

# ECE 320 - Homework #8

Boolean, DTL, &, TTL Logic. Due Monday, March 7th

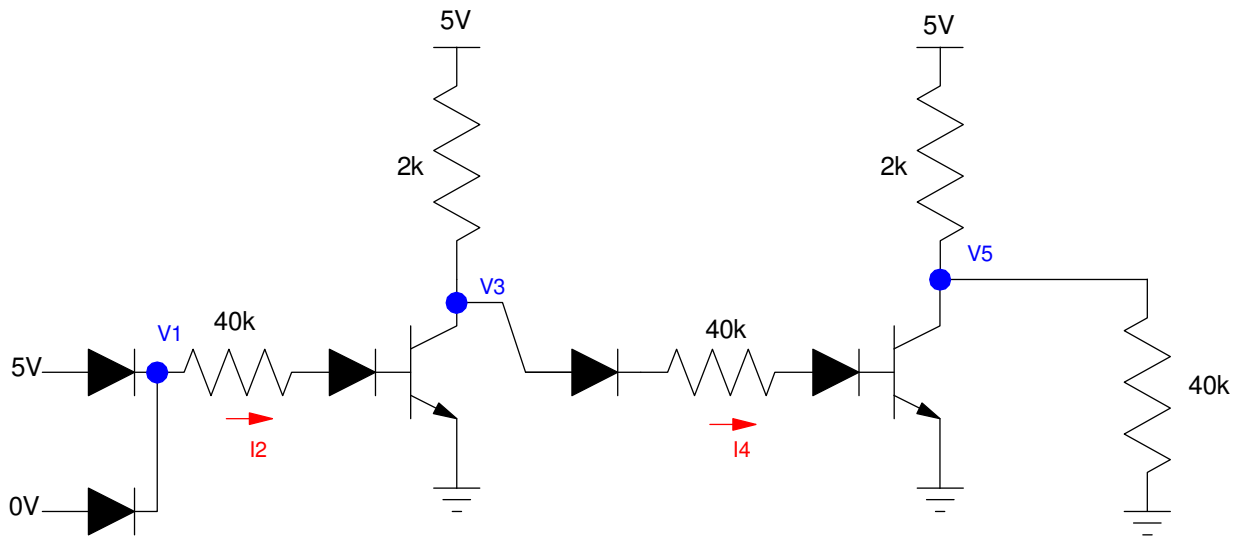
## Boolean Logic

- 1) Design a circuit to implement Y using NAND gates
- 2) Design a circuit to implement Y using NOR gates

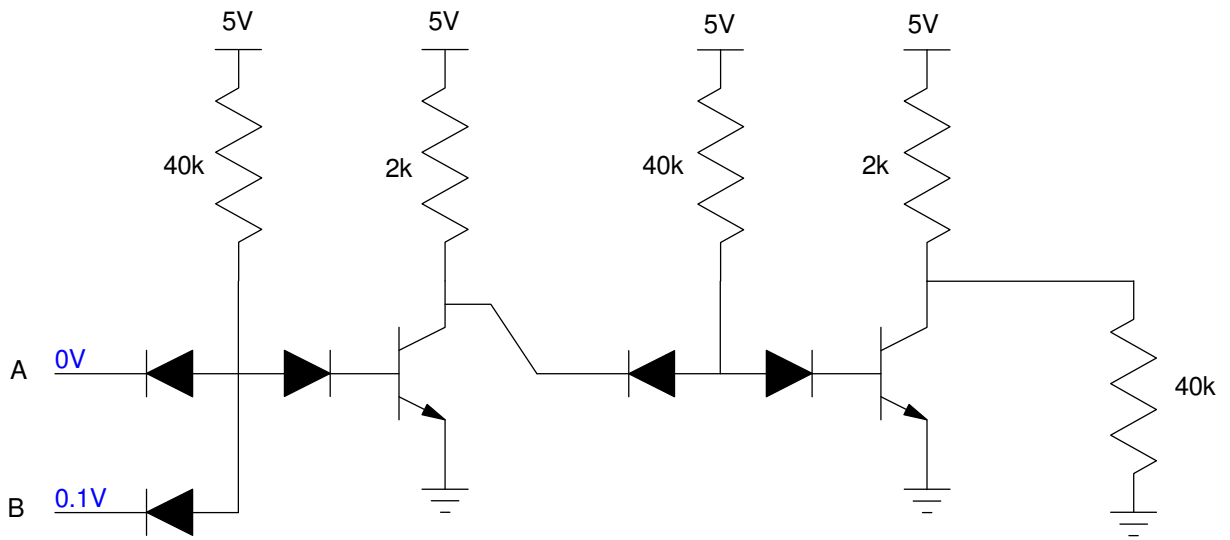
Y(A,B,C,D)		CD			
		00	01	11	10
AB	00	1	1	1	x
	01	0	0	0	1
	11	1	x	1	0
	10	x	1	x	0

## DTL Logic

- 2) Determine the voltages and currents for the following DTL OR gate. Assume 3904 NPN transistors
- 3) Simulate this circuit in CircuitLab to verify your answers

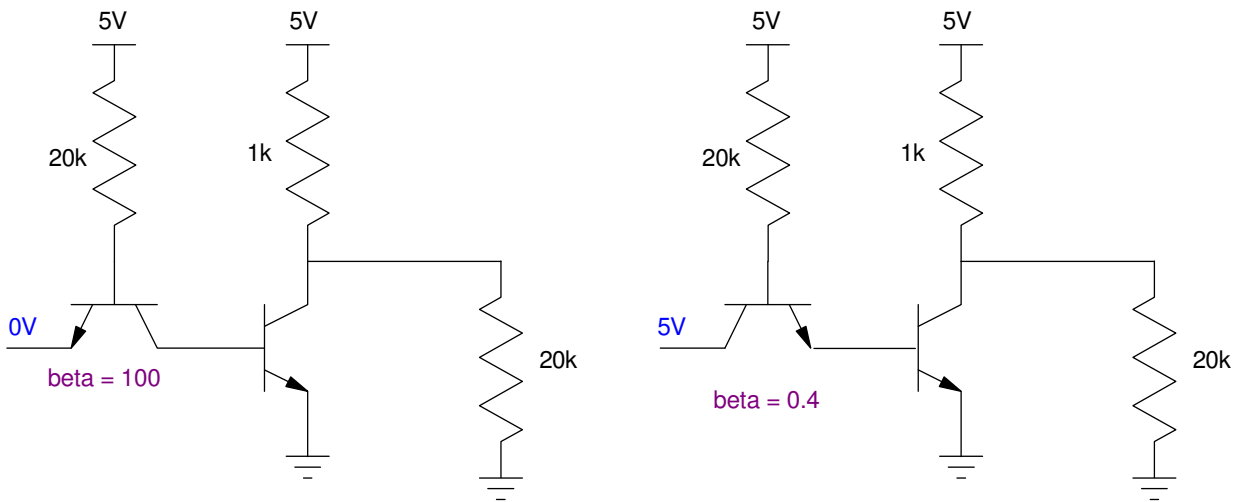


- 4) Determine the voltages and currents for the following DTL AND gate. Assume 3904 NPN transistors
- 5) Simulate this circuit in CircuitLab to verify your answers



### TTL Logic

- 6) Determine the voltages for the following TTL inverter. Assume 3904 transistors.
- 7) Simulate these circuits in CircuitLab to verify your answers



## Temperature Alarm using DTL Logic

The circuit below uses a DTL NAND gate to drive the speaker when

- The 555 timer outputs 5V, and
- The comparator outputs 5V,.

8) Determine the voltages when

- $V_1 = V_2 = 0V$
- $V_1 = V_2 = 5V$
- $V_1 = 0V, V_2 = 5V$

9) Verify your design using CircuitiLab.

**Lab: 10) (20pt):** Verify your design in hardware (build and test the circuit with your lab kit).

- note: Use a potentiometer to simulate the temperature sensor.

