

# ECE 320 - Homework #8

Competitors, Schmitt Triggers, Boolean Logic. Due Monday, March 4th, 2019

Assume a thermistor with

$$R = 1000 \cdot \exp\left(\frac{3905}{T} - \frac{3905}{278}\right) \Omega$$

where T is the temperature in degrees Kelvin ( C + 273 ).

## Comparitors

1) Design a circuit to

- Turn on a fan when the temperature is more than 20C, and
- Turn off the fan when the temperature is less than 20C

Assume the fan draws 200mA @ 10V DC. (note: you'll need to use a TIP112 transistor)

2) Check your design in PartSim

**3 (lab)** Check your design in lab.

## Schmitt Triggers

4) Design a circuit to

- Turn on a fan when the temperature is more than 20C, and
- Turn off the fan when the temperature is less than 15C

Assume the fan draws 200mA @ 10V DC. (note: you'll need to use a TIP112 transistor)

**5 (lab)** Check your design in lab.

(note: PartSim doesn't like Schmitt Triggers...)

## Boolean Logic

6) Implement the following function using NAND gates

7) Implement the following function using NOR gates

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