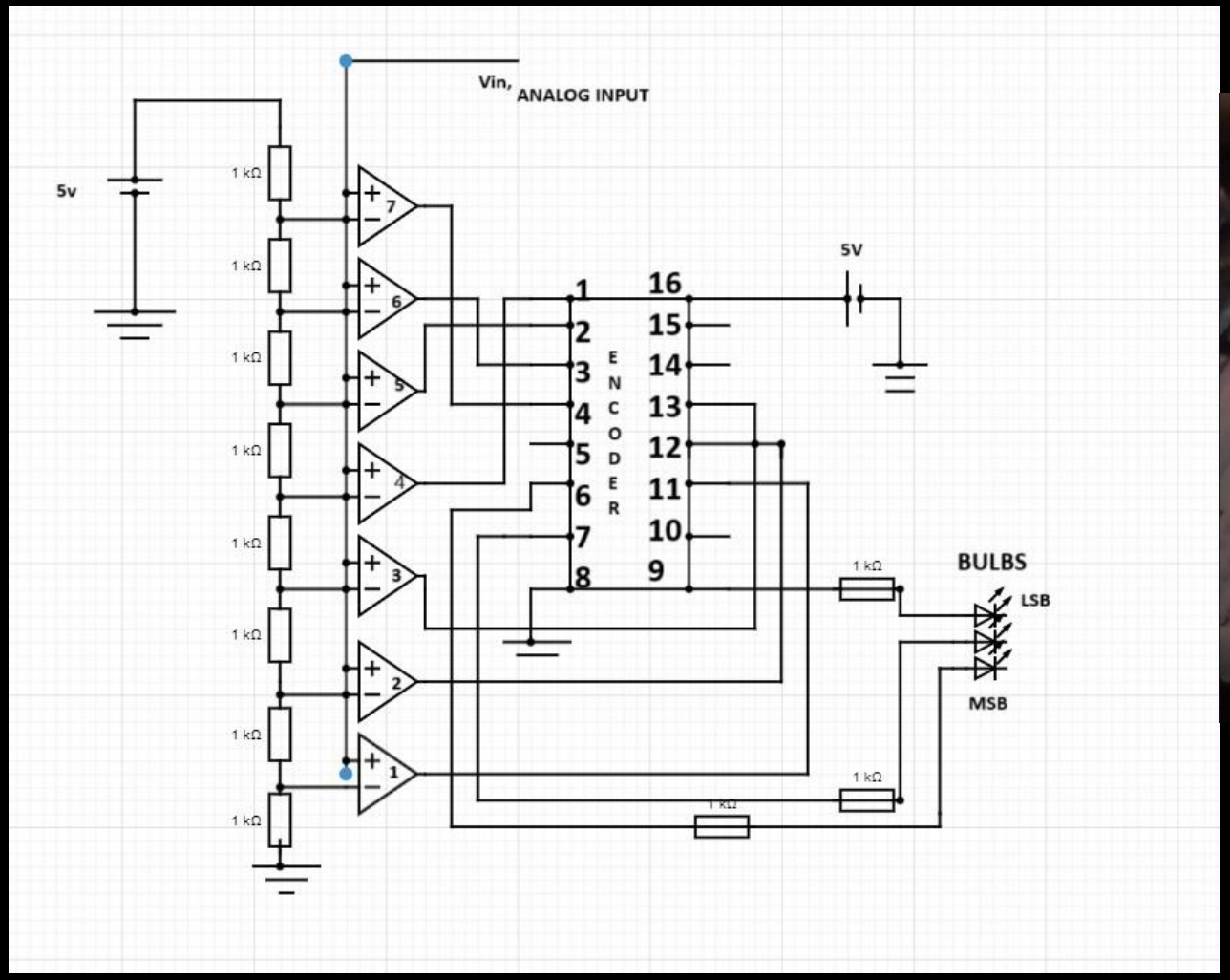
PROJECT CIRCUIT AND FLASH ADC

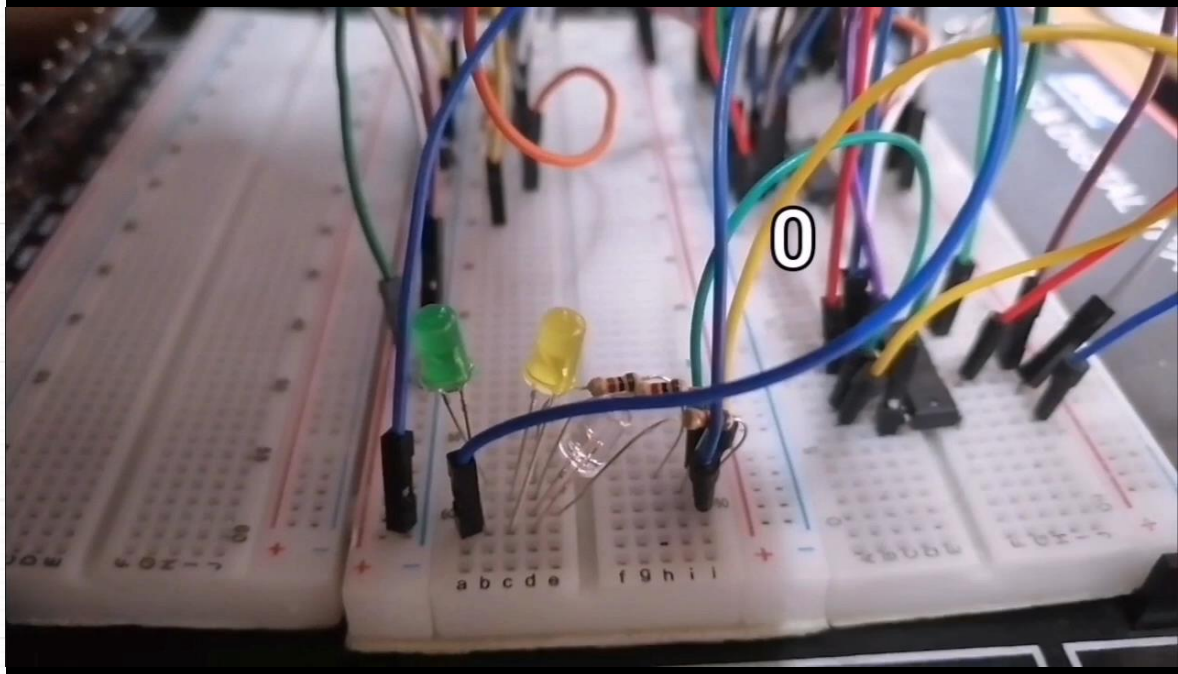
- Flash ADC is formed of a series of comparators, each one comparing the input signal to a unique reference voltage.
- Comparator outputs are connect to the inputs of a priority encoder circuit, which produces a binary output.

Steps:

- Setting Reference Voltage
- Setting and Comparing input Voltage
- Priority Encoding
- LED Display

PROJECT CIRCUIT AND FLASH ADC

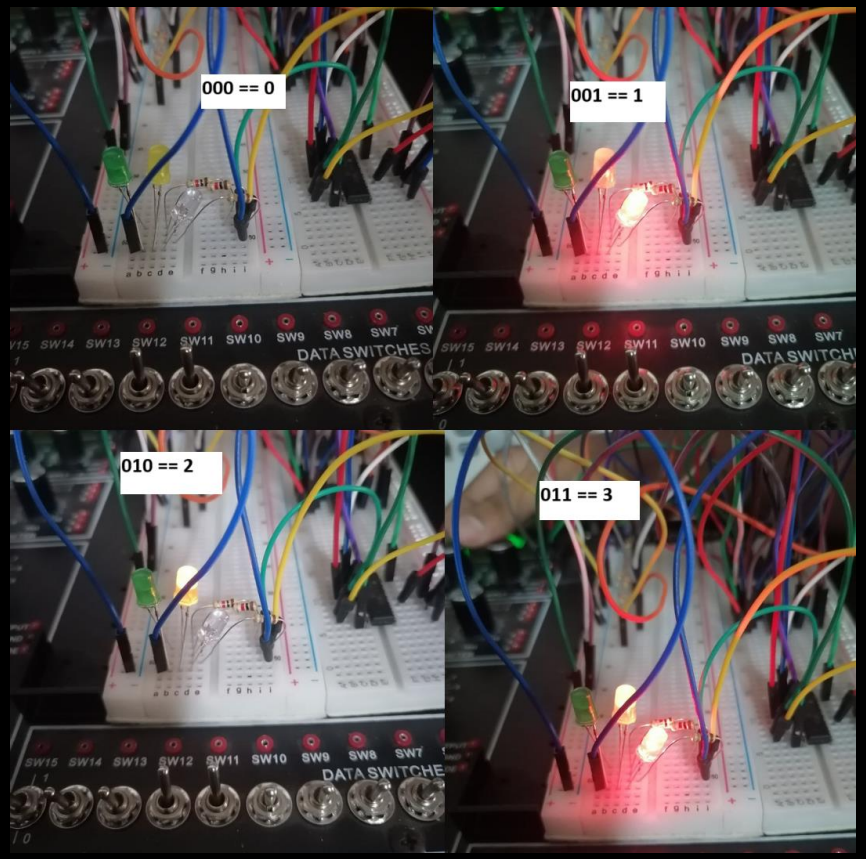


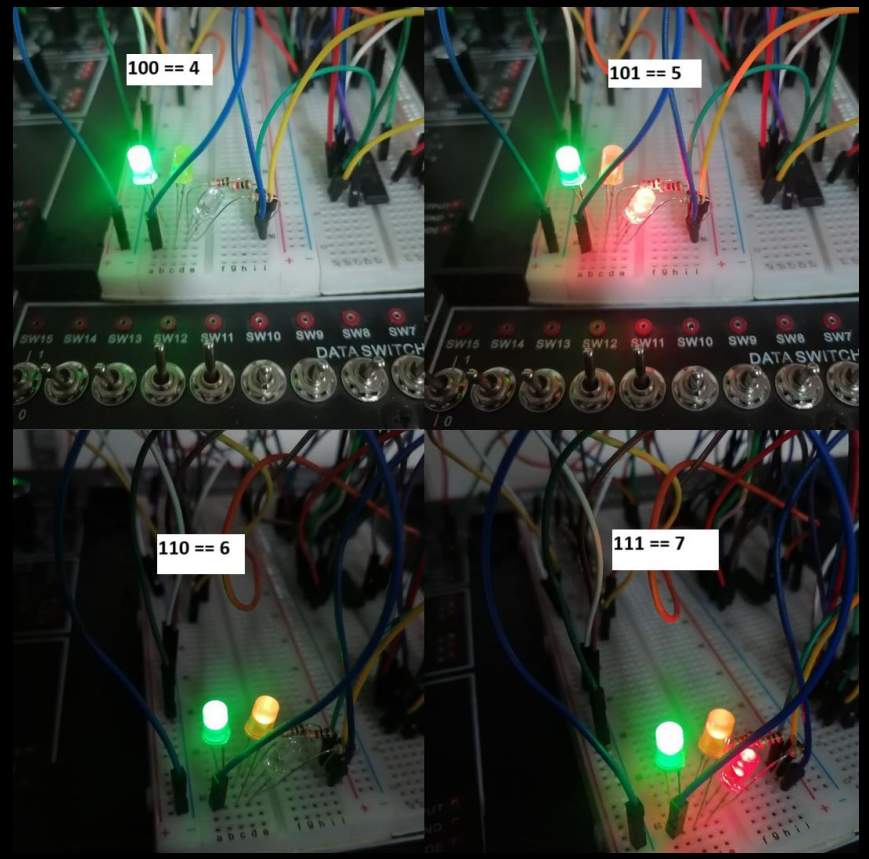


INPUT VOLTAGE RANGE FOR DIGITAL BITS

Input voltage range (V)	Binary Output
0-0.625	000
0.625-1.25	001
1.25-1.875	010
1.875-2.5	011
2.5-3.125	100
3.125-3.75	101
3.75-4.375	110
4.375-5	111

PROJECT PICTURES





SUMMARY

Thank you