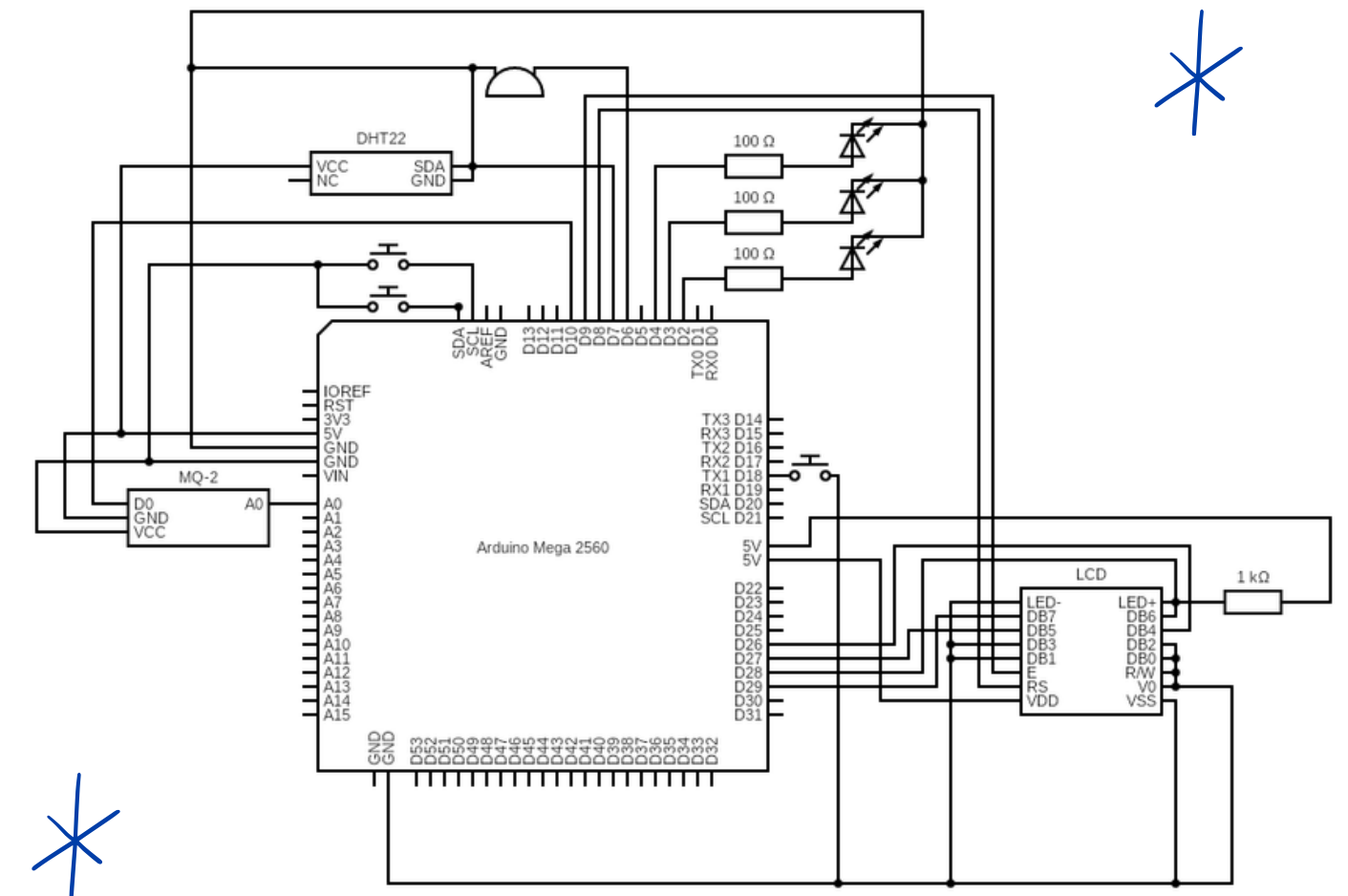


# Dispositivo de monitoramento ambiental

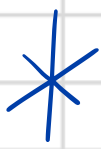
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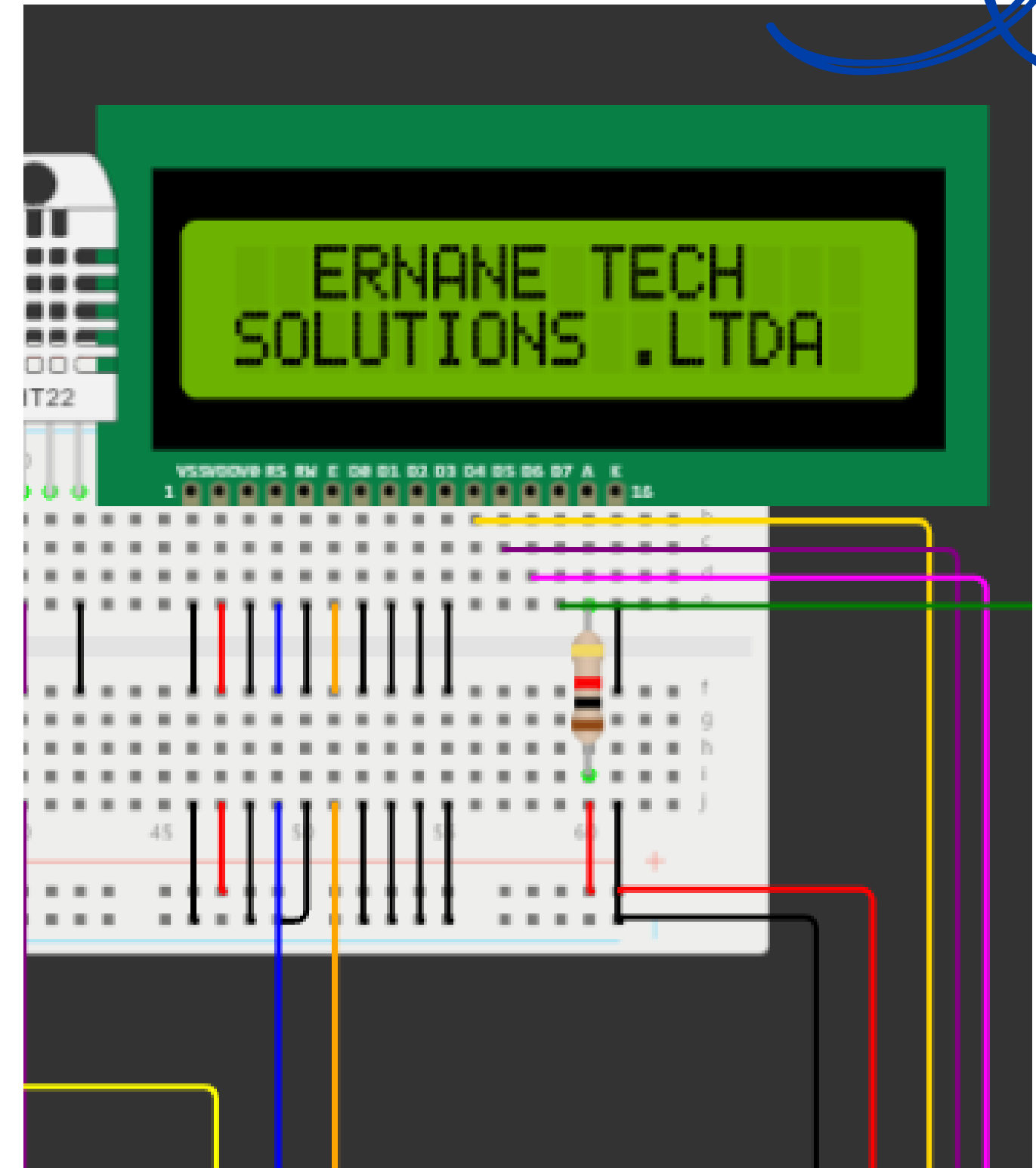


Aluno: Ernane Ferreira Rocha Junior



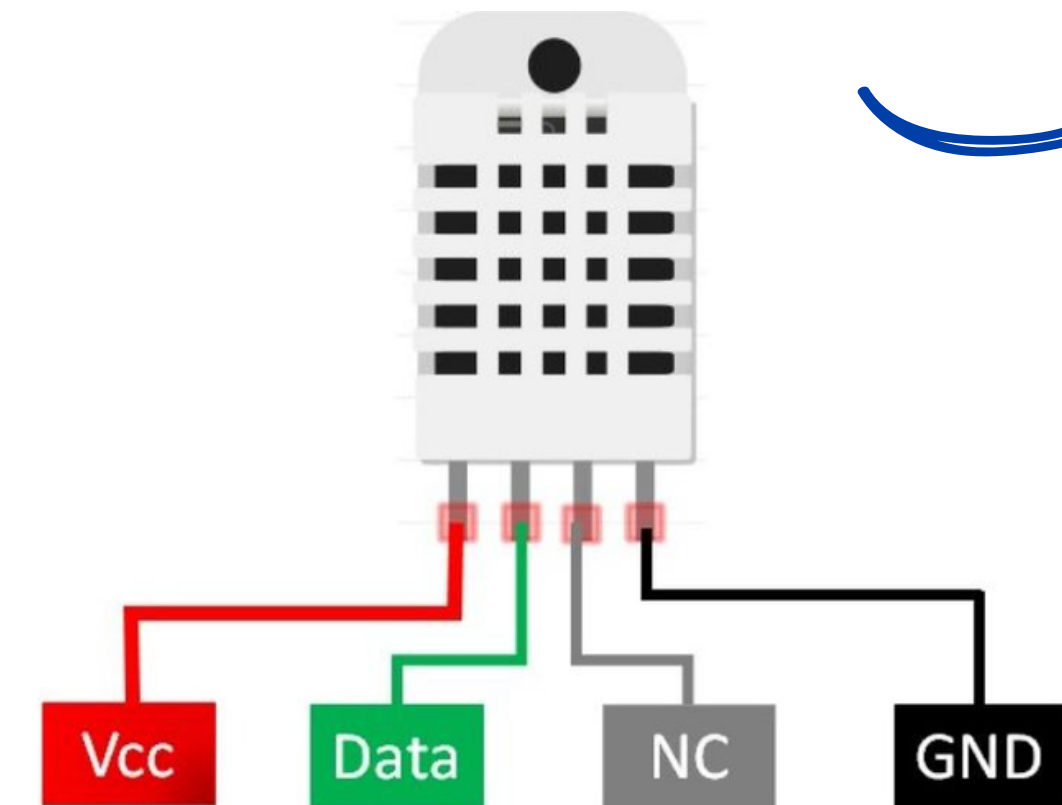
# Funcionalidades

- Medição de Temperatura;
- Medição de humidade;
- Detecção de Incêndio;
- Botão de controle;
- Display LCD;
- Modos de configuração:
  - Unidade de temperatura (C, F ou K);
  - Intervalo de amostragem;
  - Alerta de temperatura mínima no ambiente;
  - Alerta de temperatura máxima no ambiente;
  - Alerta de umidade mínima no ambiente;
  - Alerta de umidade máxima no ambiente;
- Registros de medições;
- Logs de informações.



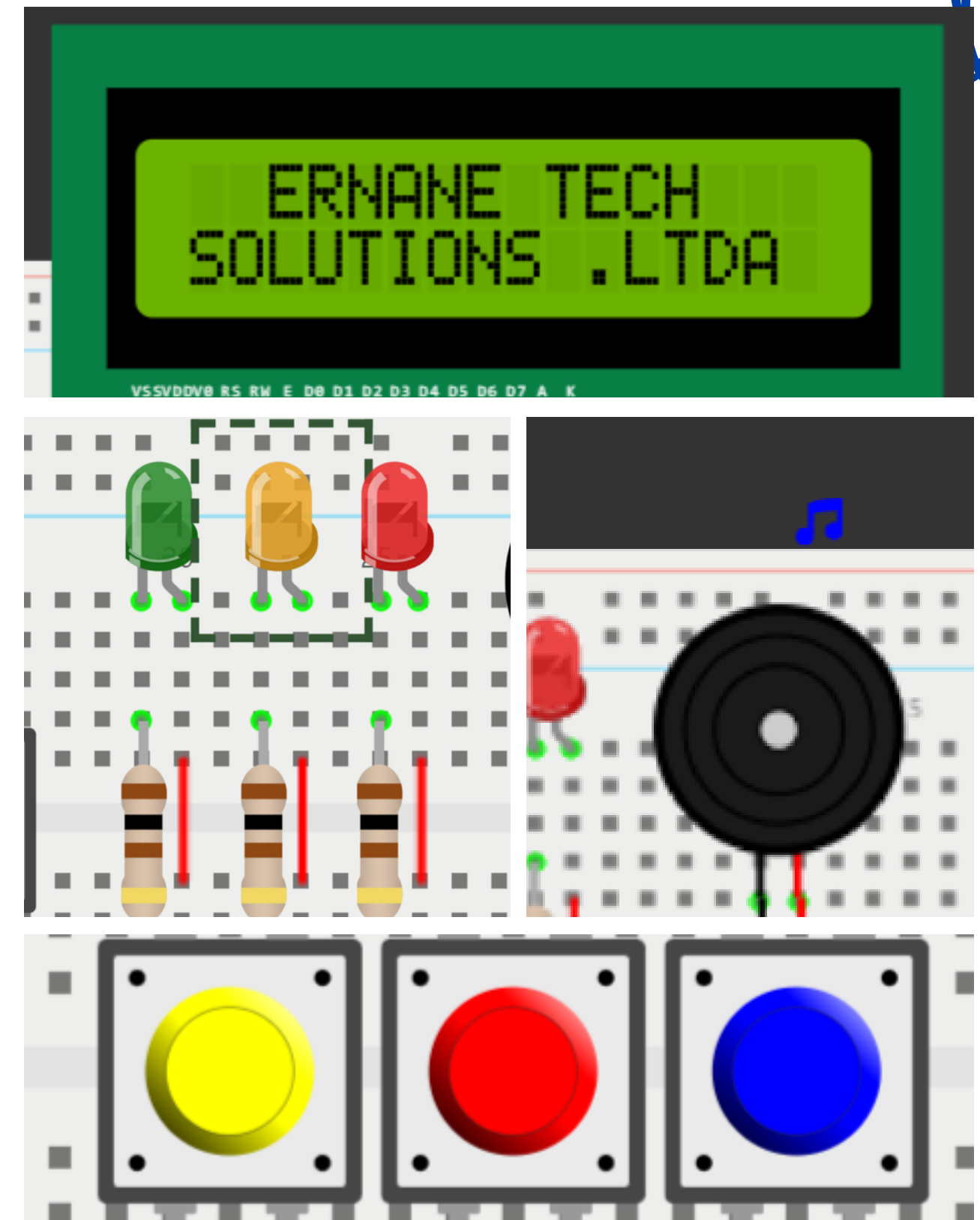
# Sensores:

- DHT22:
  - Utilizado para medição de temperatura e umidade do ambiente;
  - Família DHT como uma ótima referência. Ex.: DHT11;
  - DHT22 possui precisão superior:
    - Temperatura:  $\pm 0,5^{\circ}\text{C}$ ;
    - Umidade: de  $\pm 2\%$ ;
  - Intervalo de medição:
    - Temperatura:  $-40^{\circ}\text{C}$  a  $80^{\circ}\text{C}$
    - Umidade: 0% a 100%
- MQ-2:
  - Sensor de gás inflamável e de **fumaça**;
  - Metano, butano, propano principalmente.



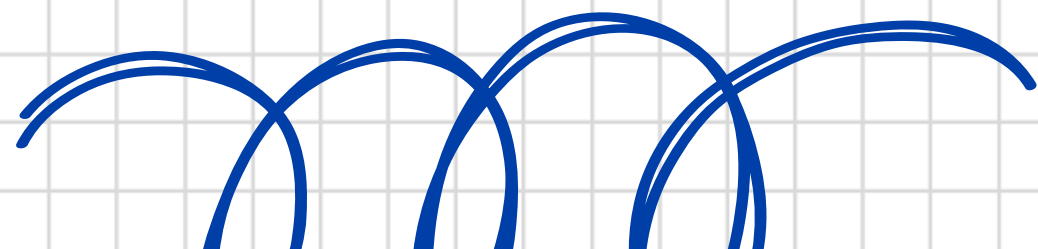
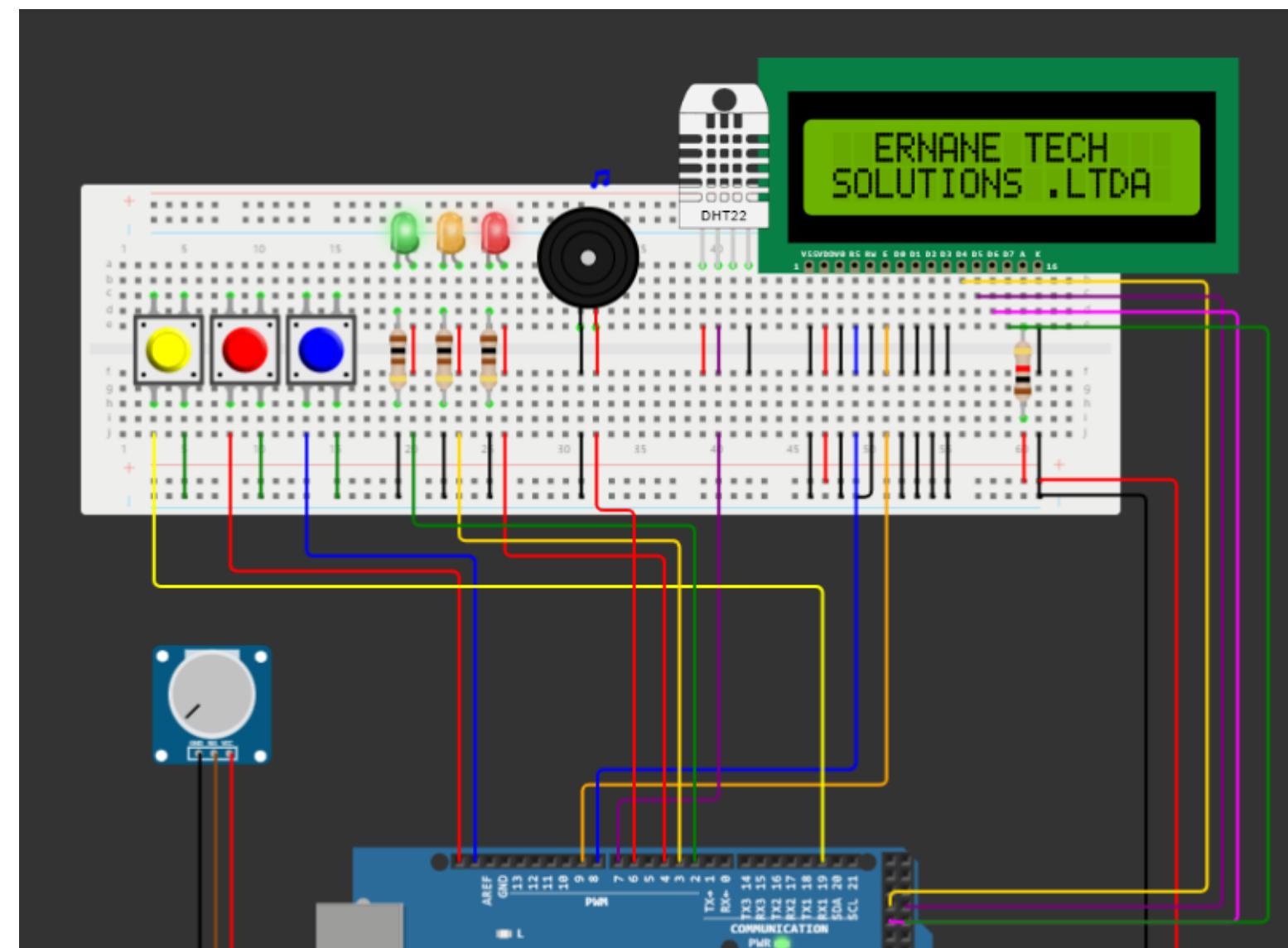
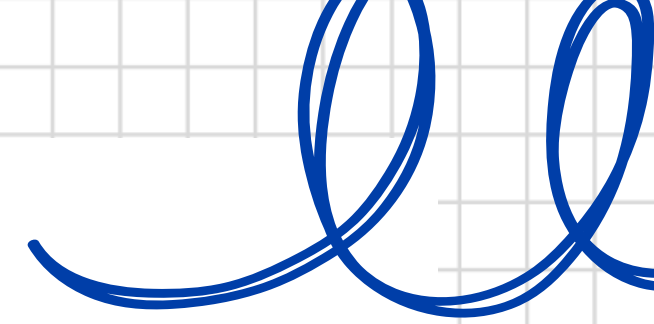
# Interação

- Display LCD 16x2;
- LEDs;
  - Verde: modo congelado;
    - Dispositivo está apenas apresentando informações;
  - Amarelo: modo de operação;
    - Dispositivo realizando captura de dados dos sensores;
  - Vermelho: problema ou limite ultrapassado.
    - Algum limite mínimo ou máximo foi ultrapassado e/ou foi detectado índice relevante de fumaça no ambiente.
- Buzzer;
- Botões: utilizados para navegação entre telas.



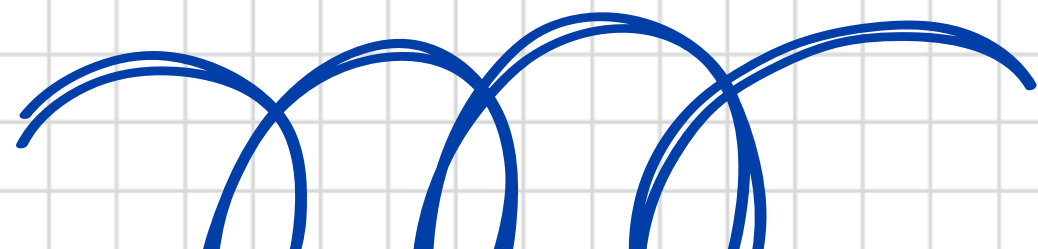
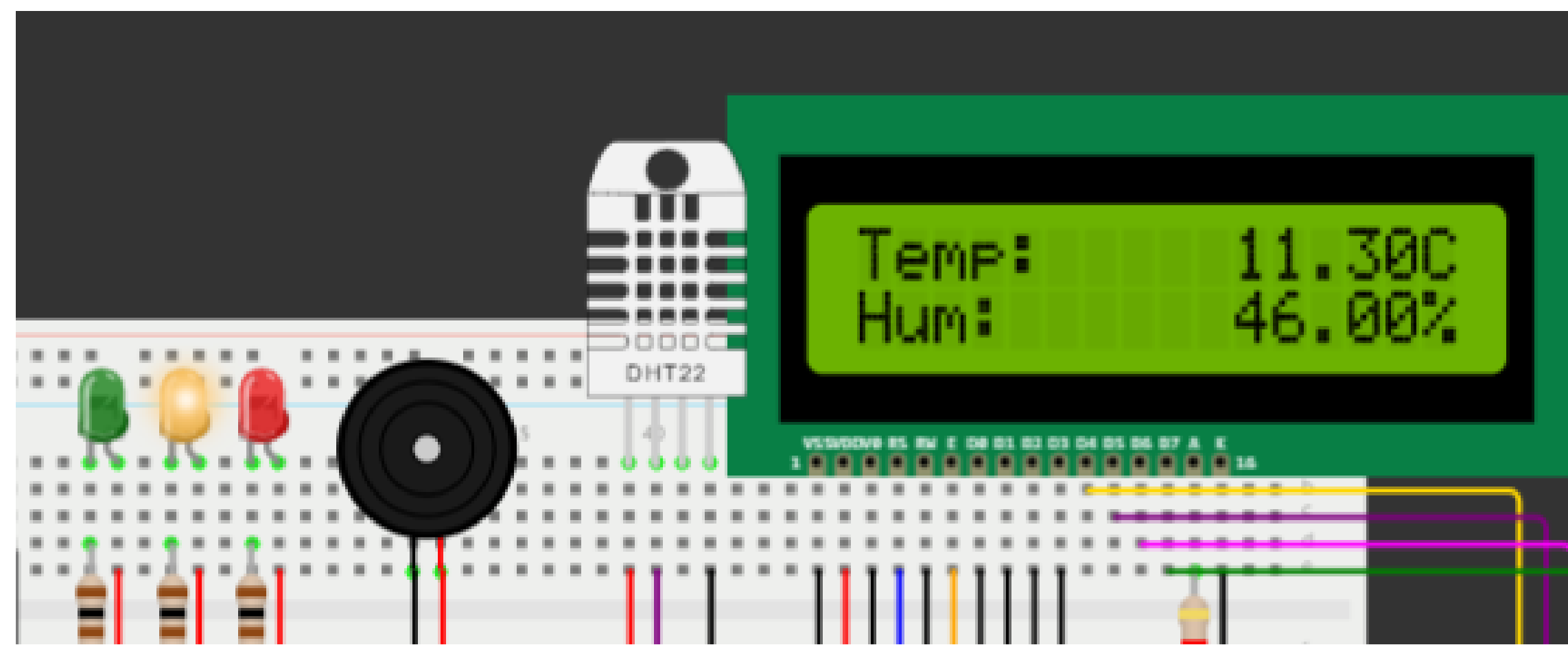
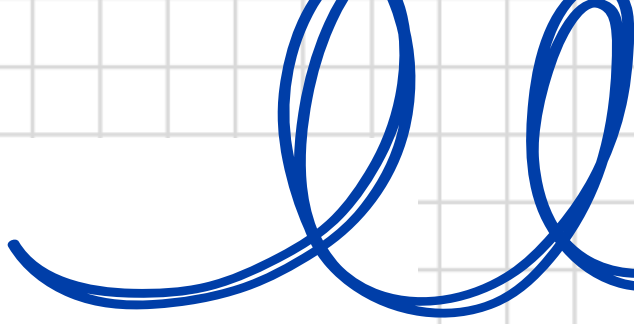


# Telas: Inicialização

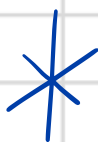




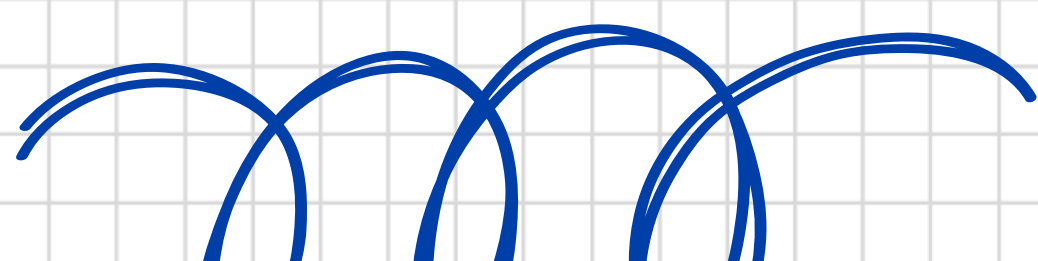
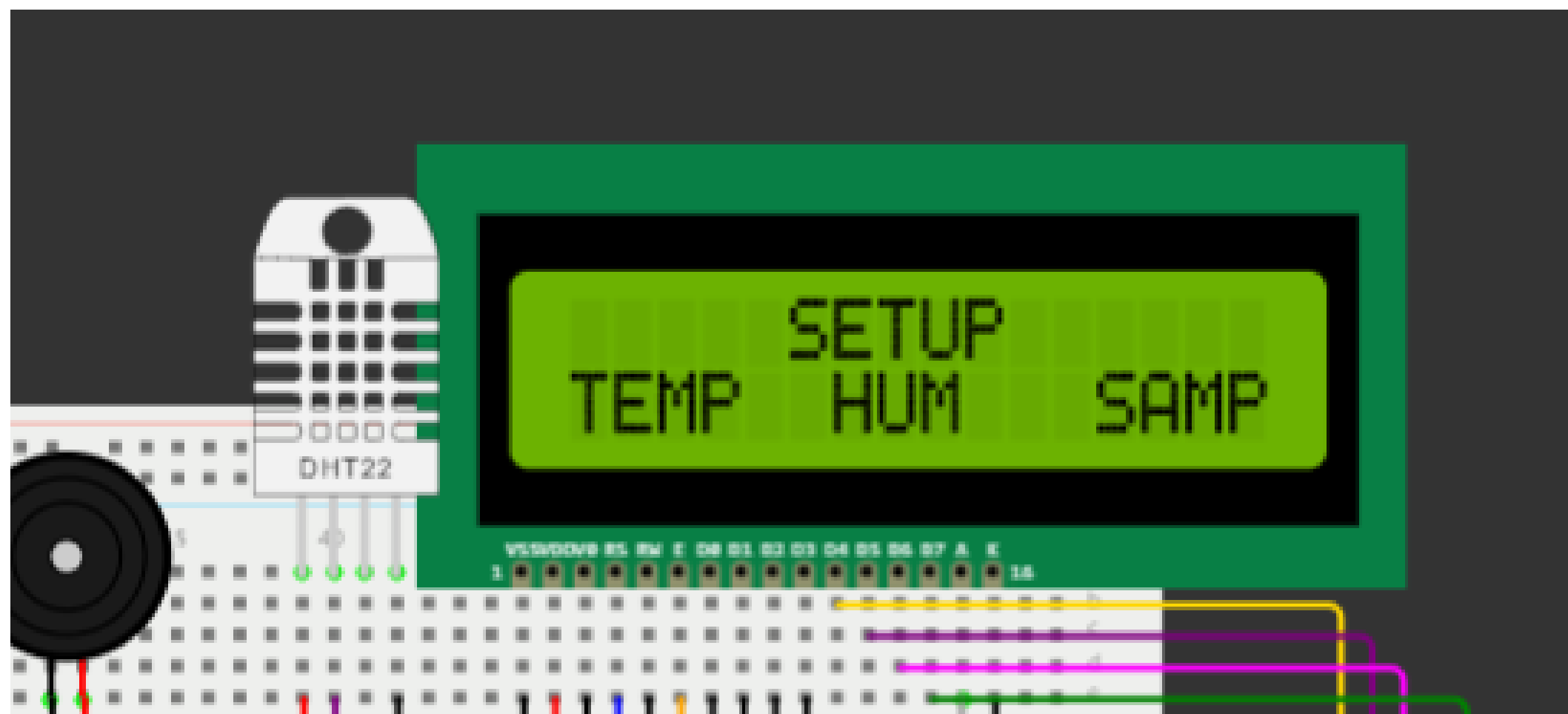
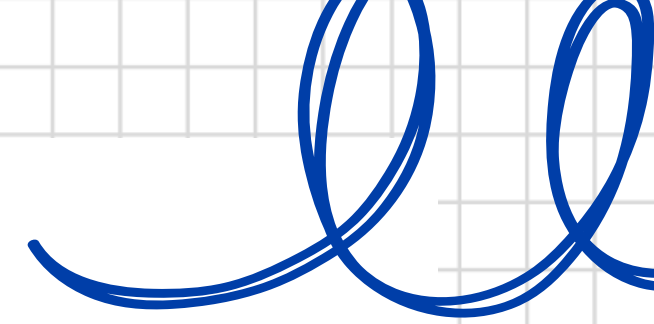
# Telas: Dados





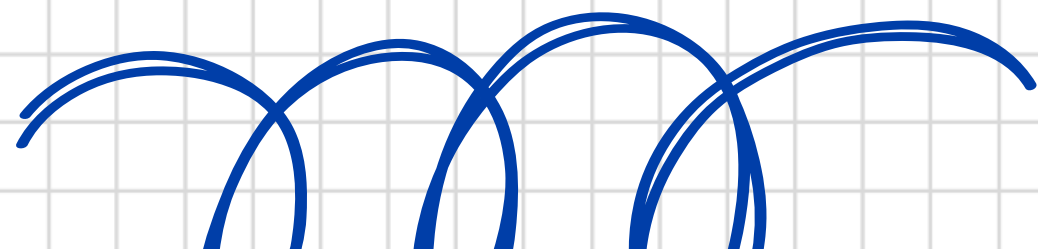
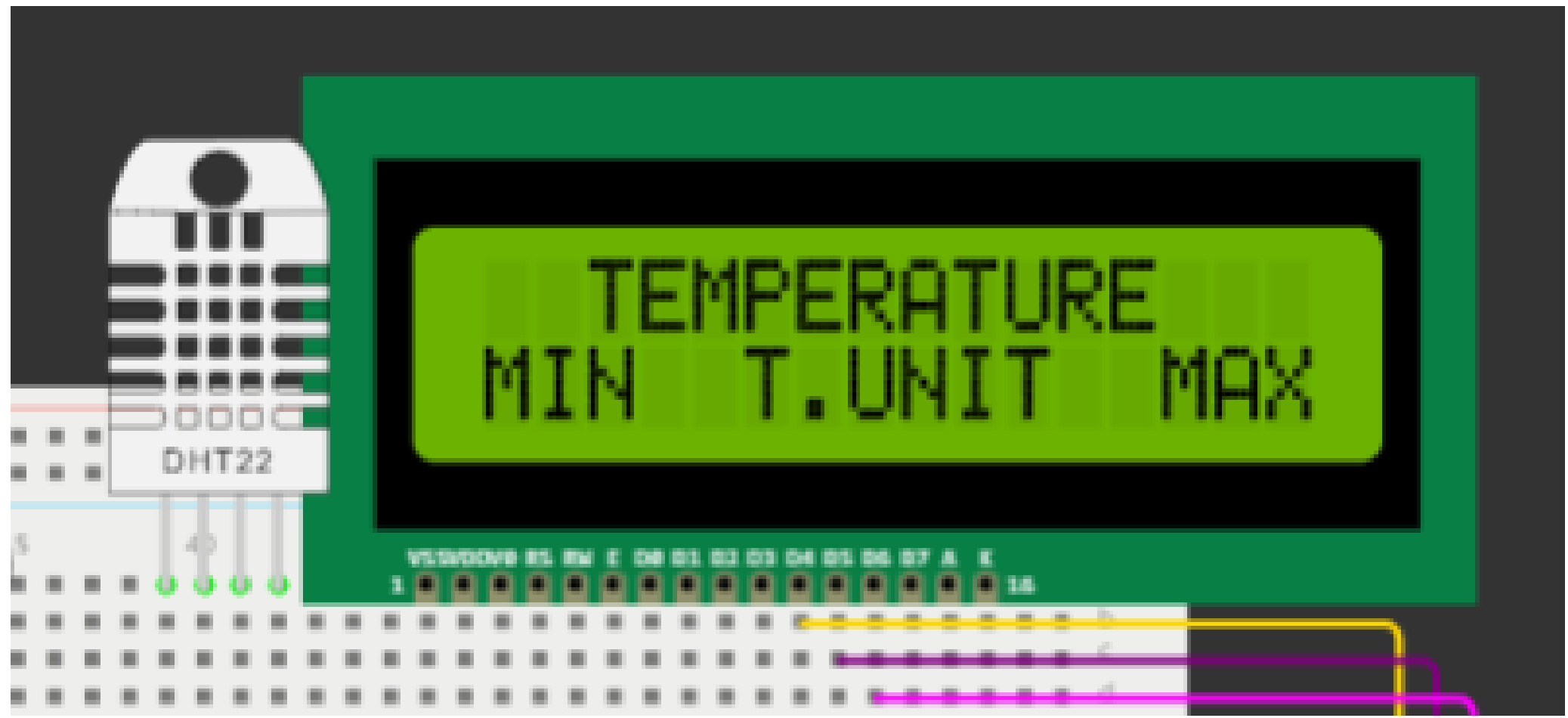
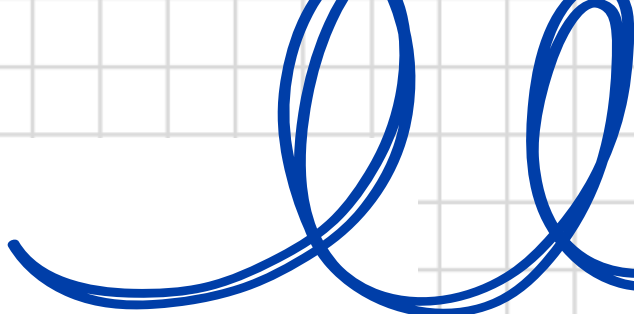


# Telas: Menu de configuração





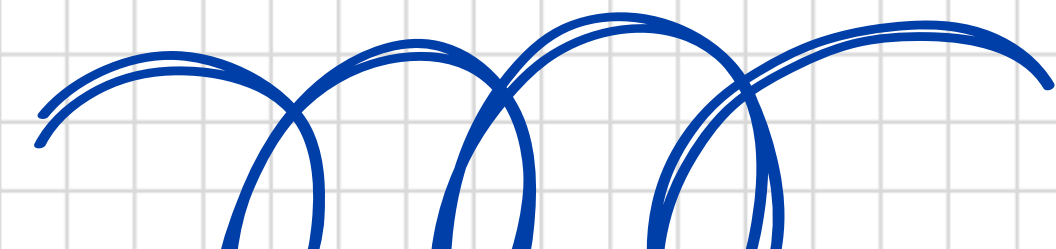
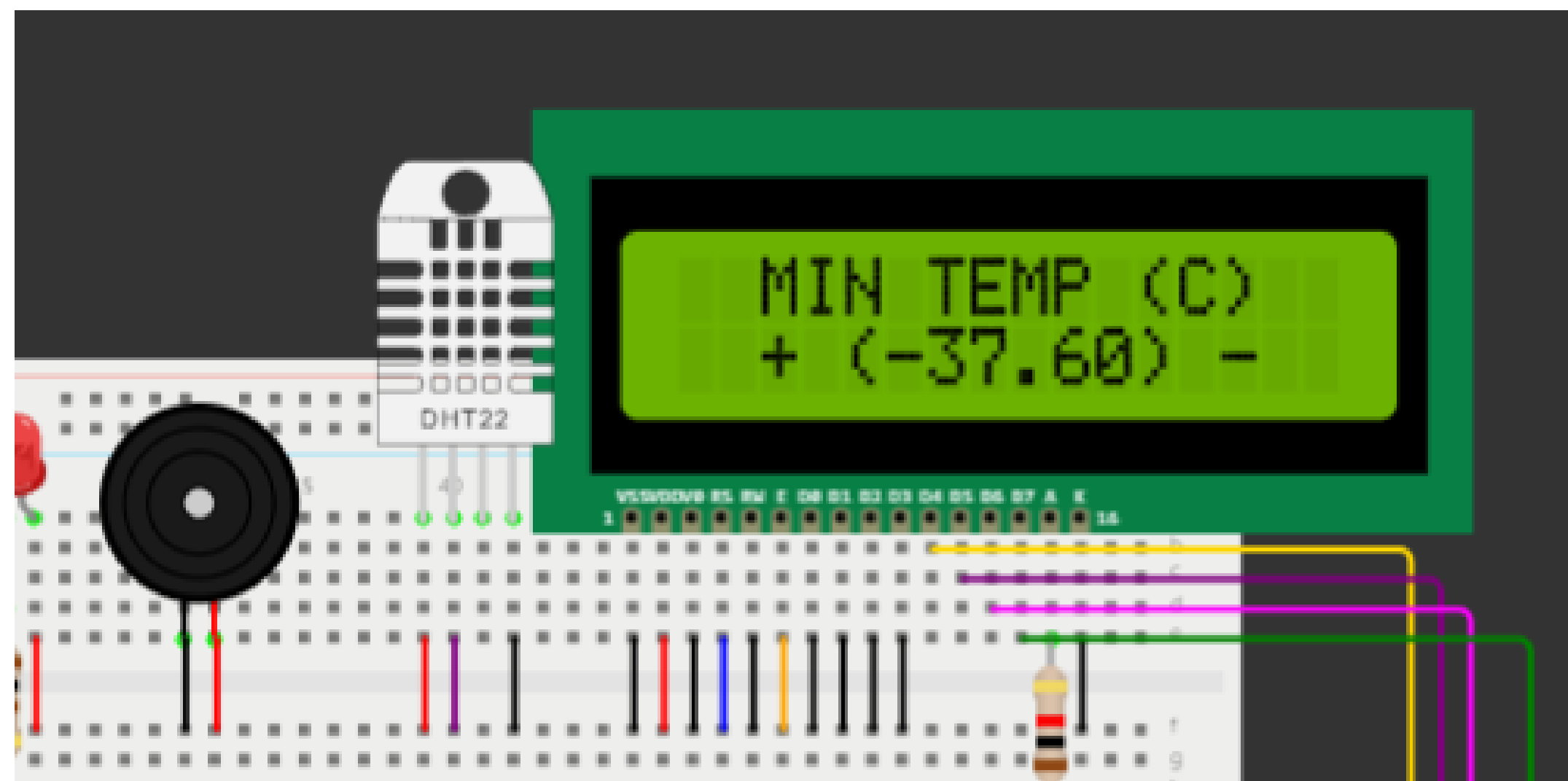
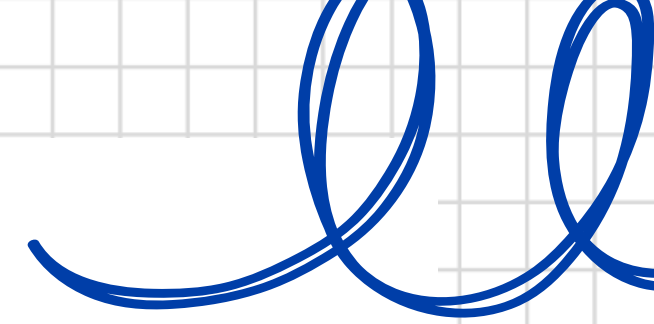
# Telas: Configurações de Temperatura





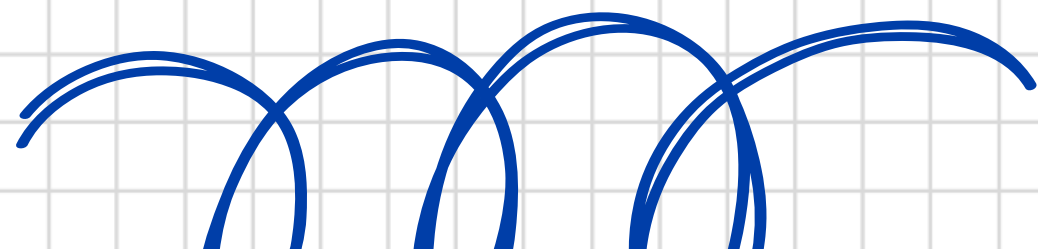
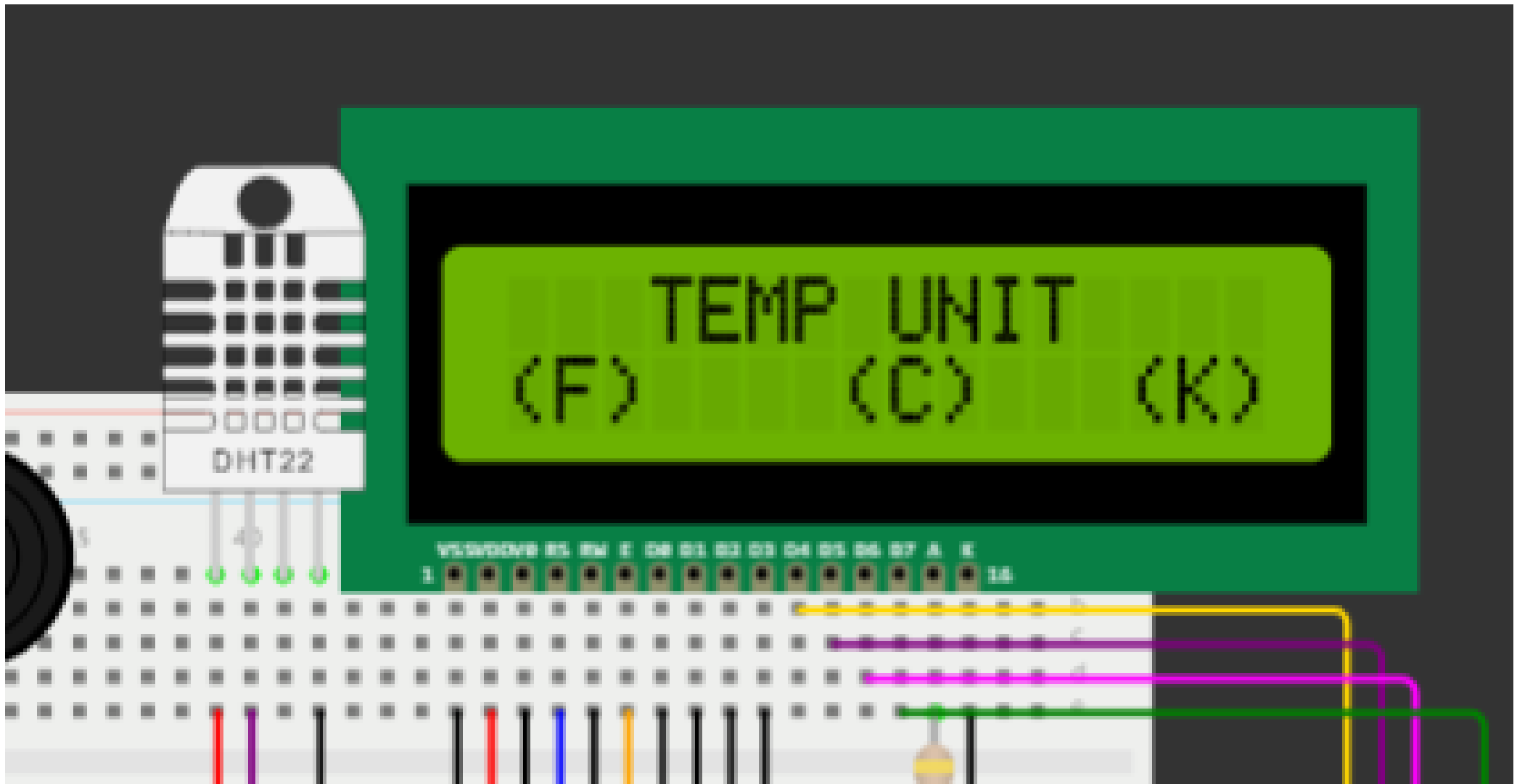
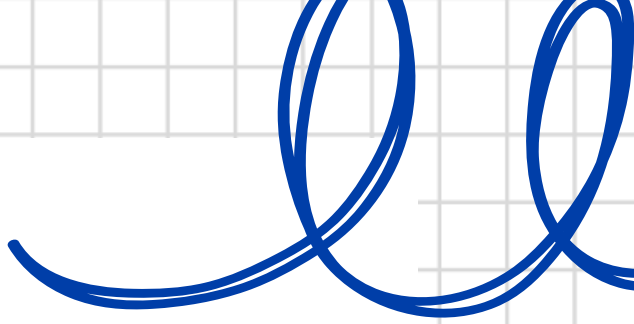


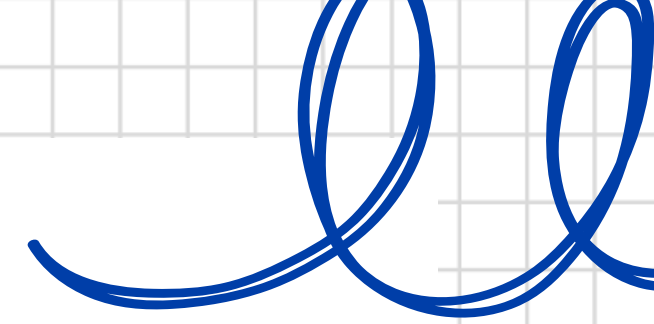
# Telas: Temperatura mínima



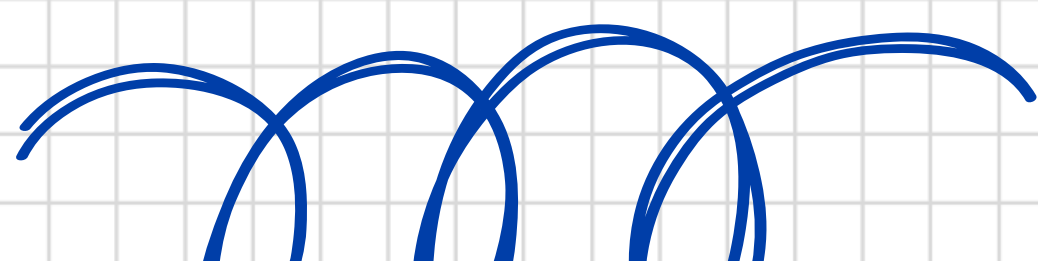
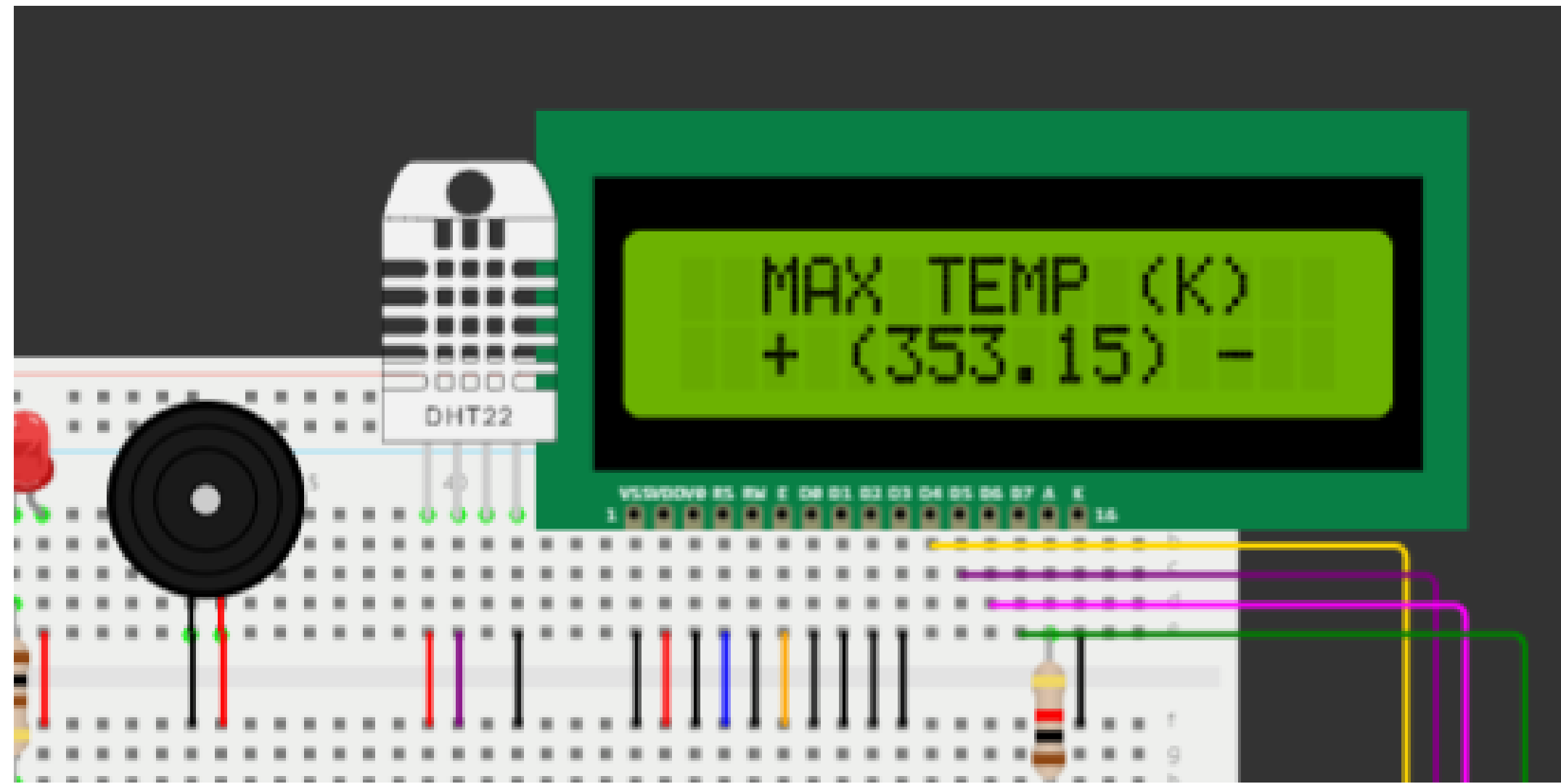


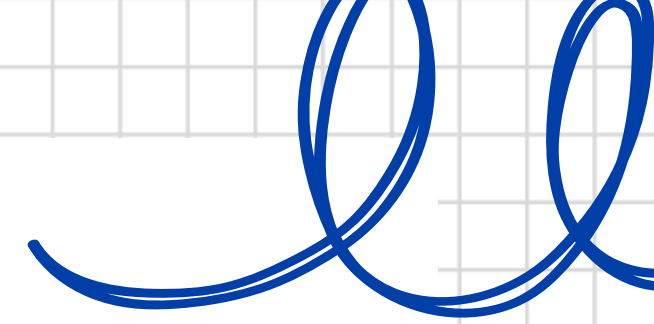
# Telas: Temperatura – Unidade de medição



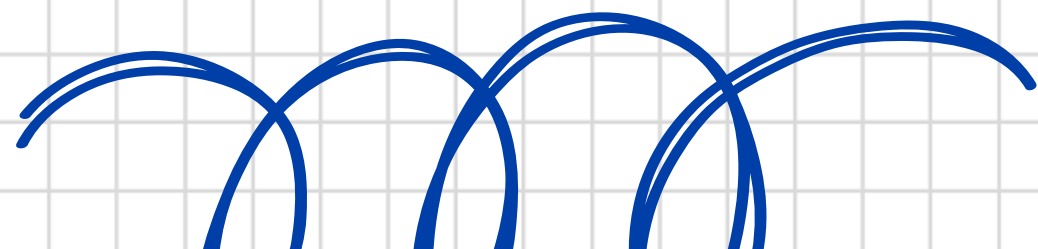
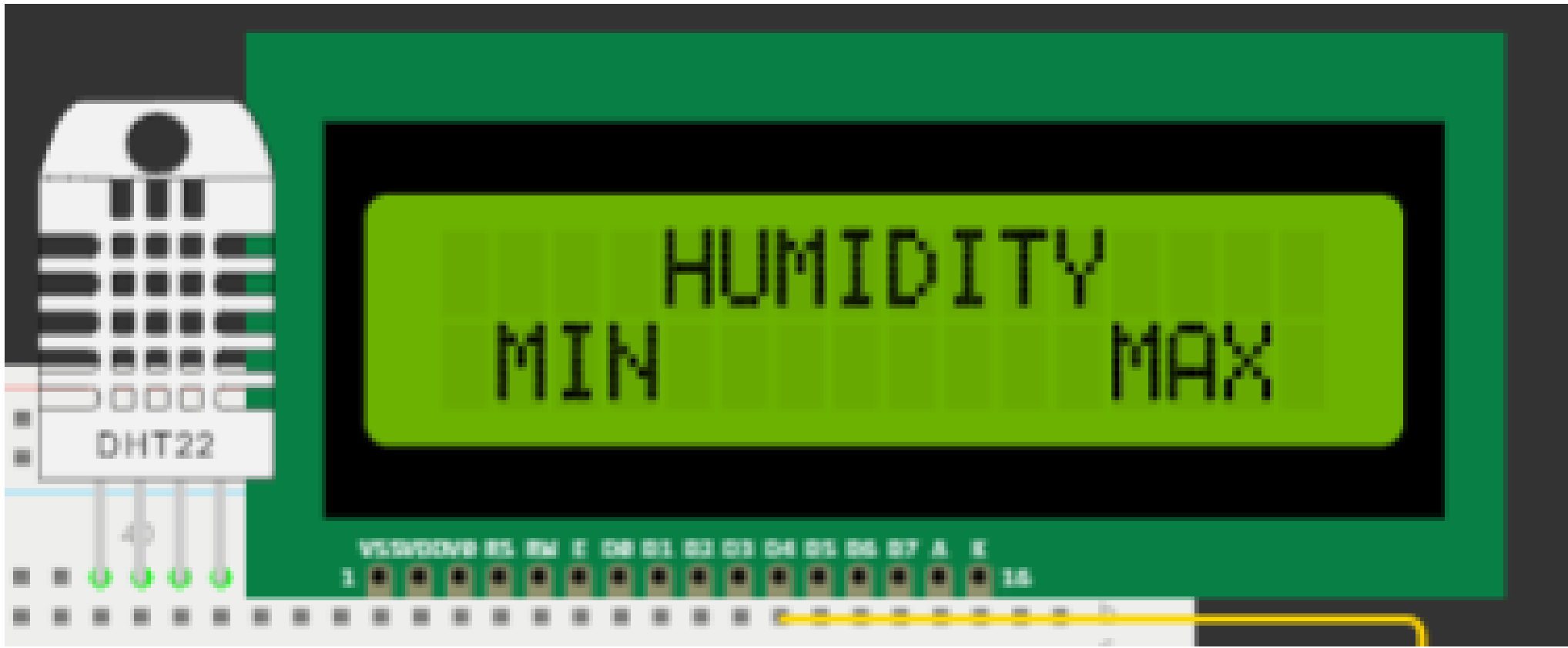


# Telas: Temperatura Máxima



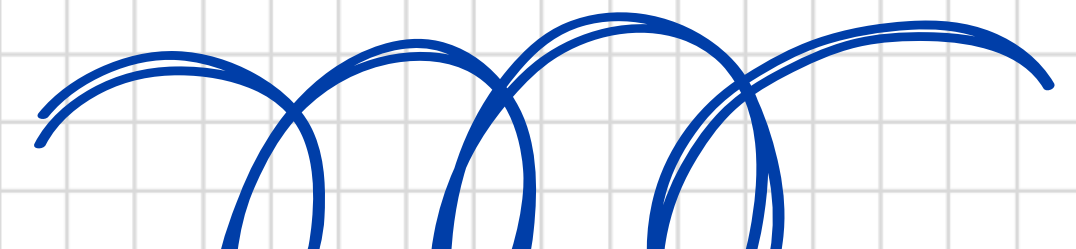
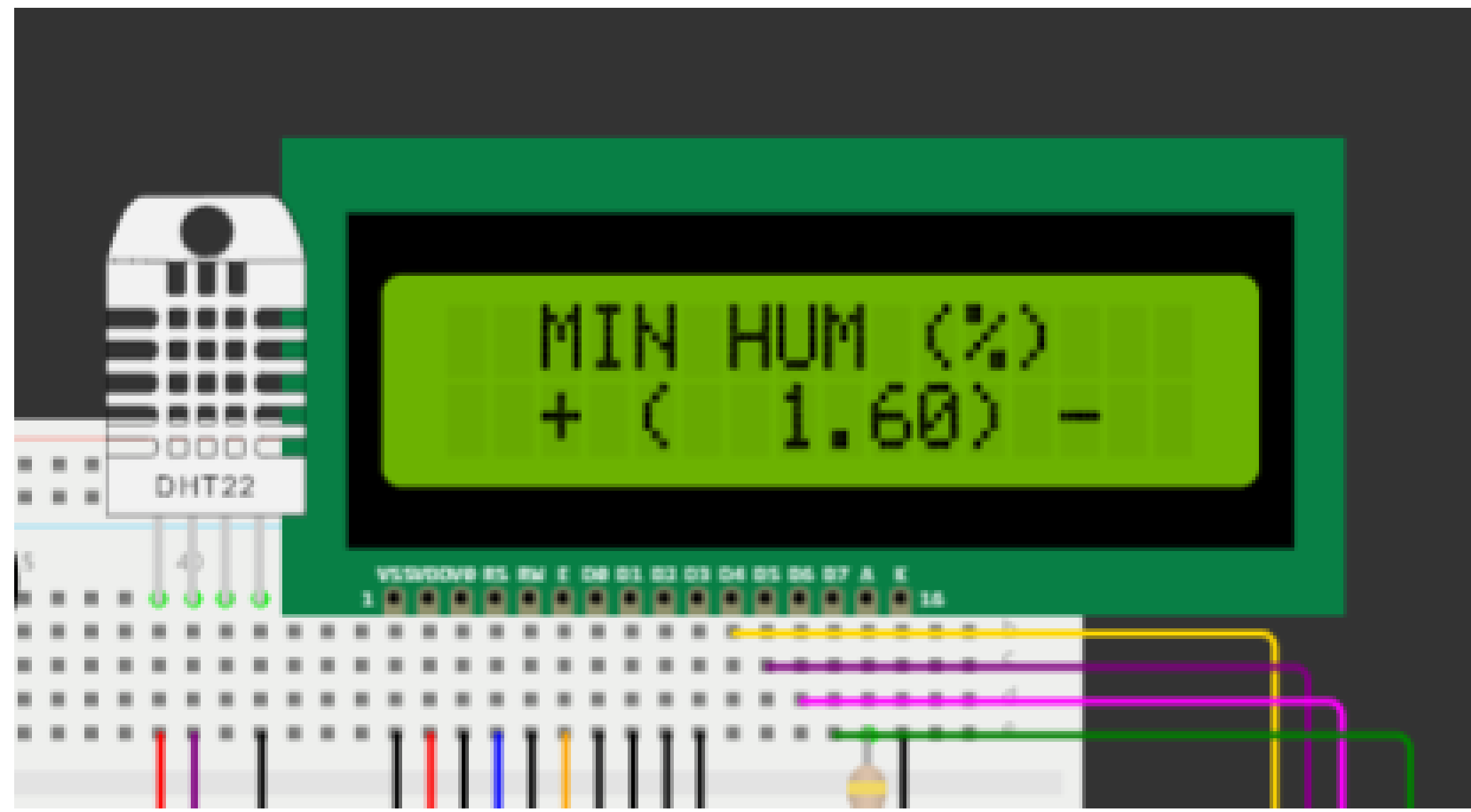
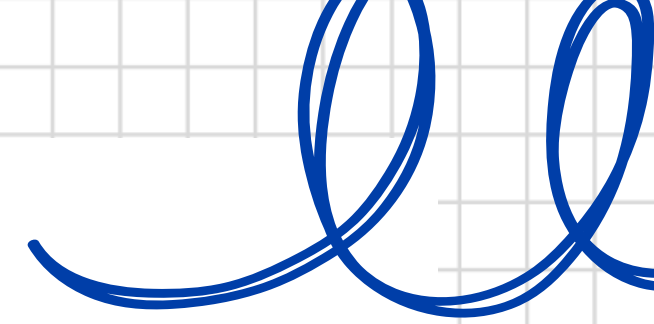


# Telas: Configurações de Umidade



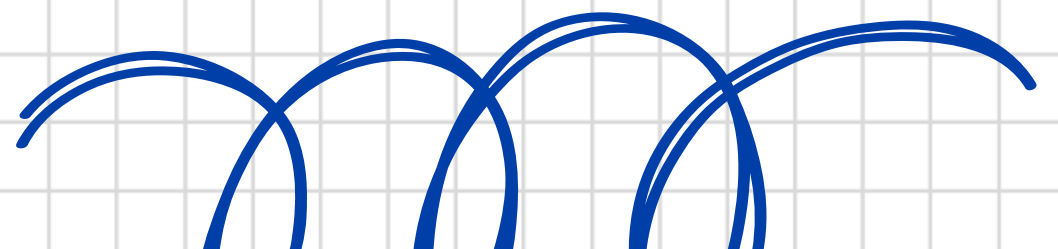
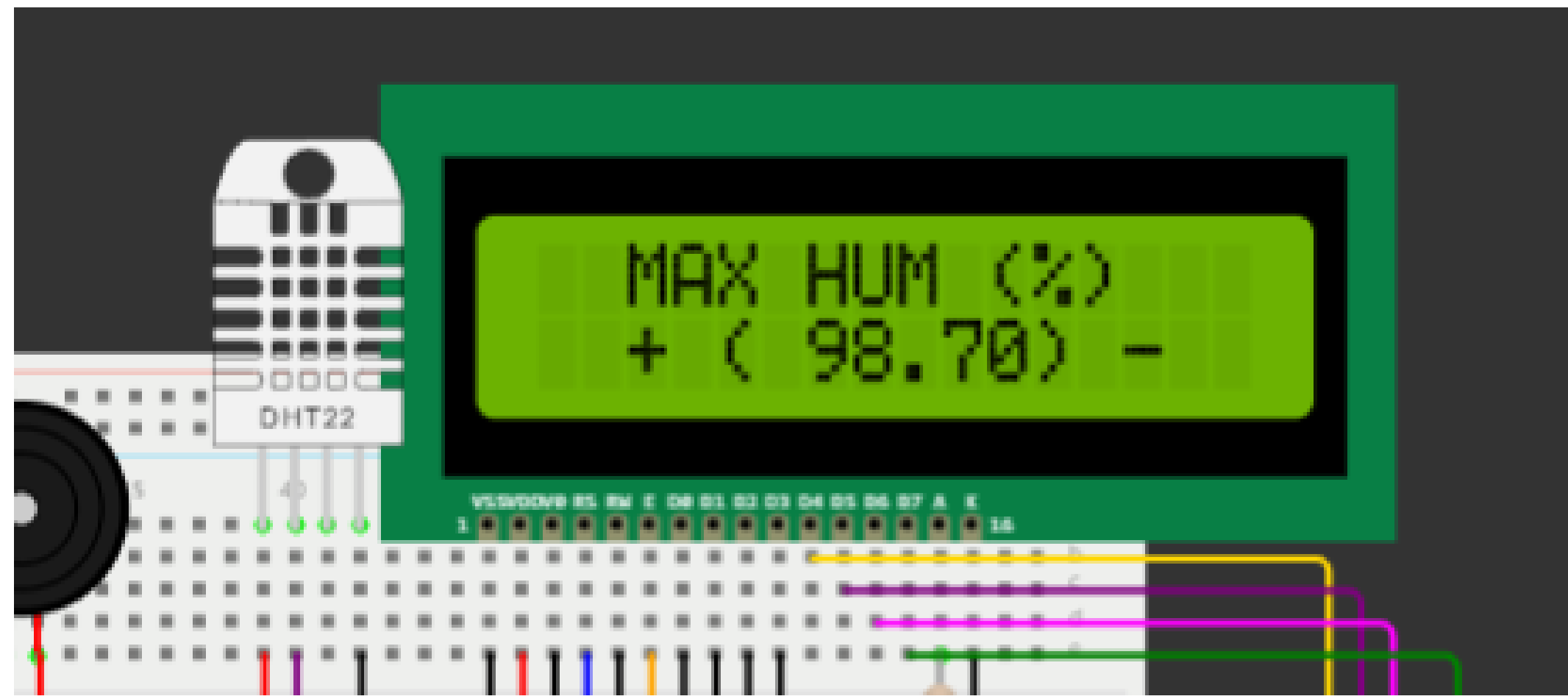
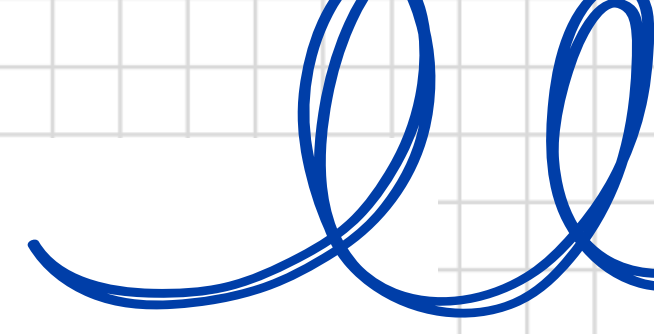


# Telas: Umidade Mínima



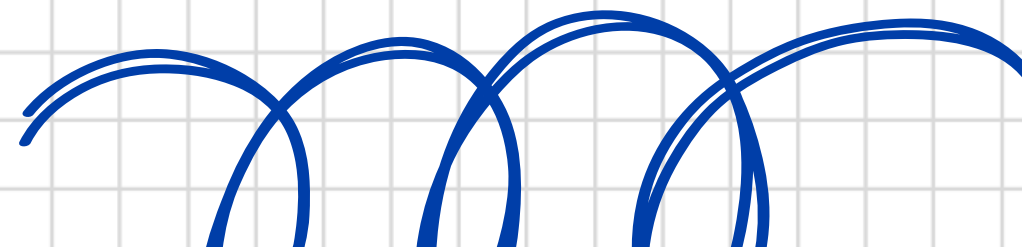
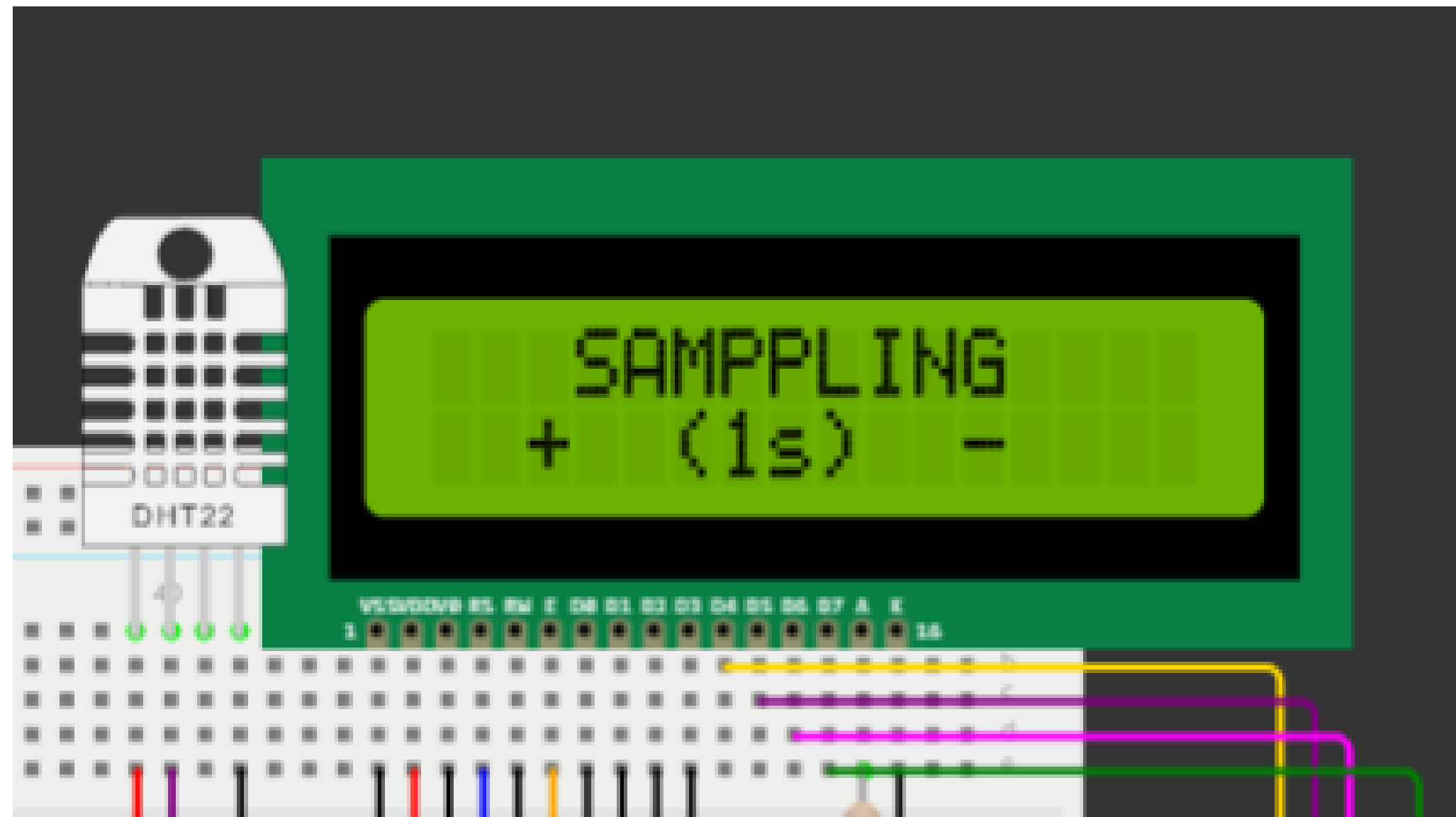
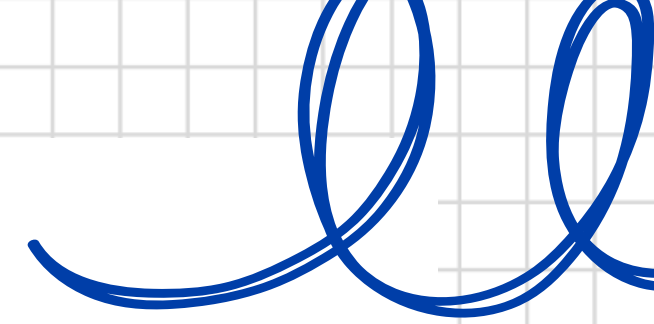


# Telas: Umidade Máxima

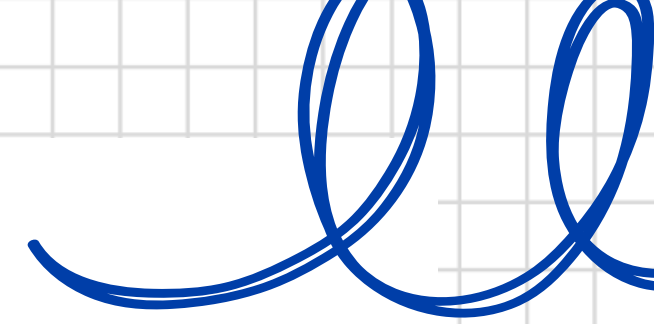




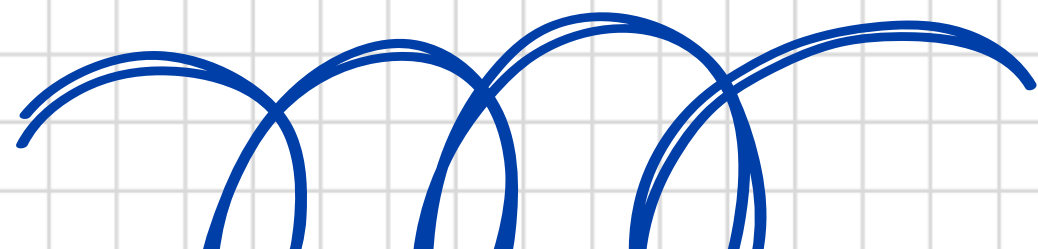
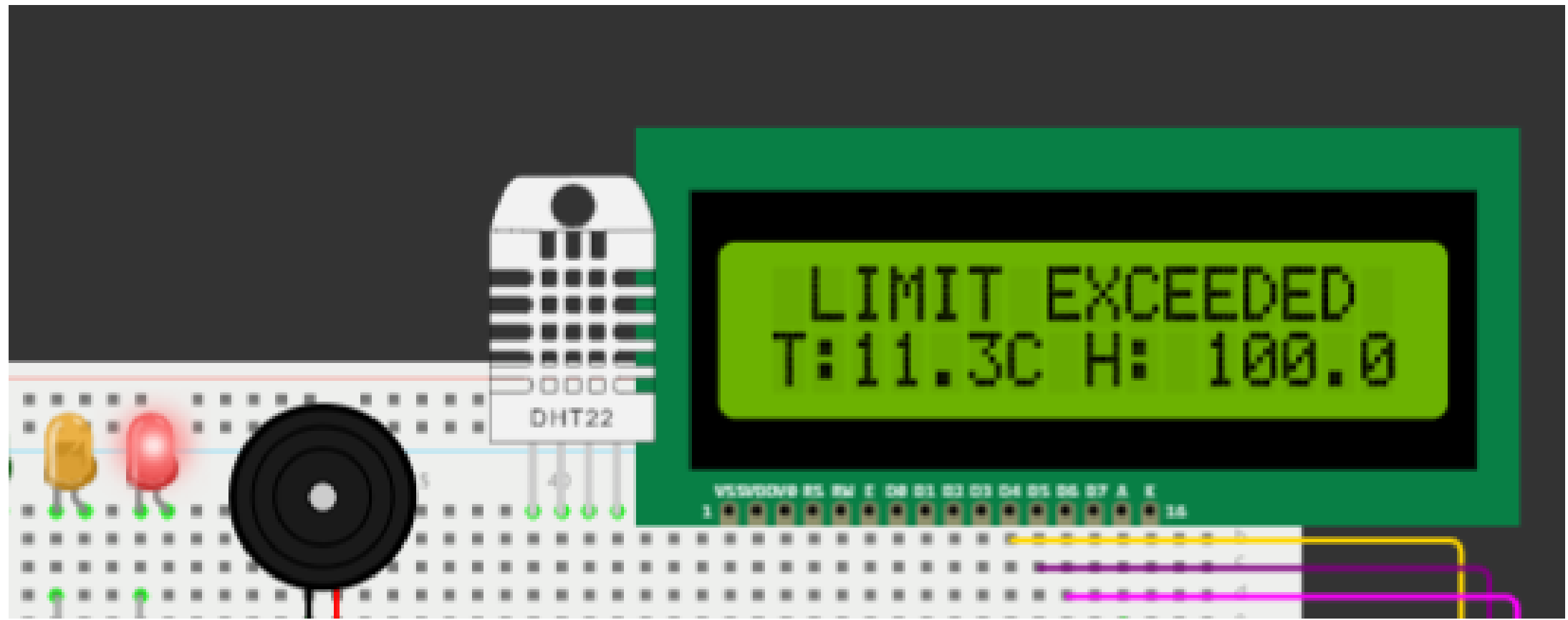
# Telas: Taxa de amostragem

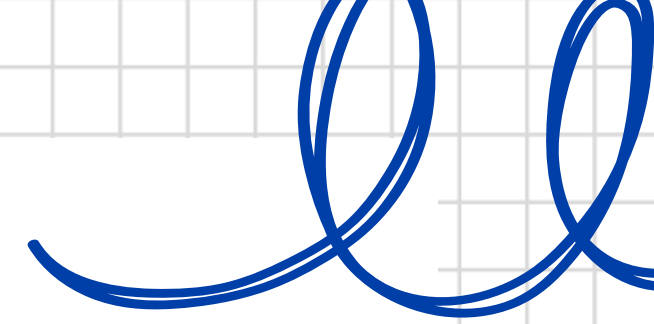




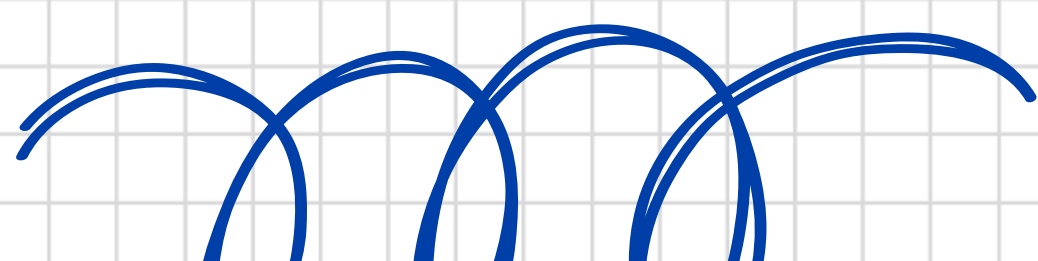
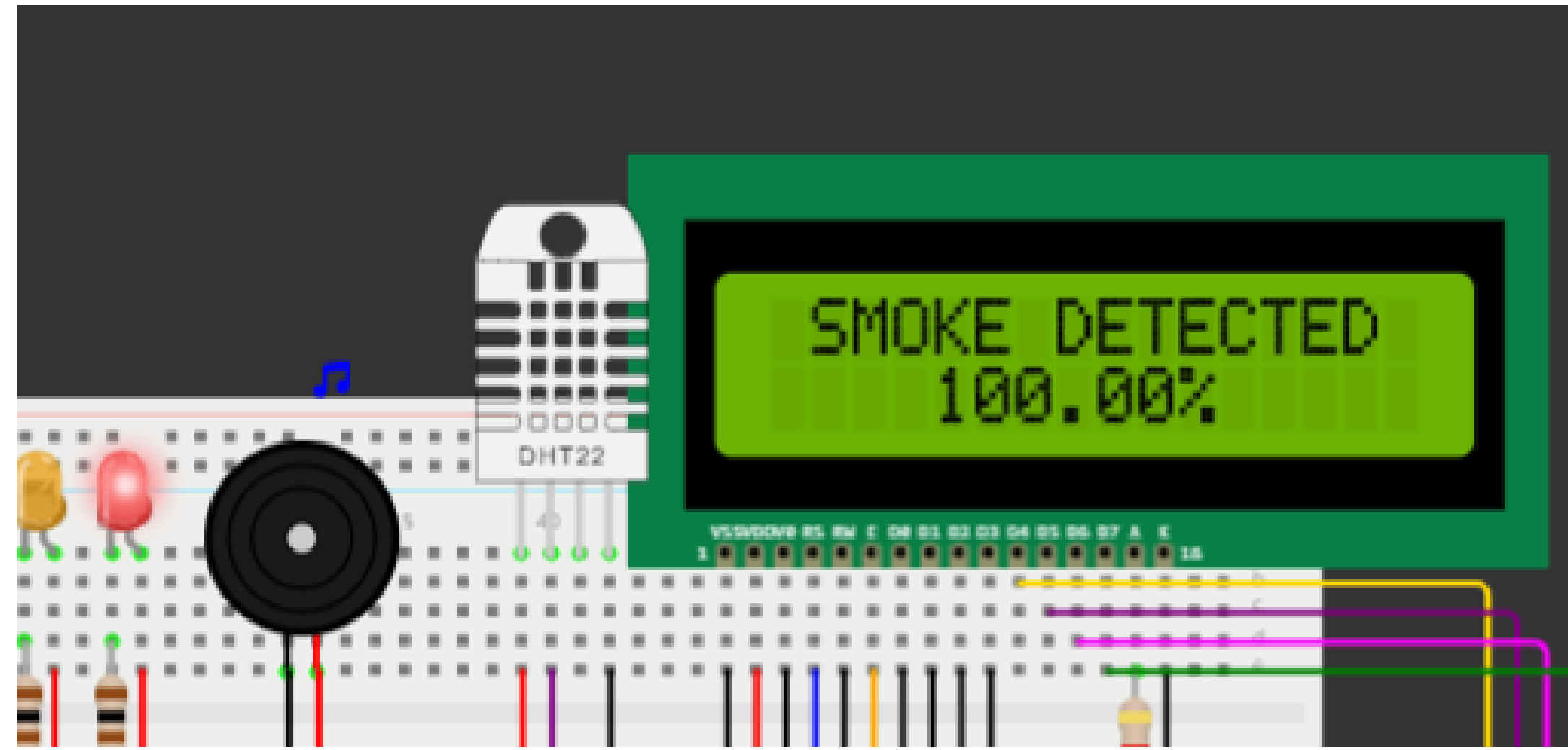


# Telas: Alerta – Limite excedido



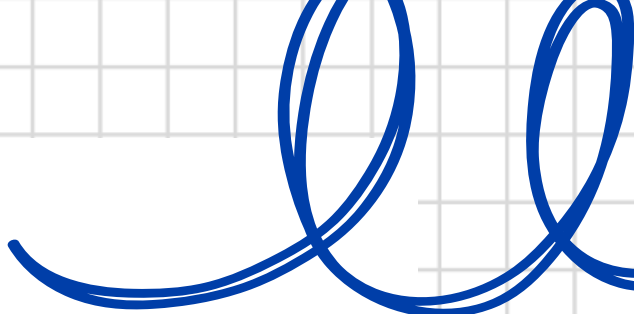


# Telas: Alerta – Detecção de fumaça

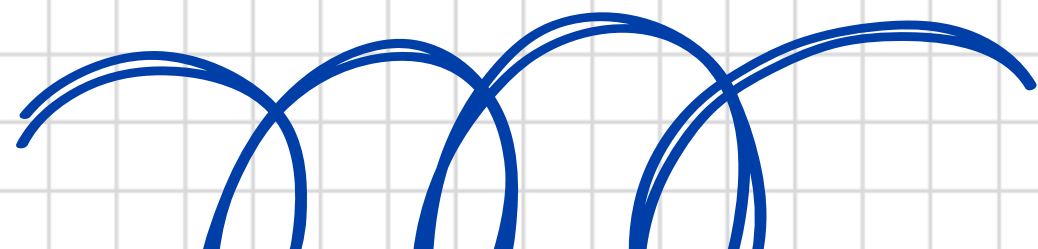




# Posicionamento

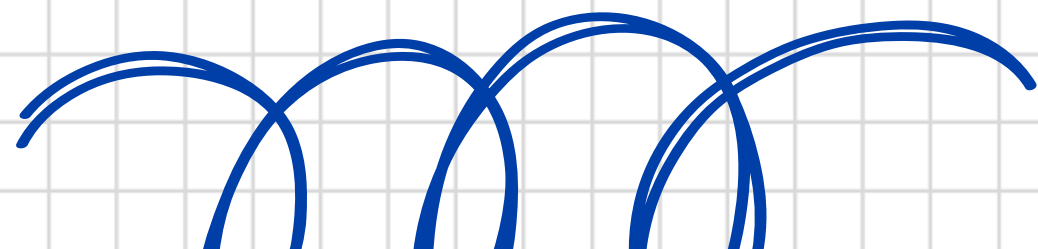
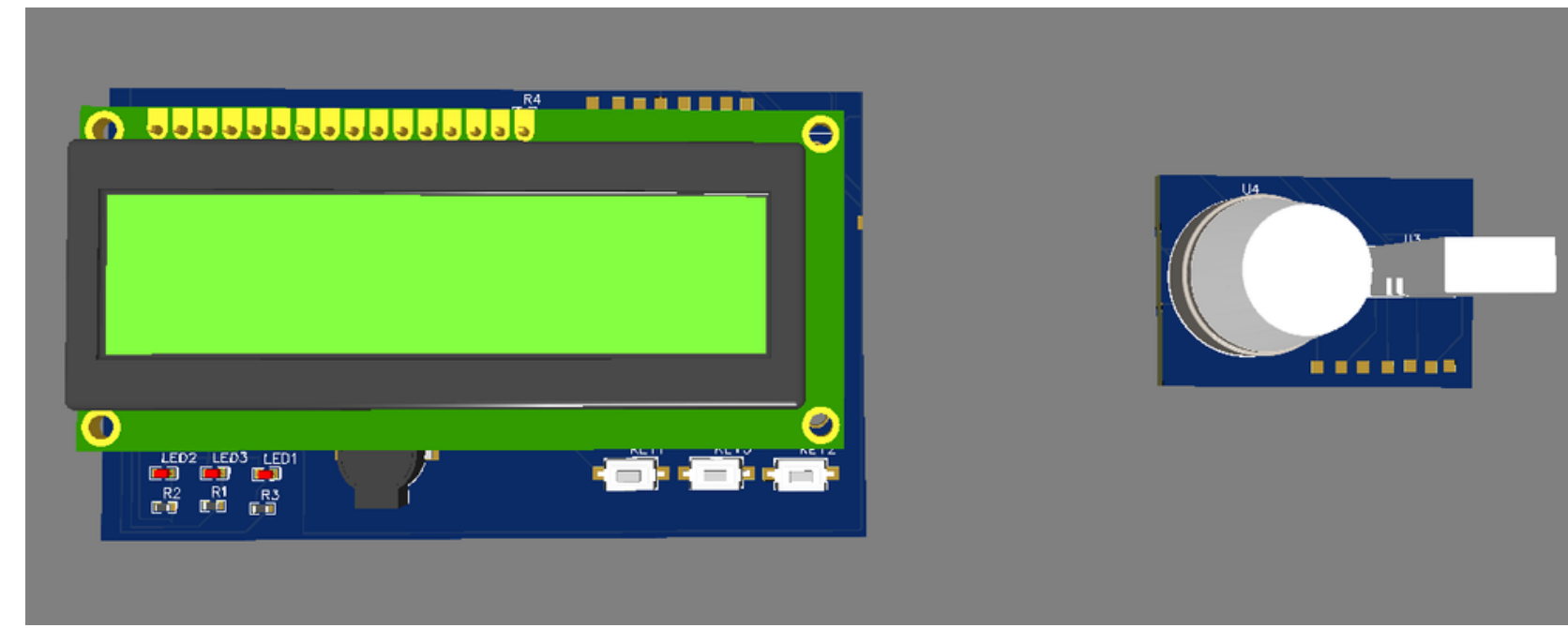
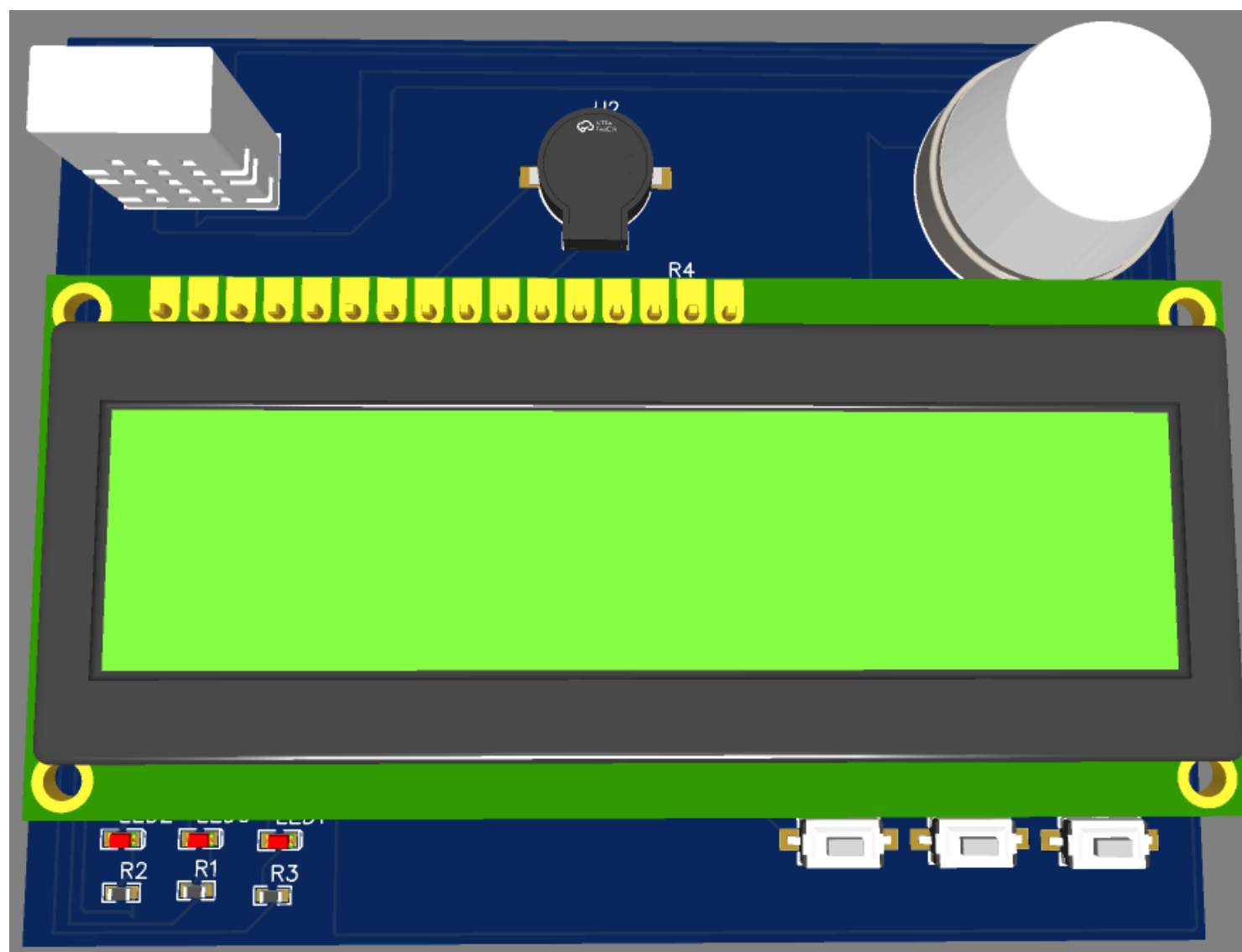
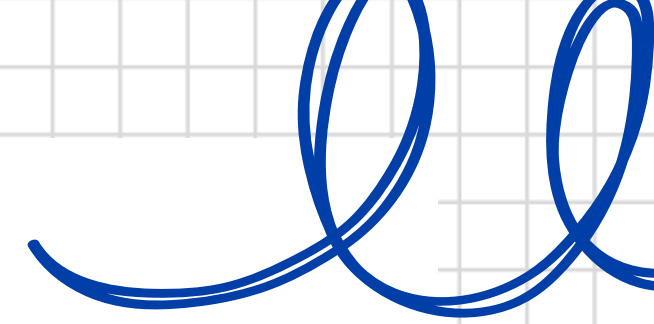


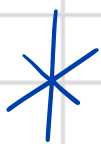
- Módulo de sensoriamento posicionado à 7 metros de altura do chão;
- Central de monitoramento posicionado à 1,20 metros de altura do chão.





# Modelo



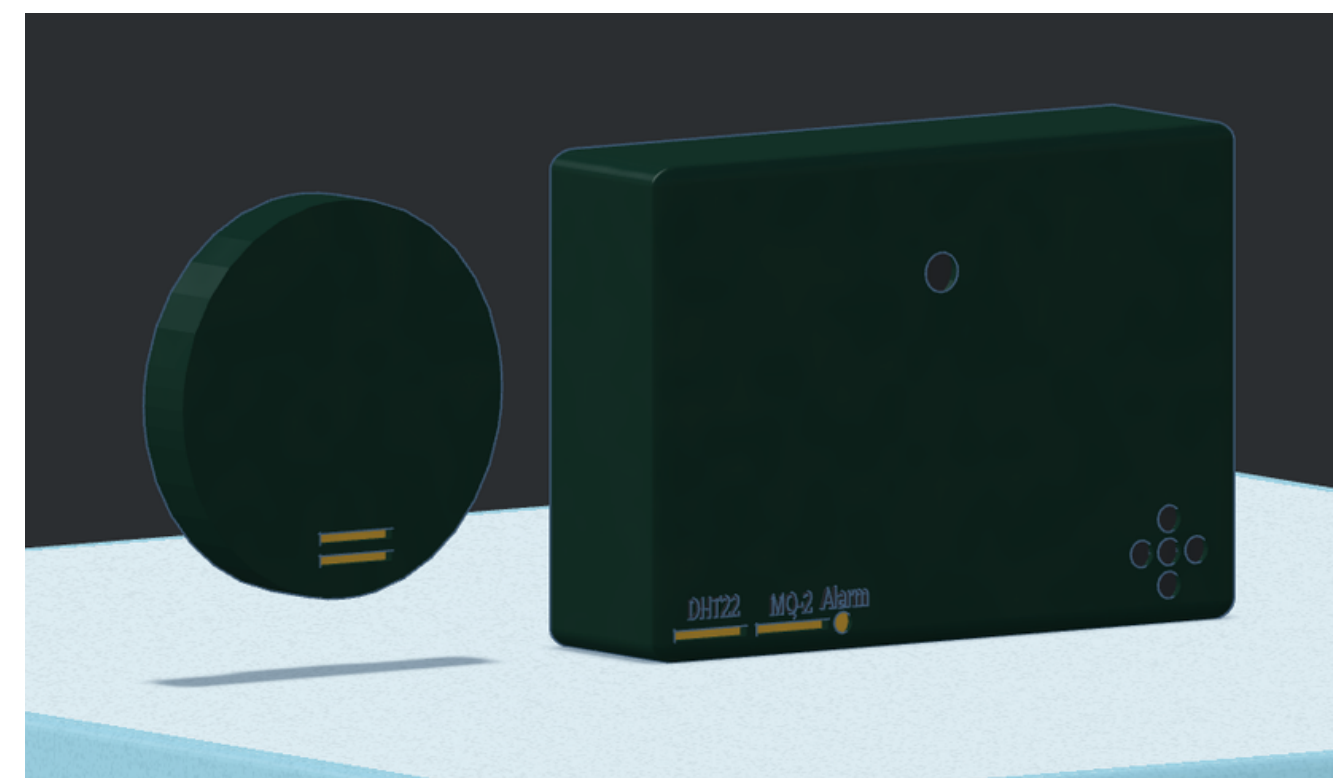


# Modelo

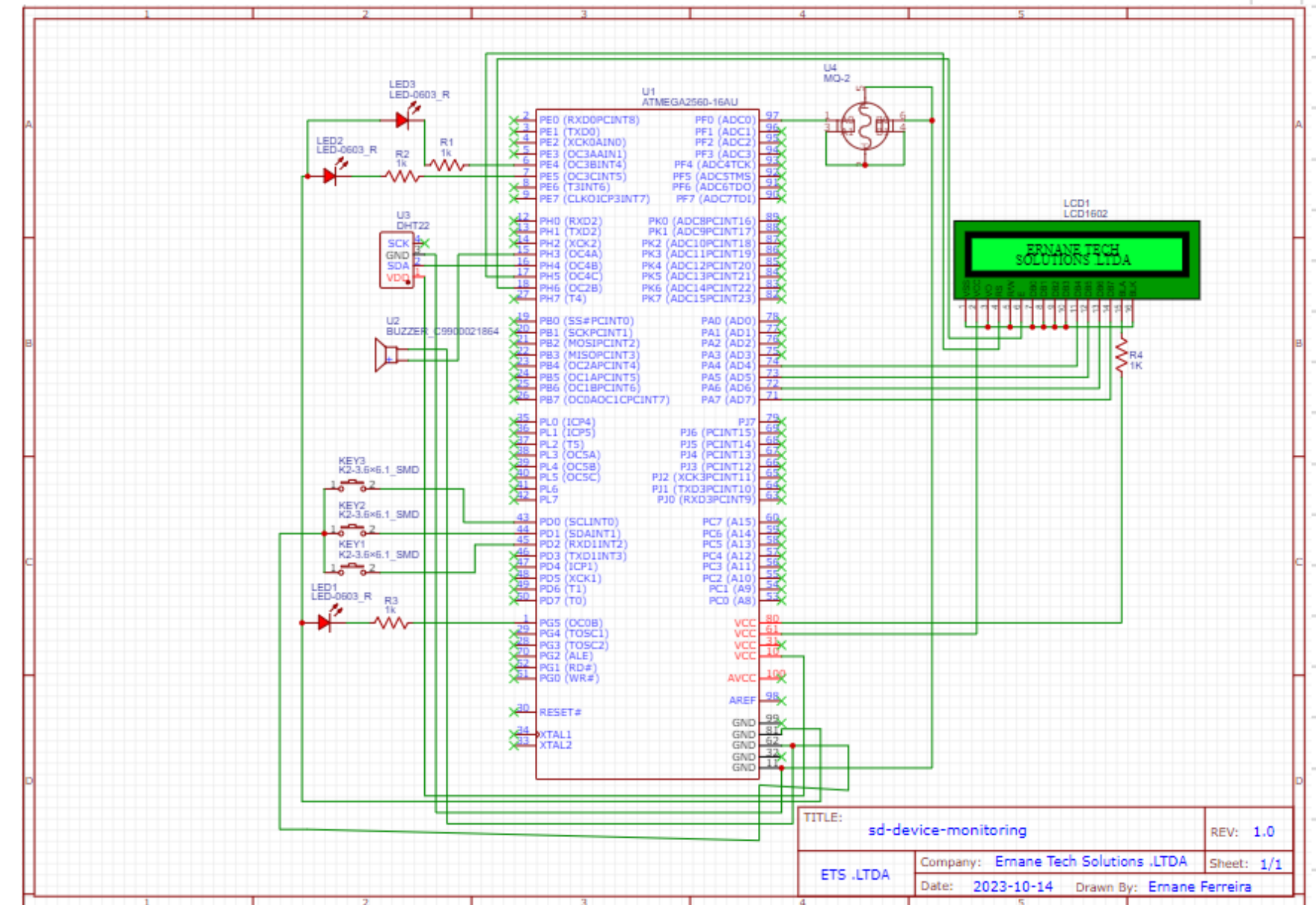
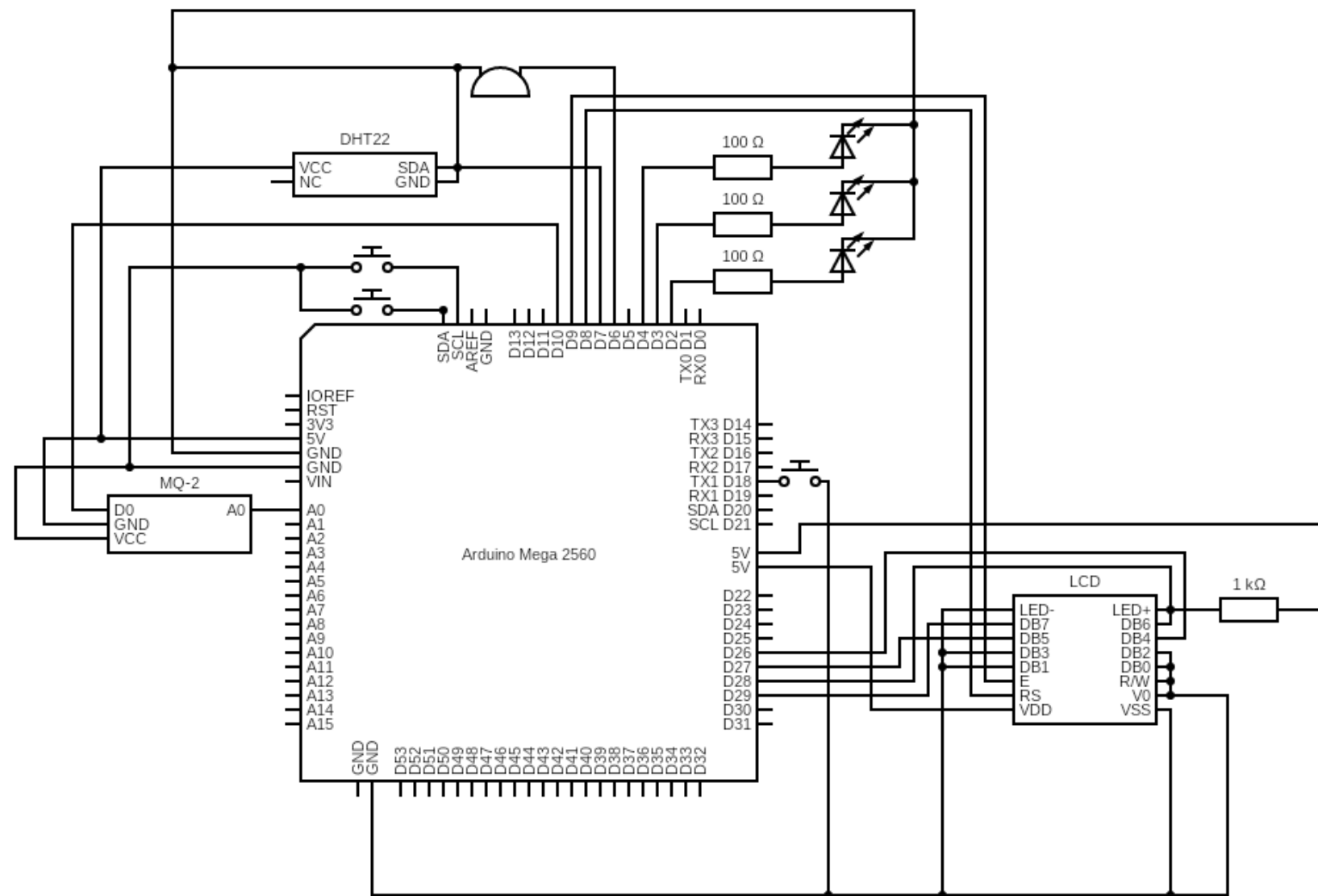




# Modelo



# Modelo





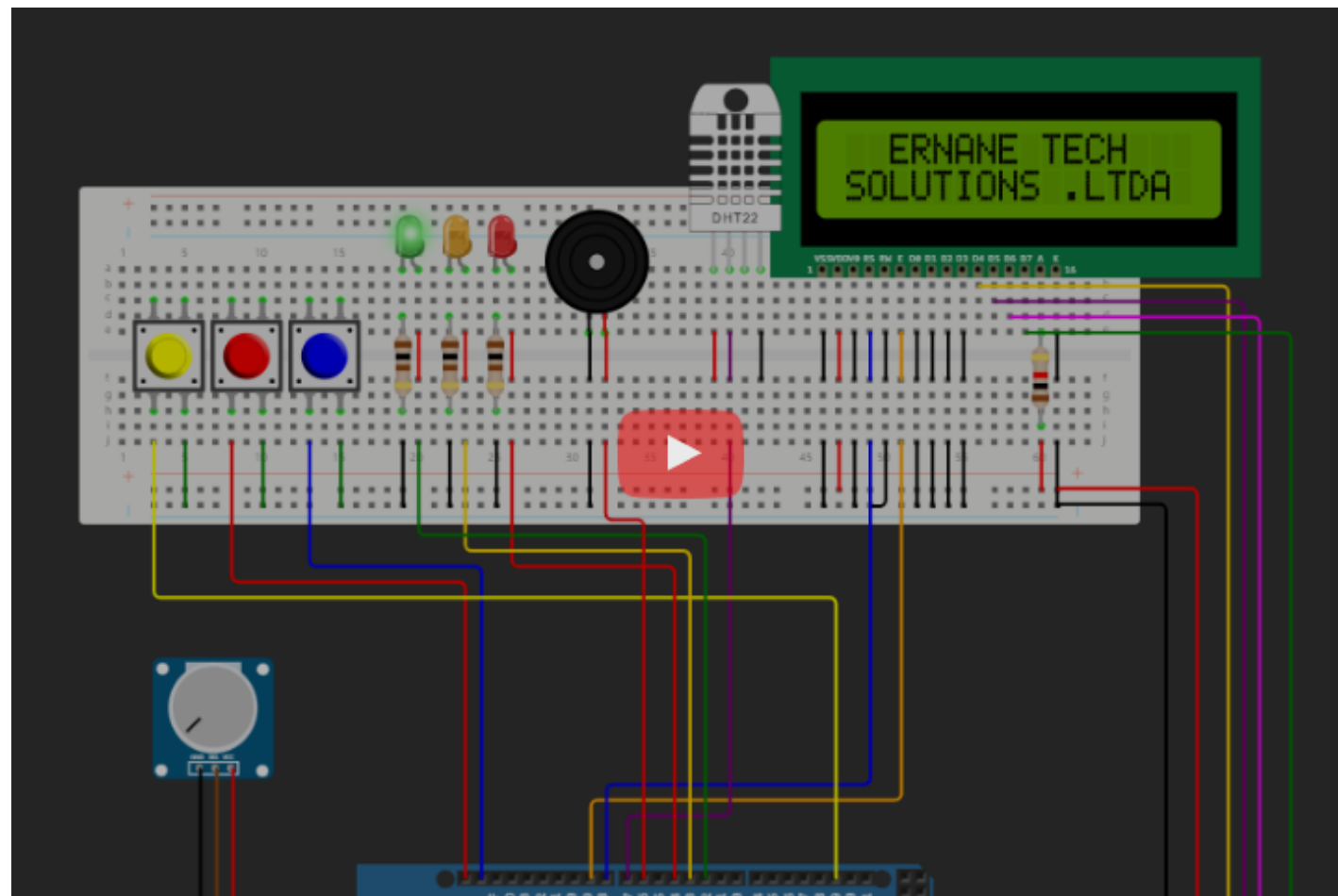


# Orçamento

Componentes	Matrix Eletrônica Alecrim – Natal/RN (Fornecedor Local)	Eletrogate (Fornecedor virtual)	Baú da Eletrônica (Fornecedor virtual)
Resistor 1K $\Omega$ 1/4W	R\$ 0,15 (unidade)	R\$ 1,10 (10 unidades)	R\$ 0,10 (unidade)
DHT22 / Am2302	R\$ 15,00 (unidade)	R\$ 35,06 (unidade)	R\$ 31,70 (unidade)
Push Button (Chave Tátil) 6x6x5mm	R\$ 2,75 (unidade)	R\$ 0,24 (unidade)	R\$ 0,25 (unidade)
Sensor de gás inflamável e fumaça MQ-2	R\$ 15,00 (unidade)	R\$ 18,90 (unidade)	R\$ 18,28 (unidade)
Buzzer	R\$ 6,50 (unidade)	R\$ 2,38 (unidade)	R\$ 2,75 (unidade)
Resistor 100 $\Omega$ 1/4W	R\$ 0,15 (unidade)	R\$ 1,40 (10 unidades)	R\$ 0,05 (unidade)
Display LCD 16x2 com Backlight Verde	R\$ 22,00 (unidade)	R\$ 19,86 (unidade)	R\$ 30,90 (unidade)
LEDs	R\$ 0,75 (unidade)	R\$ 0,24 (unidade)	R\$ 0,22 (unidade)
Placa Mega 2560	R\$ 98,00 (unidade)	R\$ 189,21 (unidade)	R\$ 238,80 (unidade)



# Simulação e protótipo



[Simulação direto no Wokwi](#)  
[Video de simulação no Youtube](#)



[Vídeo de implementação no Youtube](#)



# Obrigado!



**ETS – Ernane Tech Solutions  
LTDA**

## **E-mail**

contato@ets.com.br

## **Mídias Sociais**

@ets

## **Ligue para nós**

(84) 3456-7890

## **Projeto**

<https://github.com/ErnaneJ/sd-device-monitoring>

