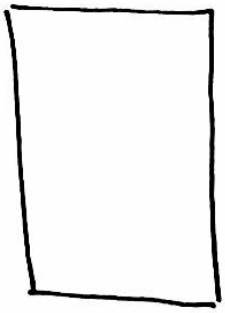
In (Analog)

Temp Prob 1 →
Temp Prob 2 →
Temp Prob 3 →
Temp Prob 4 →
Temp Prob 5 →



OUT (Digital)

valve →
Pump →
Ignitor →
level Sensor →

Question:
What is AREF when you have a pin for 3.3V?
- Used for the top of the input range for the analog input.

① Read the temperatures of probes

② Temp of prob 3 < 68 & valve is not open
Then open valve
Fire ignitor

③ Temp of prob 3 > 72 & valve is open
Then close valve

④ Temp of prob 3 < 72 but > 68 & valve is ON
~~open~~ after 15 min fire

* Pump Δ's based on tank level
* burner operates based on Prob 3

Question
what is millis()
- Returns the # of millisecond since the arduino board began running the program

① Read the level of water

4mA = 2"
20mA = 24"

② Sensor current < 4mA
Turn pump off

③ Sensor current > 20mA
Turn pump ON

④ If sensor current > 4mA but < 20mA
If Pump off: if pump is off for > 5S
Turn pump ON
If Pump ON: if pump is ON for > 5S
TURN pump OFF

Question
- How are you reading the level if input is full? b/c it's specified as an input
- Said min 2" but it says 4"

Question
why convert the level sensor voltage to current

Ignitor

- OUTPUT (High or low)
  on OFF

Level Sensor

- Input (voltage) * it's reading this value from the pin (0 to 1023)
  convert voltage → current

Pump

- OUTPUT (High or low)

~~Temp Probe (analog input)~~

Valve

- OUTPUT (High, low)

Temp Probe (ADC/voltage Reading) → resistance

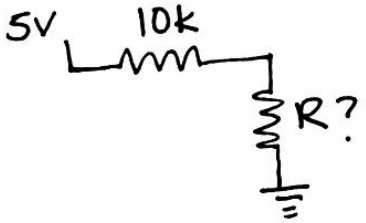
To measure temp, measure resistance. Microcontroller doesn't have ability to read resistance it can read voltage. Need to convert the resistance into voltage by adding another resistor in series (w/ the thermistor)

$$V_o = \frac{R}{R + 10K} * V_{cc}$$

(10K: fixed resistor)

$$\text{ADC value} = \frac{V_o * 1023}{V_{cc}}$$

$$\text{ADC Value} = \frac{R}{R+10K} * \frac{V_{cc} * 1023}{V_{cc}} = \frac{R}{R+10K} * 1023$$



We want the R so $\frac{10K}{((1023/ADC)-1)} = R$

Question: what is pinMode?

PinMode specifies the pin as an output or input

Why 1023?

Arduino has a 10-bit Analog-to-digital converter it will map volts btw 0 and 5 to int. values btw 0 and 1023

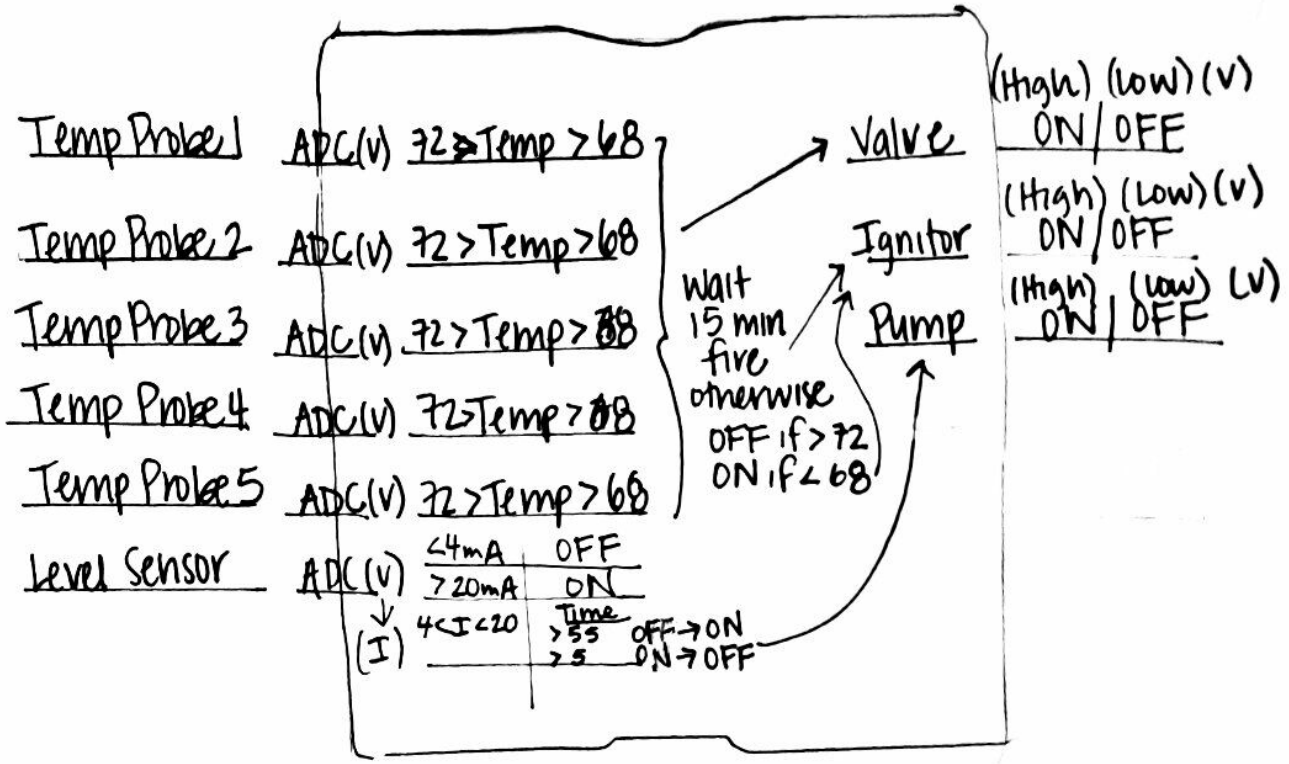
resolution is:

5V / 1024
= .0049
4.9mV

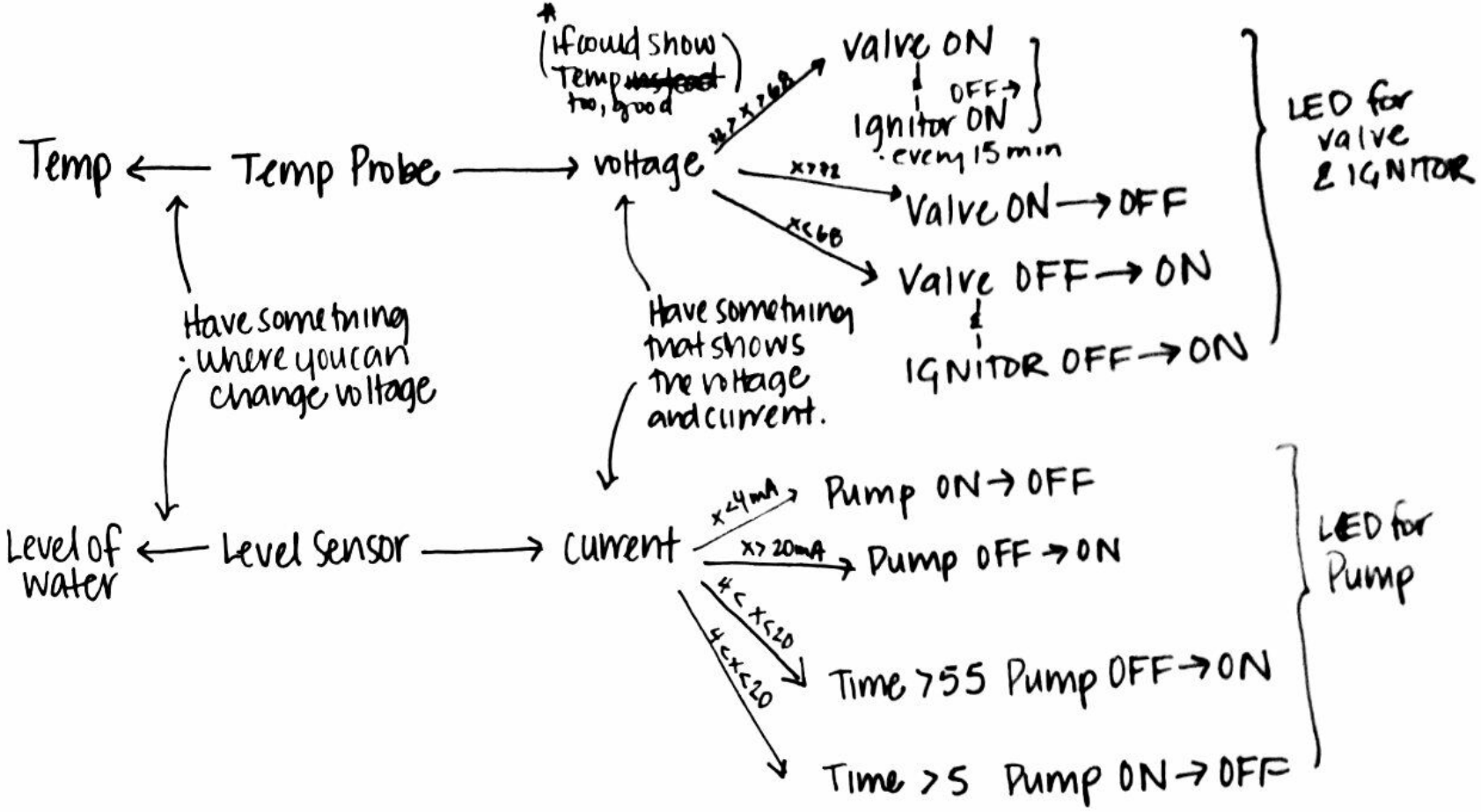
why not divide by 1024?

These binary outputs (high or low) have a voltage to them right?

Flow Diagram



Testing apparatus



Need: Time component to keep time.