

ئون ئۈچىنچى دەرس
ئانالوگ كىرىش ۋە چىقىش
Analog Read and Write

دوكتور ياسىن مەمەتجان

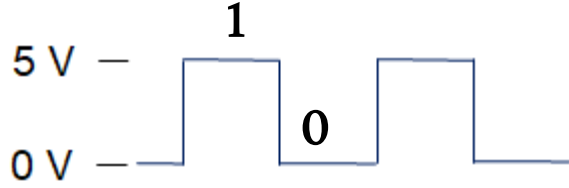
2024-05-17

مەگگۈتەك تەربىيەلەش

مەركىزى

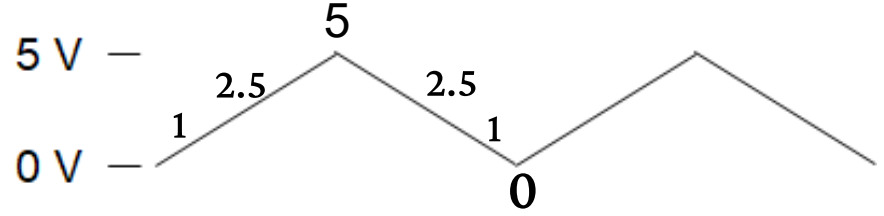


نڪكى خيل سگنال



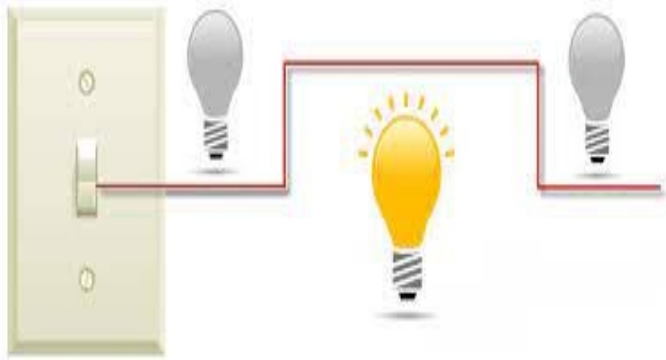
رهقه ملىك سگنال

Digital signal



ٿانالوگ سگنال

Analog signal



بىز بۈگۈن ئۆگىنىدىغان قومماندىلار



digitalWrite()



analogWrite()



digitalRead()



if() statements



analogRead()

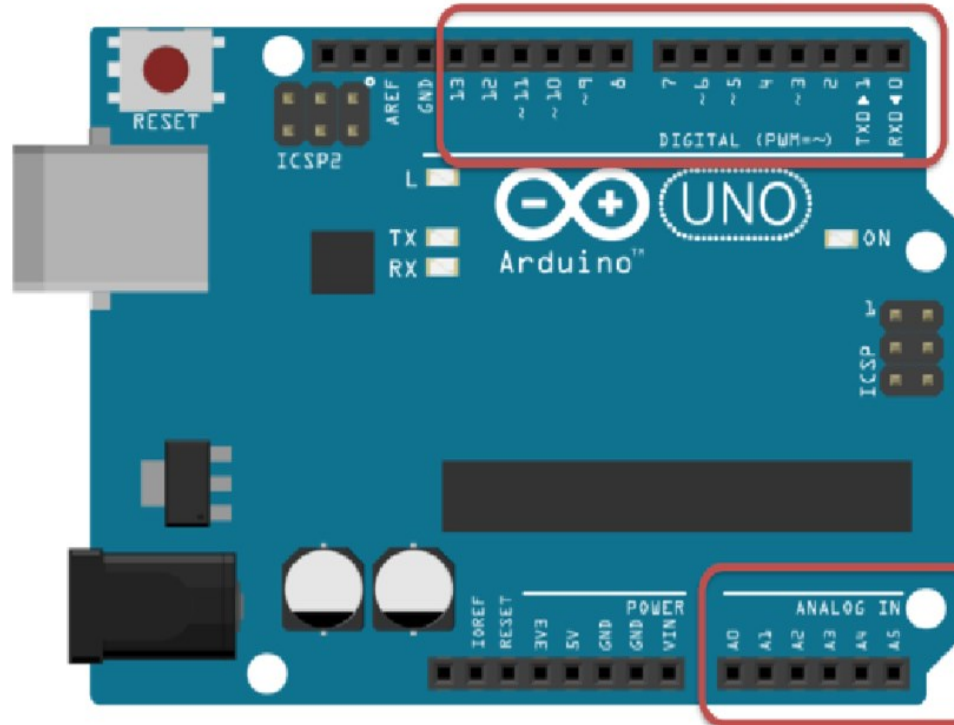


Serial communication

آنالوگ کمرش و چقش / Analog Inputs & outputs

~ آنالوگ چقش / analog outputs

Digital Inputs and Digital Output



ره قه ملک کمرش و چقش
You can choose from the code if they are to be inputs or outputs

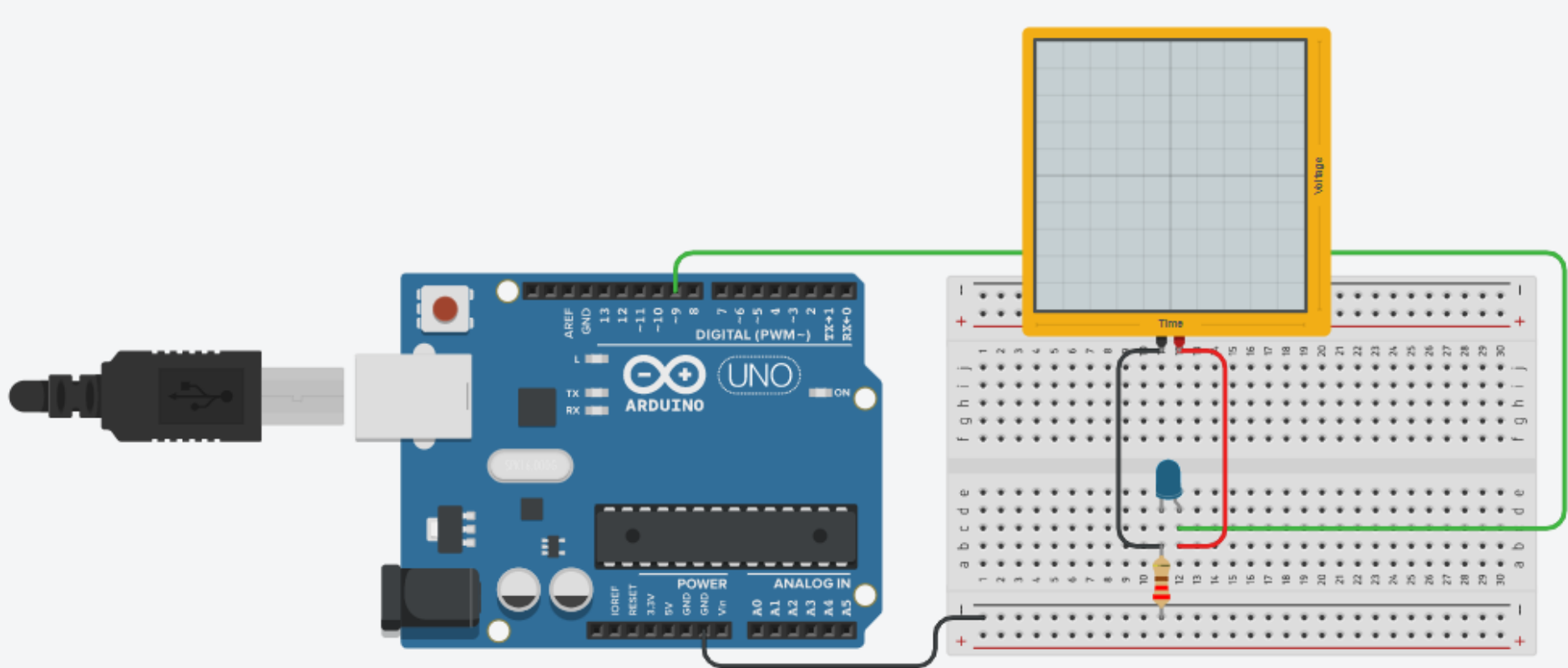
Those marked with ~ can also be used as "Analog Outputs", so-called PWM outputs

آنالوگ کمرش

Analog Inputs

analogWrite مسالڤرى

سۇسلاش - Fading



سۇسلاش - Fading

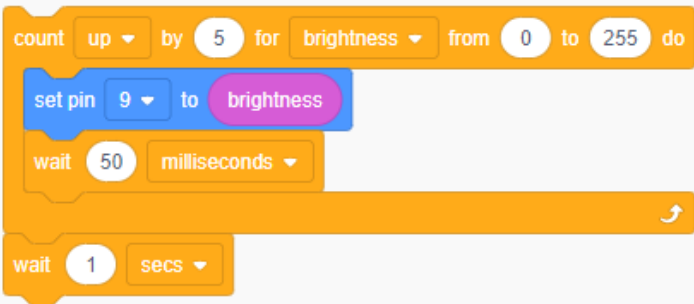
```
int brightness = 0;
```

```
void setup()  
{  
  pinMode(9, OUTPUT);  
}
```

```
void loop()  
{
```

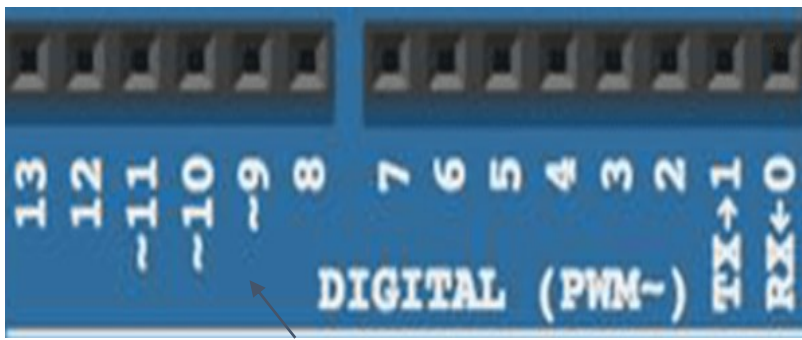
```
  for (brightness = 0; brightness <= 255; brightness += 5) {  
    analogWrite(9, brightness);  
    delay(50); // Wait for 50 millisecond(s)  
  }  
  delay(1000); // Wait for 1000 millisecond(s)
```

```
}
```



The image shows a Scratch code editor with the following blocks:

- A "do loop" block: "count up by 5 for brightness from 0 to 255 do".
- Inside the loop:
 - A "set pin 9 to brightness" block.
 - A "wait 50 milliseconds" block.
- A "wait 1 secs" block at the end of the loop.



Digital I/O (Input/Output) رهقه مملك كرش

`analogWrite(3,64)`

`analogWrite(3,127)`

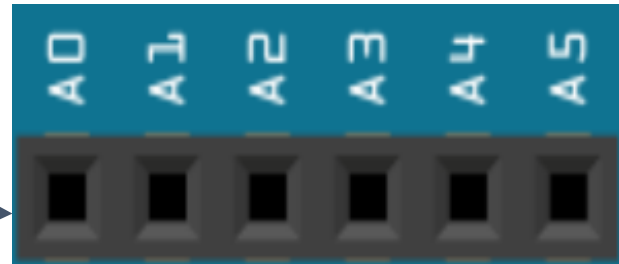
`analogWrite(3,191)`

PWM



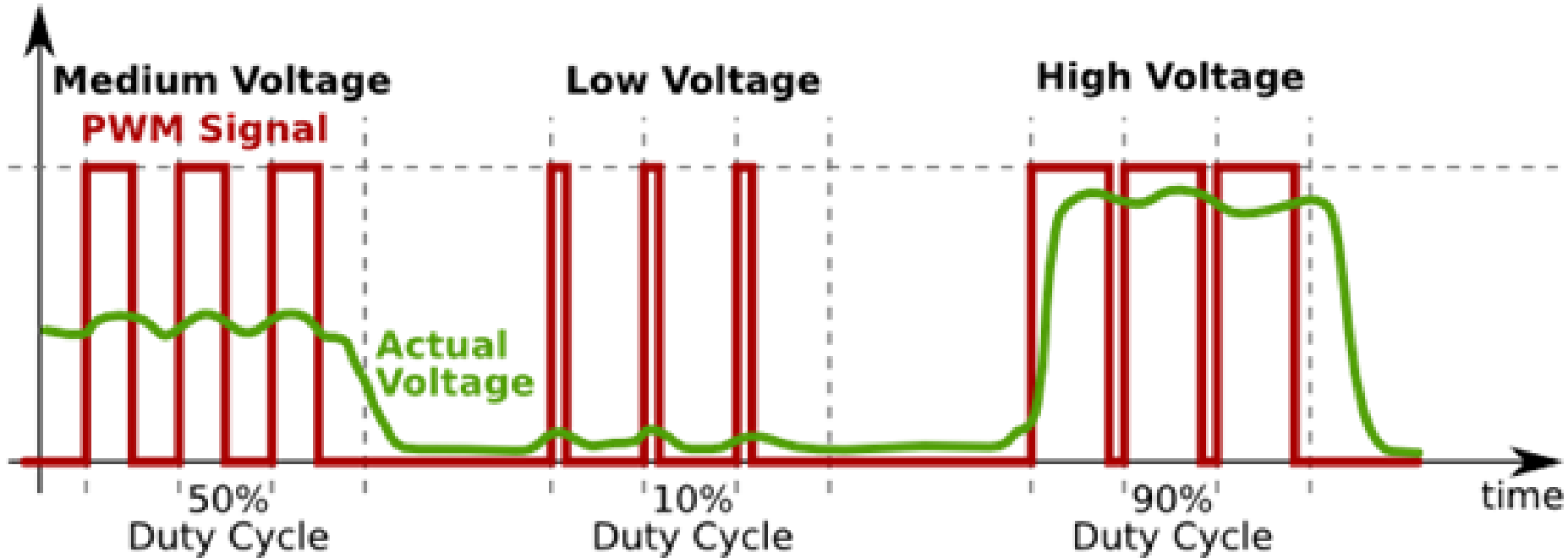
دولقون كهگلكنى مؤدولياتسيهلهش

ئانالوگ چقش ~



Analog input pins

دولقۇن كەڭلىكىنى مۇدۇلياتسىيەلەش



ياخشى مەھسۇلات لايىھەلەشنىڭ ئون قاندىسى

يېڭىلىق

ئاددىي

پايدىلىق

گۈزەل

چىداملىق

كىچىك

ھەقىقىي

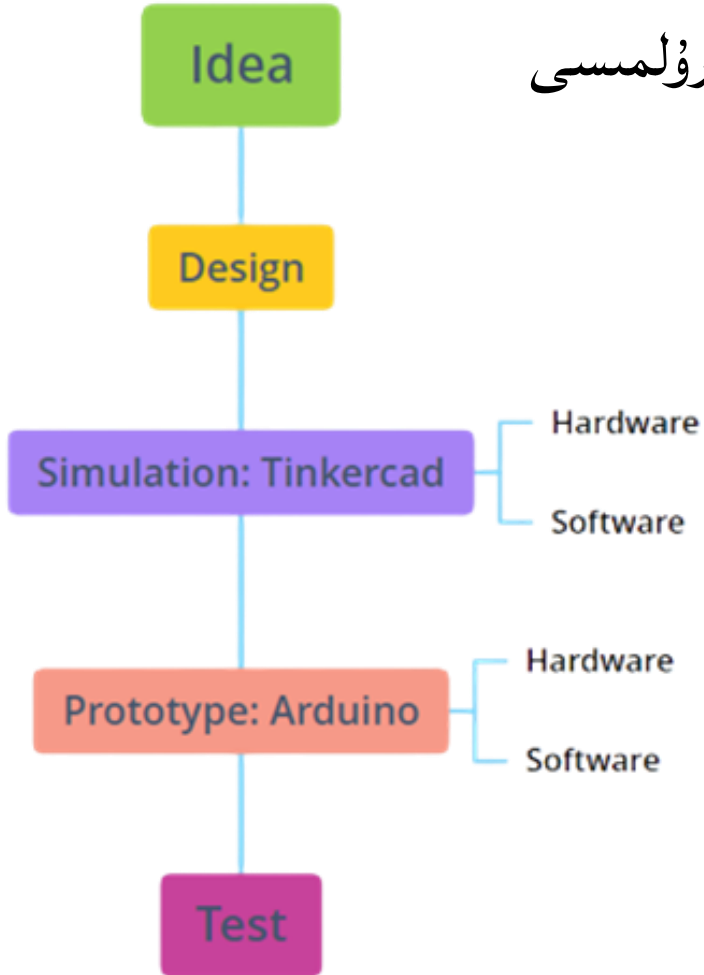
قوللىنىشچان

مۇھىتقا زىيانسىز

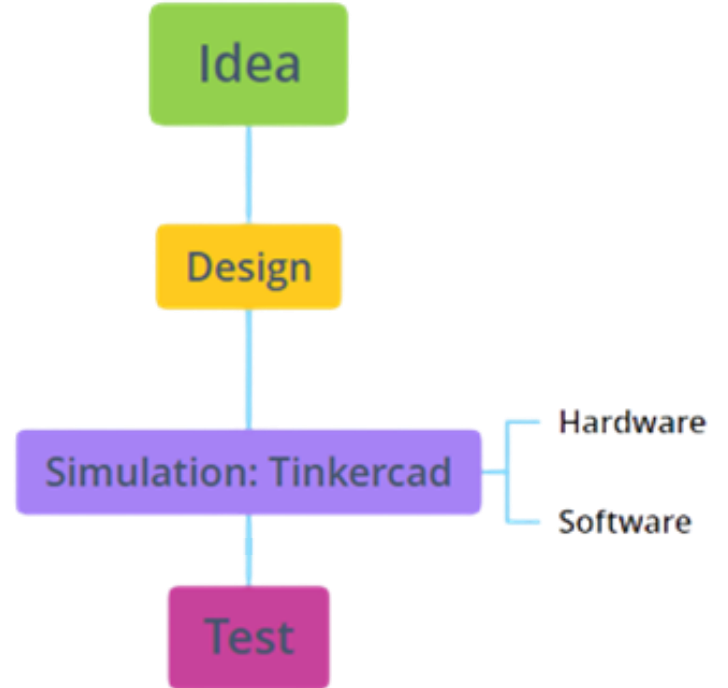
چۈشەندۈرگىلى
بولدىغان



دەرسىمىزنىڭ ئومۇمىي قۇرۇلمىسى



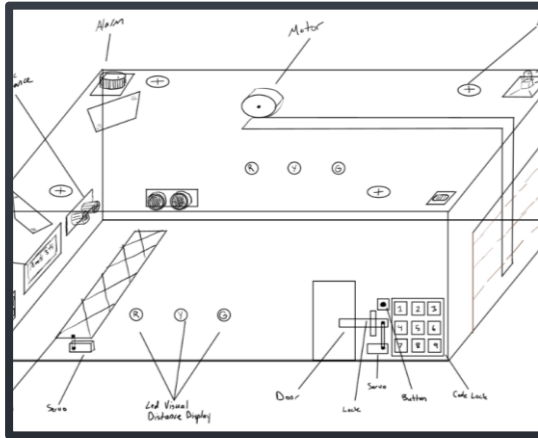
ئىدىيەدىن پروتوتىپقىچە



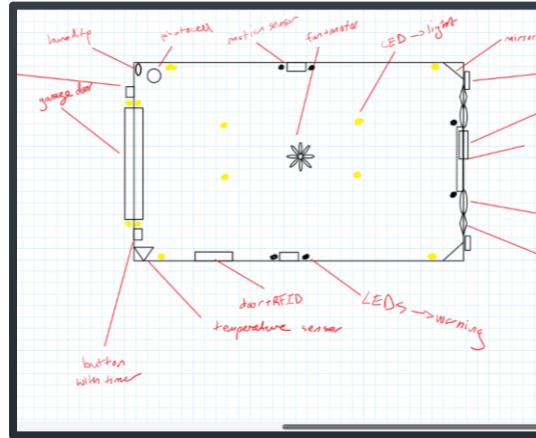
Solutions space

		Solutions					
		Solution 1		Solution 2		Final Solution	
Criteria	Weight	Score	Partial Score	Score	Partial Score	Score	Partial Score
Cost	0.10	3/5	0.060	6/10	0.060	7/10	0.070
Ease of use	0.10	3/5	0.060	4/5	0.080	1	0.100
Reliability	0.20	3/5	0.120	12/15	0.160	3/5	0.120
Safety	0.15	9/10	0.135	6/10	0.090	8/10	0.120
Code Complexity	0.20	8/10	0.160	7/10	0.140	9/10	0.180
Hardware Complexity	0.20	9/10	0.180	7/10	0.140	9/10	0.180
Security	0.05	1/6	0.008	1/3	0.017	2/3	0.033
Sum	1.00		0.723		0.687		0.803

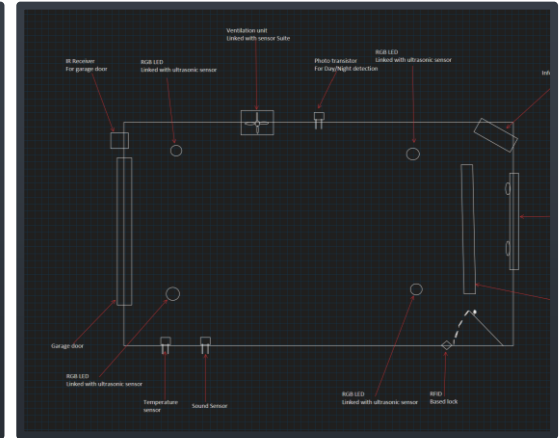
Final solution

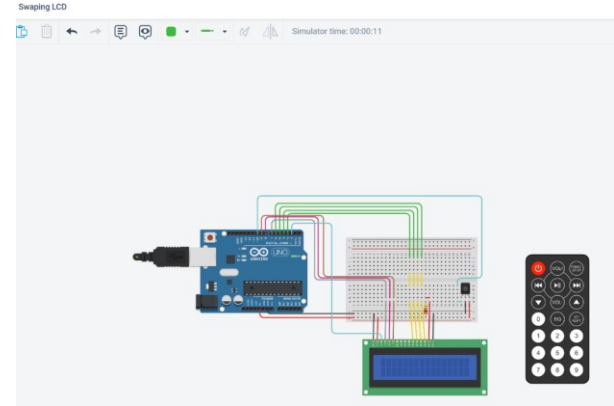
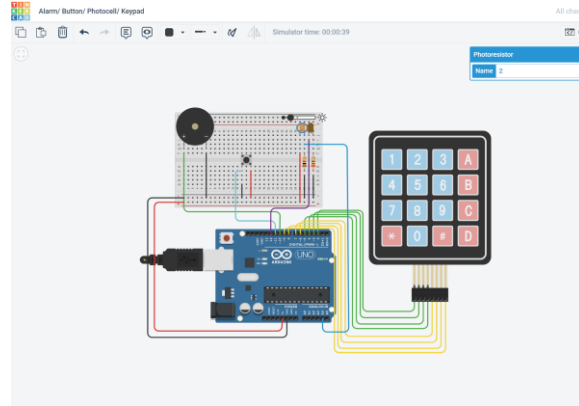
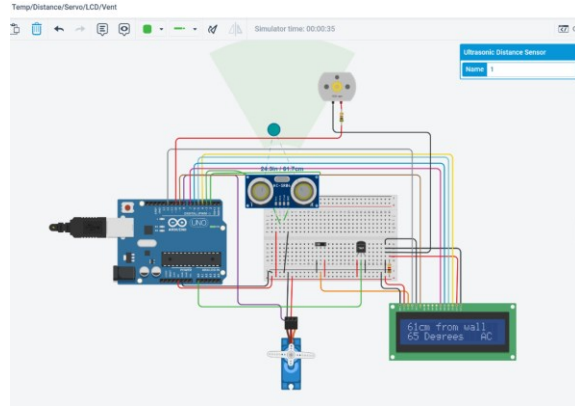


Solution 1



Solution 2

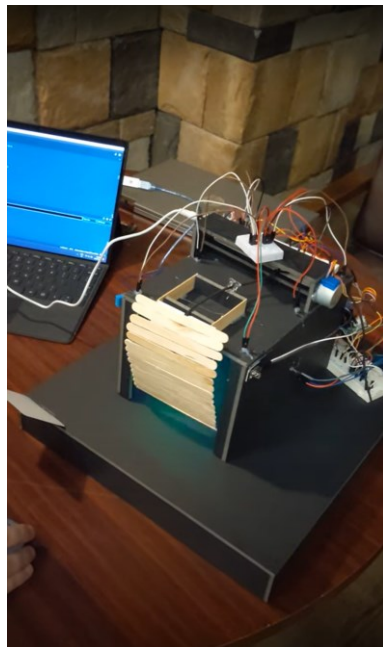
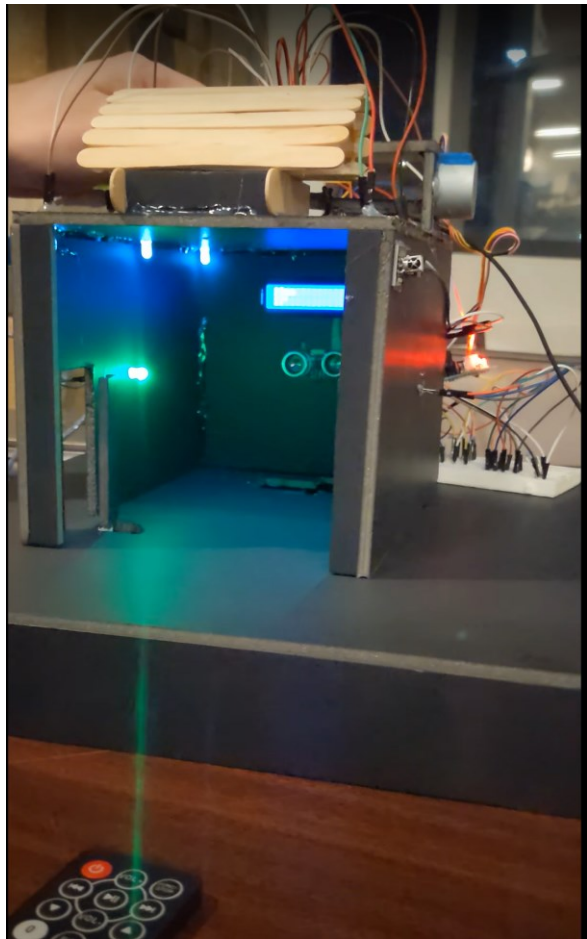




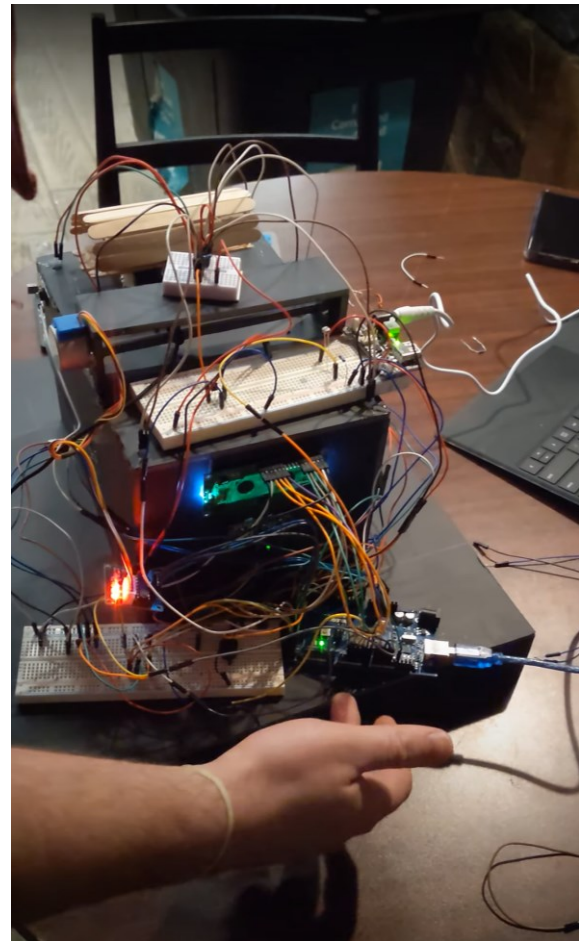
Prototyping

In person prototyping





First build

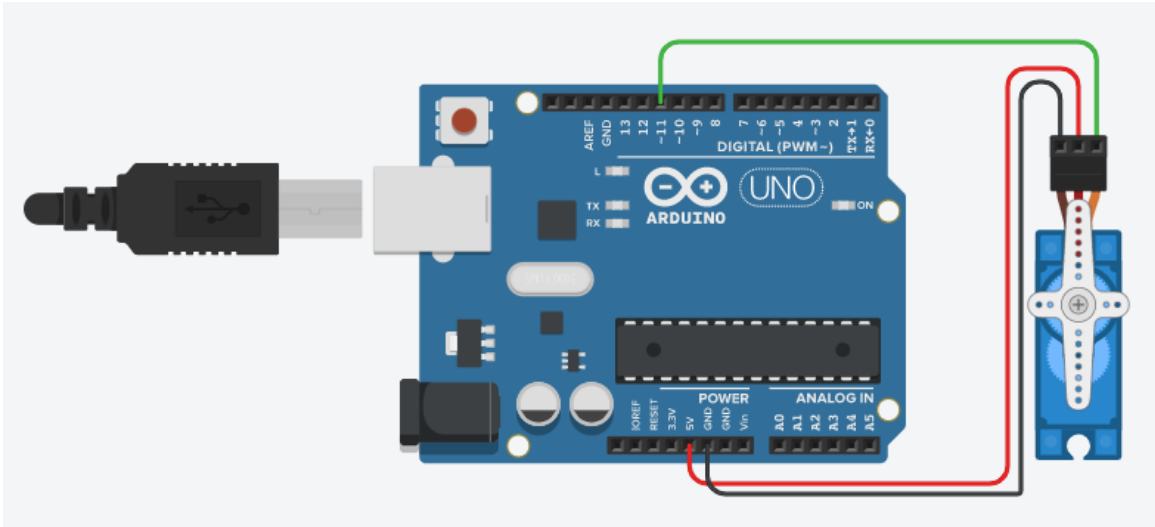


تۈگىدى

سوئالڭىز بولسا، تورىتىمىزدىكى
ھەر بىر دەرسنىڭ سوئال
!!سورايدىغان يىرىگە يېزىڭ



سپرۆو ماتور



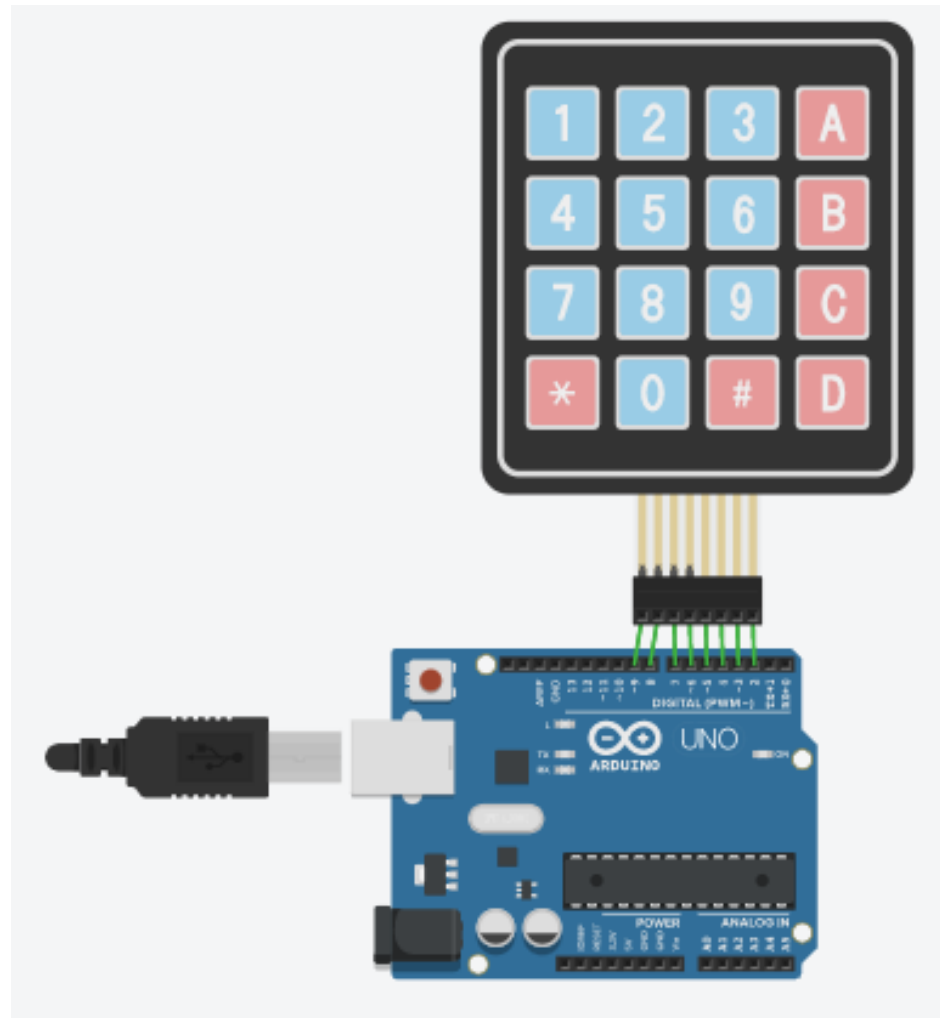
کود

```
forever
  rotate servo on pin 11 to 90 degrees
  wait 1 secs
  rotate servo on pin 11 to 180 degrees
  wait 1 secs
```

كېيىن ئۆتىلىدىغان دەرس

كۆنۈپكا تاختىسى

Keypad



```
#include <Keypad.h> ← كۇنۇپكا تاختىنىڭ كۈتۈپخانىسى
```

```
const int ROW_NUM = 4; //four rows ← تۆت قۇر بارلىقىنى بەلگىلەيدۇ
```

```
const int COLUMN_NUM = 4; //four columns ← تۆت ستون بارلىقىنى بەلگىلەيدۇ
```

```
char keys[ROW_NUM][COLUMN_NUM] = {  
  {'1','2','3','A'},  
  {'4','5','6','B'},  
  {'7','8','9','C'},  
  {'*','0','#','D'}  
};
```

← تۆت ستون بارلىقىنى بەلگىلەيدۇ

```
byte pin_rows[ROW_NUM] = {9, 8, 7, 6}; //connect to the row pinouts of the keypad
```

```
byte pin_column[COLUMN_NUM] = {5, 4, 3, 2}; //connect to the column pinouts of the keypad
```

```
Keypad keypad = Keypad( makeKeymap(keys), pin_rows, pin_column, ROW_NUM, COLUMN_NUM );
```

```
void setup(){  
  Serial.begin(9600);  
}
```

```
void loop(){  
  char key = keypad.getKey();  
  
  if (key){  
    Serial.println(key);  
  }  
}
```

بىزنىڭ ئۆگىتىش ئۇسۇلىمىز

- To build skills, product, and better future career
- Need to convert our weakness and challenge to opportunity, strength, and power
 - Mindset – high mind
 - Skillset
 - Toolset

- **Mindset:**

- Talk about Visual Leadership and its role in times of crisis
- Current technology - digital world and future of AI
- Mentality is reality □ Movement starts within you

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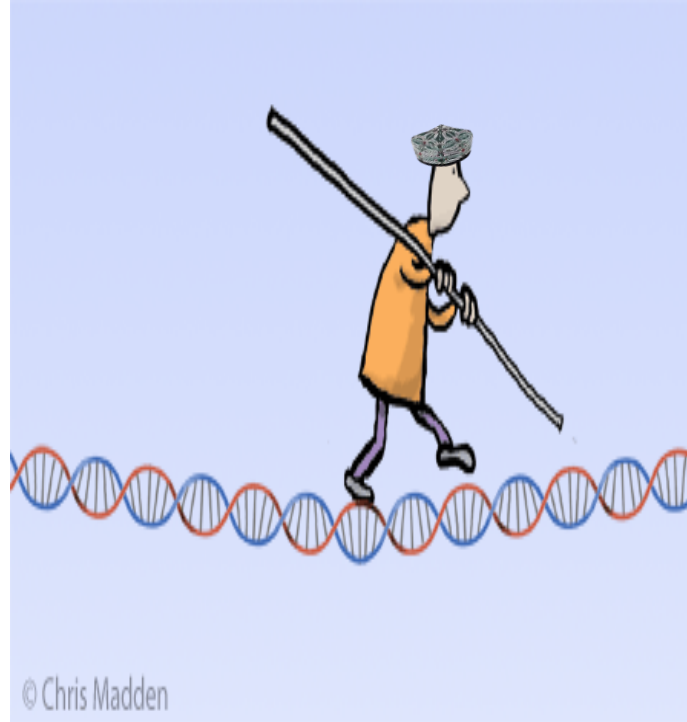
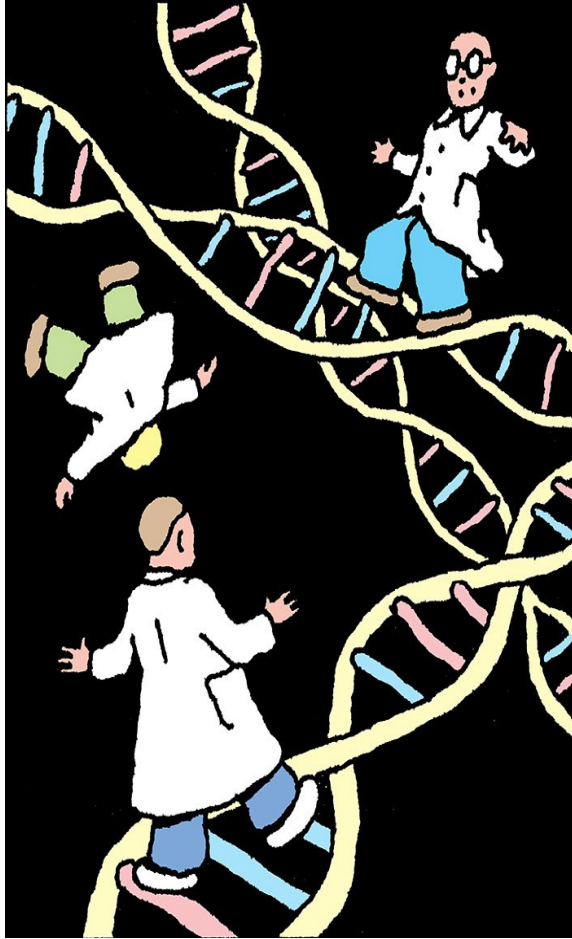
- **Toolset:**

- Simulation with Tinkercad / Hardware / Software / Integration / Documentation – idea

- **Skillset:**

- Step by Step (one sensor at a time, and add more sensors one by one)

نۆۋەتتىكى مەسىلىلەر



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توغرا ماھارەت Right skills

توغرا دېتال Right tools

توغرا ئىرادە Right mindset

