



Vhodno izhodne naprave

Laboratorijska vaja 2 - VP 2
TinkerCad-Arduino osnove

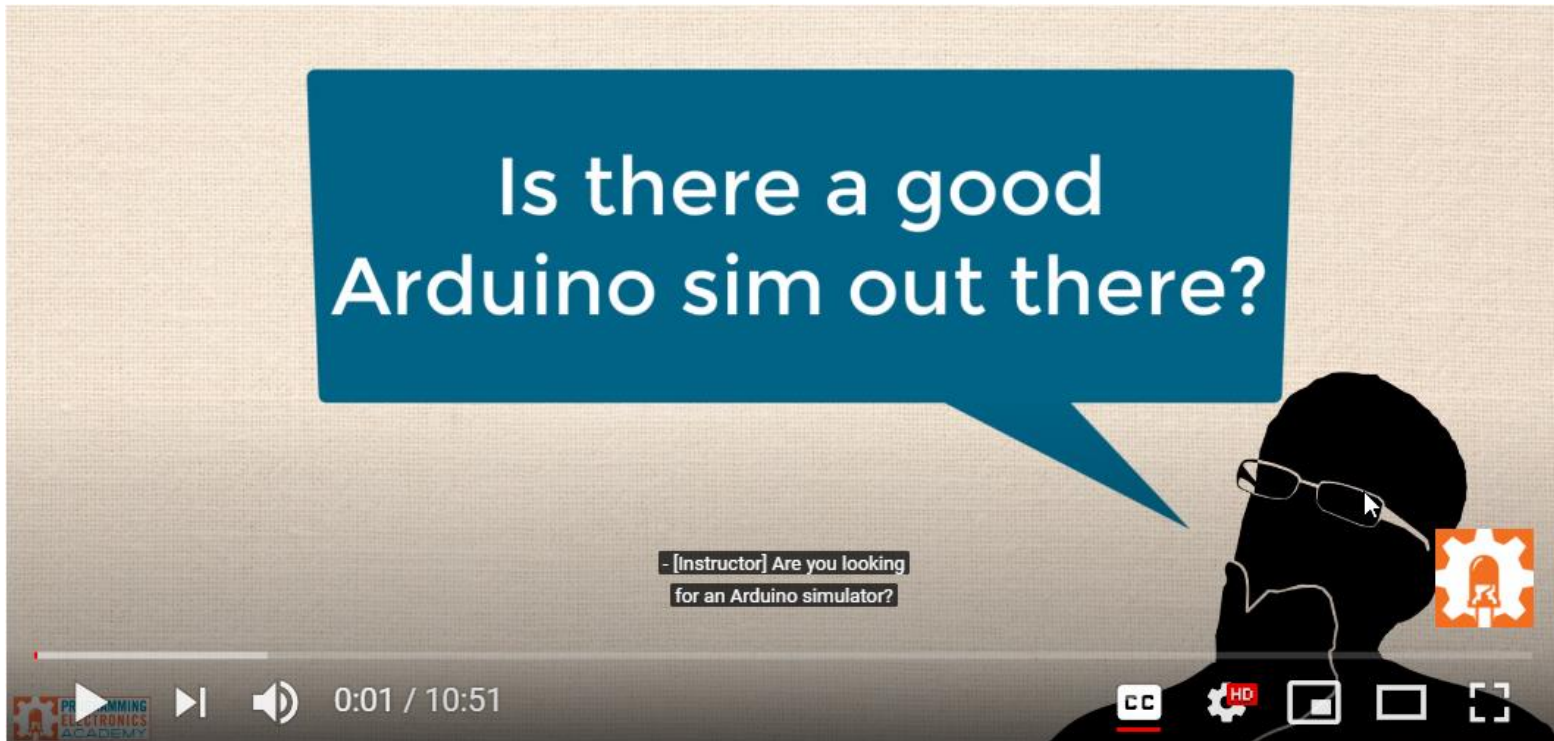
VIN projekt - VP2: TinkerCad, Breadboard, Arduino

- TinkerCad - ponovitev
- Breadboard – osnovne vezave
- TinkerCad + Arduino
- Domača naloga (DN2-1, DN2-2)

VIN projekt - VP2: TinkerCad, Breadboard, Arduino

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- Breadboard – osnovne vezave
- TinkerCad + Arduino
- Domača naloga (DN2-1, DN2-2)

TinkerCad: the Arduino Simulator you've been looking for!



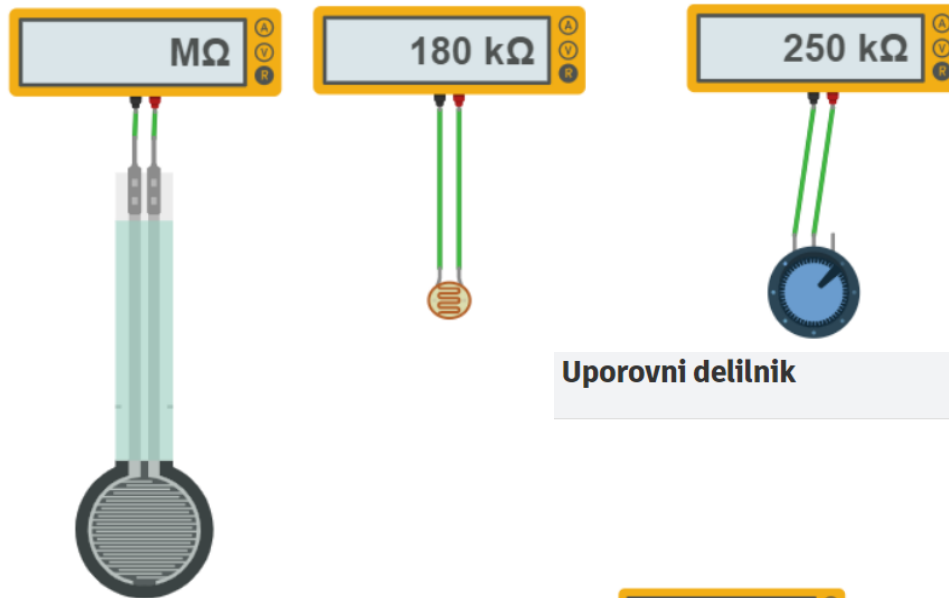
Z naslova <<https://www.youtube.com/watch?v=6uz1sCA9joc>>

VIN projekt : TinkerCad

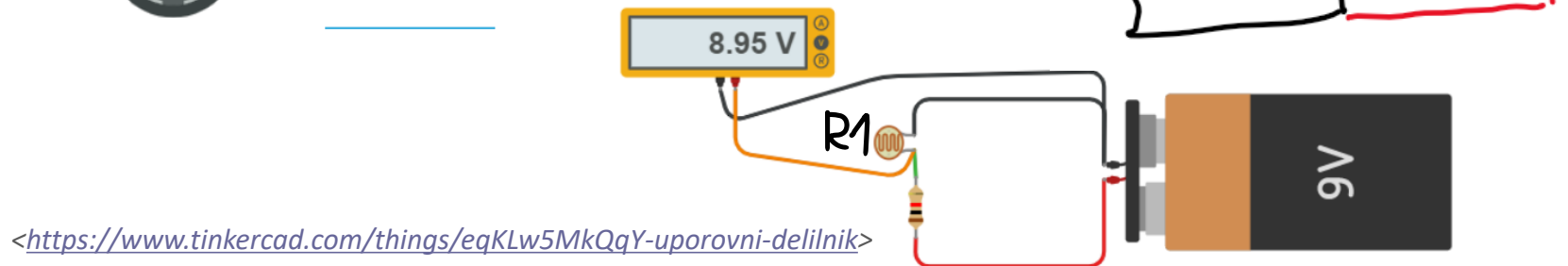
Uporovna tipala in delilnik napetosti

Uporovna tipala

Z naslova <<https://www.tinkercad.com/things/gRnhGlsvr0z-uporovna-tipala>>



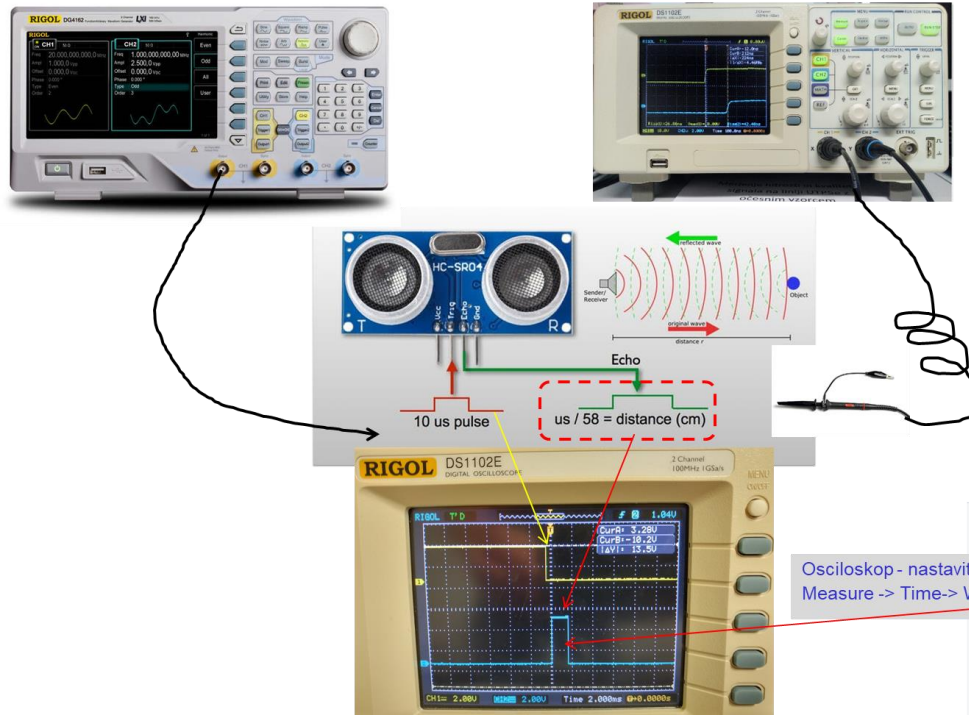
Uporovni delilnik



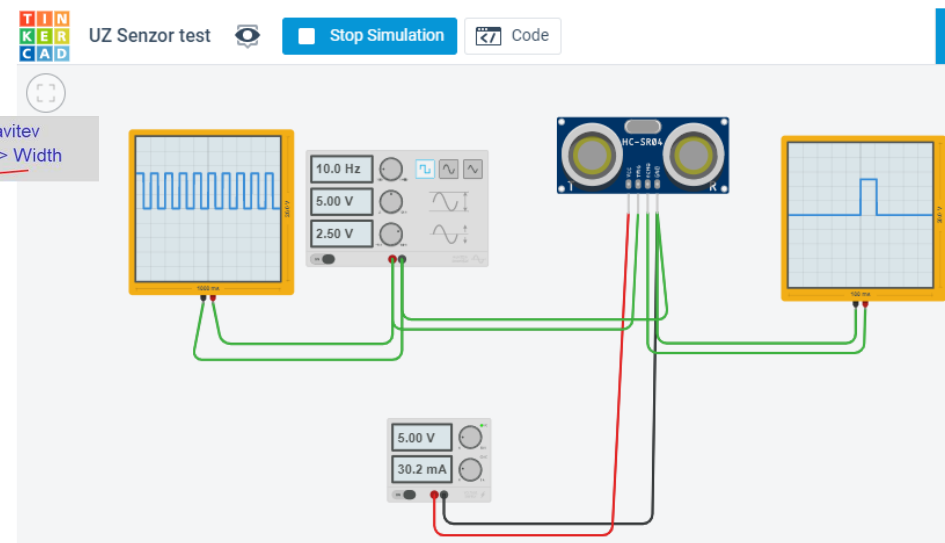
<<https://www.tinkercad.com/things/eqKLw5MkQqY-uporovni-delilnik>>

UZ senzor in HC-SR04

LAB Preizkus



Simulacija - TinkerCad



VIN projekt - VP2: TinkerCad, Breadboard, Arduino

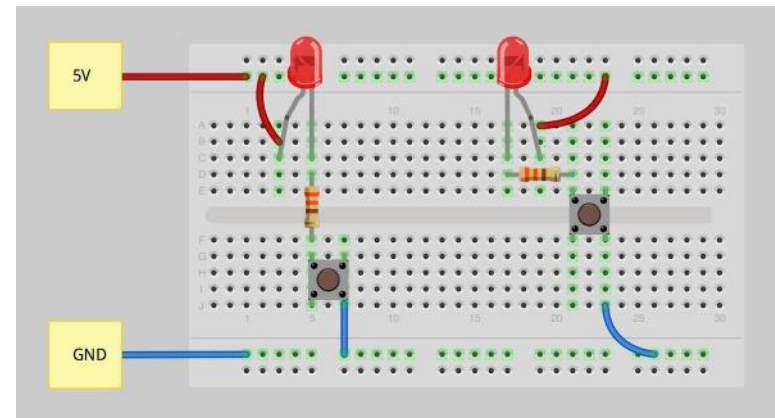
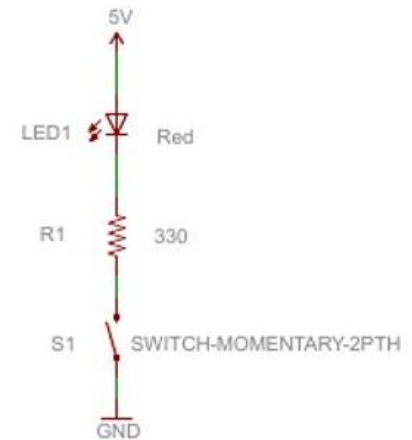
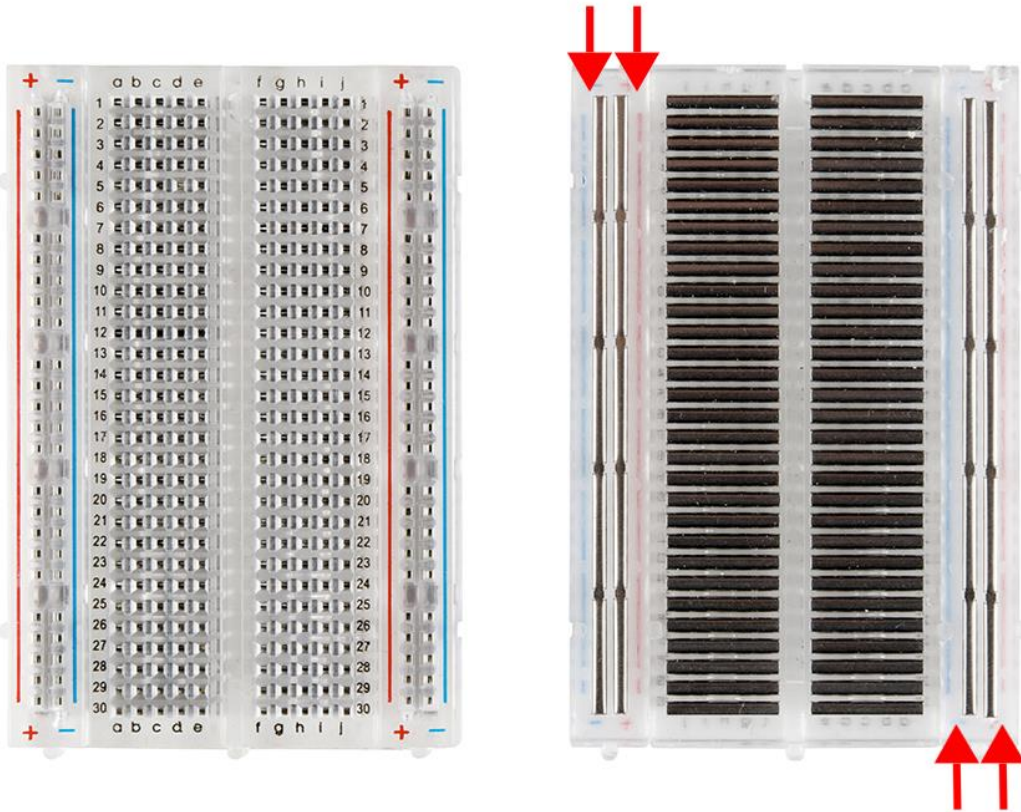
- TinkerCad - ponovitev

- Breadboard – osnovne vezave

- TinkerCad + Arduino

- Domača naloga (DN2-1, DN2-2)

VIN projekt : TinkerCad Breadboard vezave

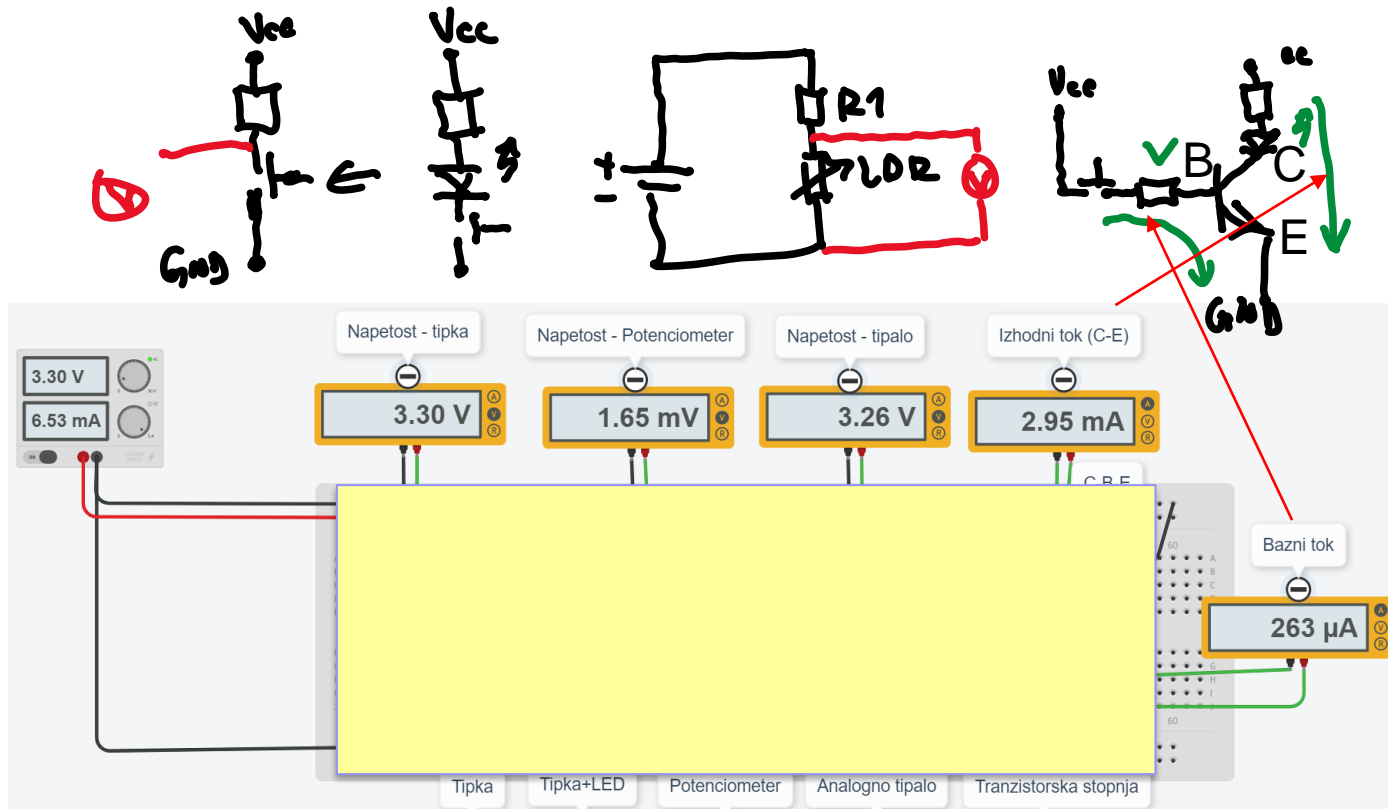


Viri

- <https://learn.sparkfun.com/tutorials/how-to-use-a-breadboard/>
- <https://www.sciencebuddies.org/science-fair-projects/references/how-to-use-a-breadboard>

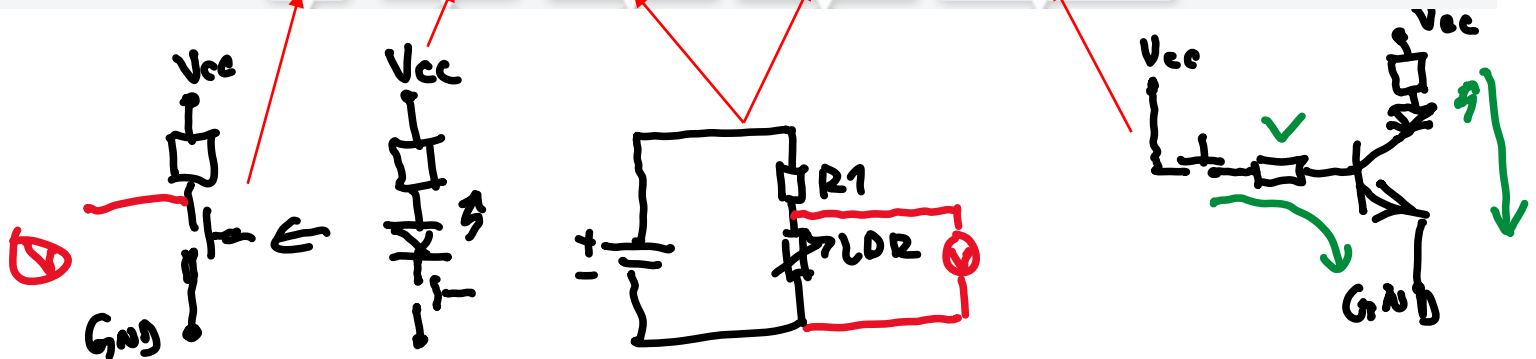
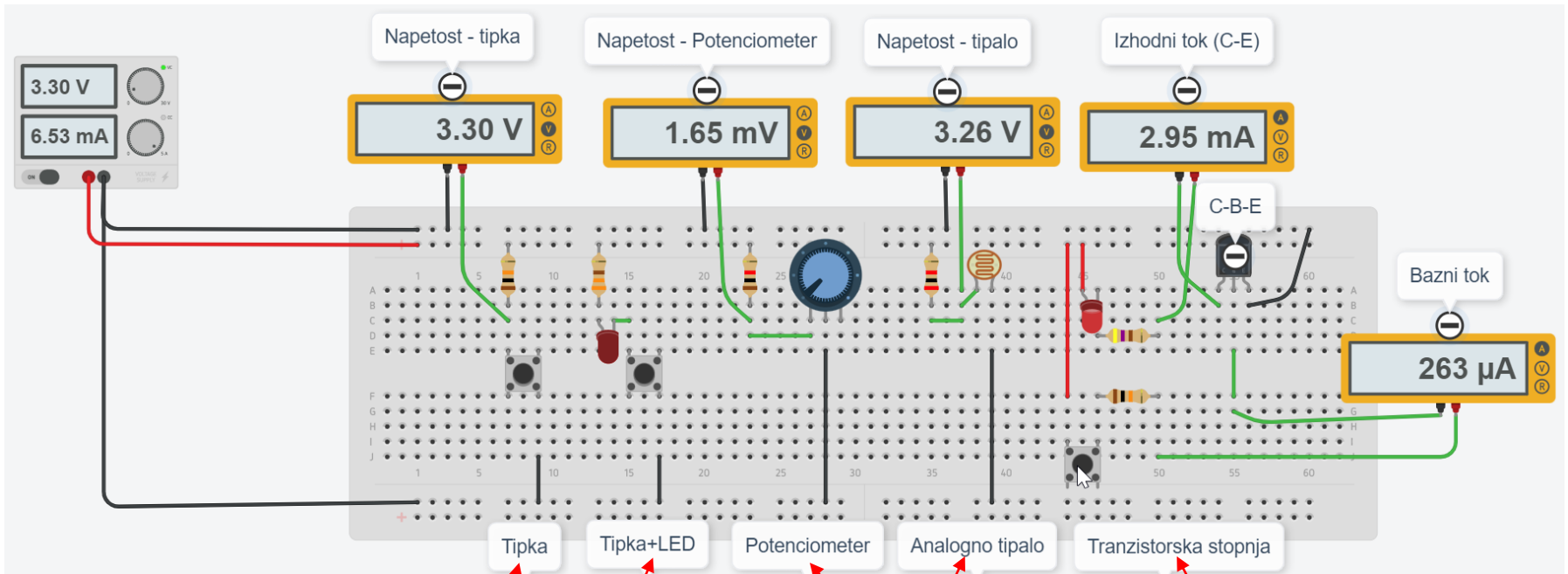
VIN projekt : TinkerCad

Breadboard – osnovne vezave



VIN projekt : TinkerCad

Breadboard vezave – Primer rešitve



VIN projekt - VP2: TinkerCad, Breadboard, Arduino

- Spoznavanje TinkerCad-a II.
- Breadboard
- TinkerCad + Arduino
- Domača naloga

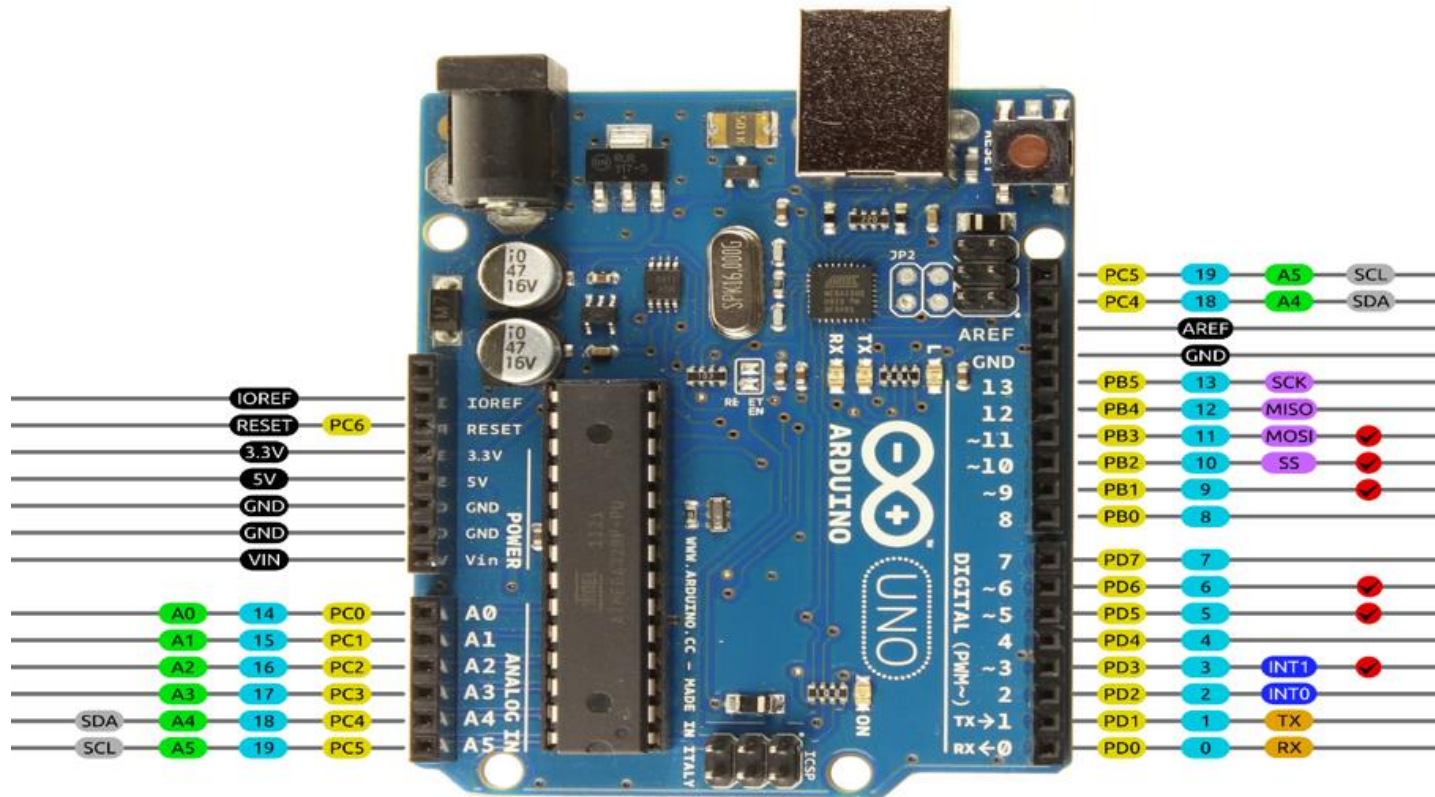
ARDUINO HW INTRO



<https://academy.programmingelectronics.com/arduino-hardware-basics/>

■ Arduino :

5V !!!



AVR DIGITAL ANALOG POWER SERIAL SPI I2C PWM INTERRUPT

Arduino – dokumentacija

<https://www.arduino.cc/reference/en>

Language Reference

Arduino programming language can be divided in three main parts: functions, values (variables and constants), and structure.

FUNCTIONS

For controlling the Arduino board and performing computations.

Digital I/O

`digitalRead()`
`digitalWrite()`
`pinMode()`

Analog I/O

`analogRead()`
`analogReference()`
`analogWrite()`

Math

`abs()`
`constrain()`
`map()`
`max()`
`min()`
`pow()`
`sq()`
`sqrt()`

Random Numbers

`random()`
`randomSeed()`

Bits and Bytes

`bit()`
`bitClear()`
`bitRead()`
`bitSet()`

LANGUAGE
FUNCTIONS
VARIABLES
STRUCTURE

LIBRARIES

IOT CLOUD API

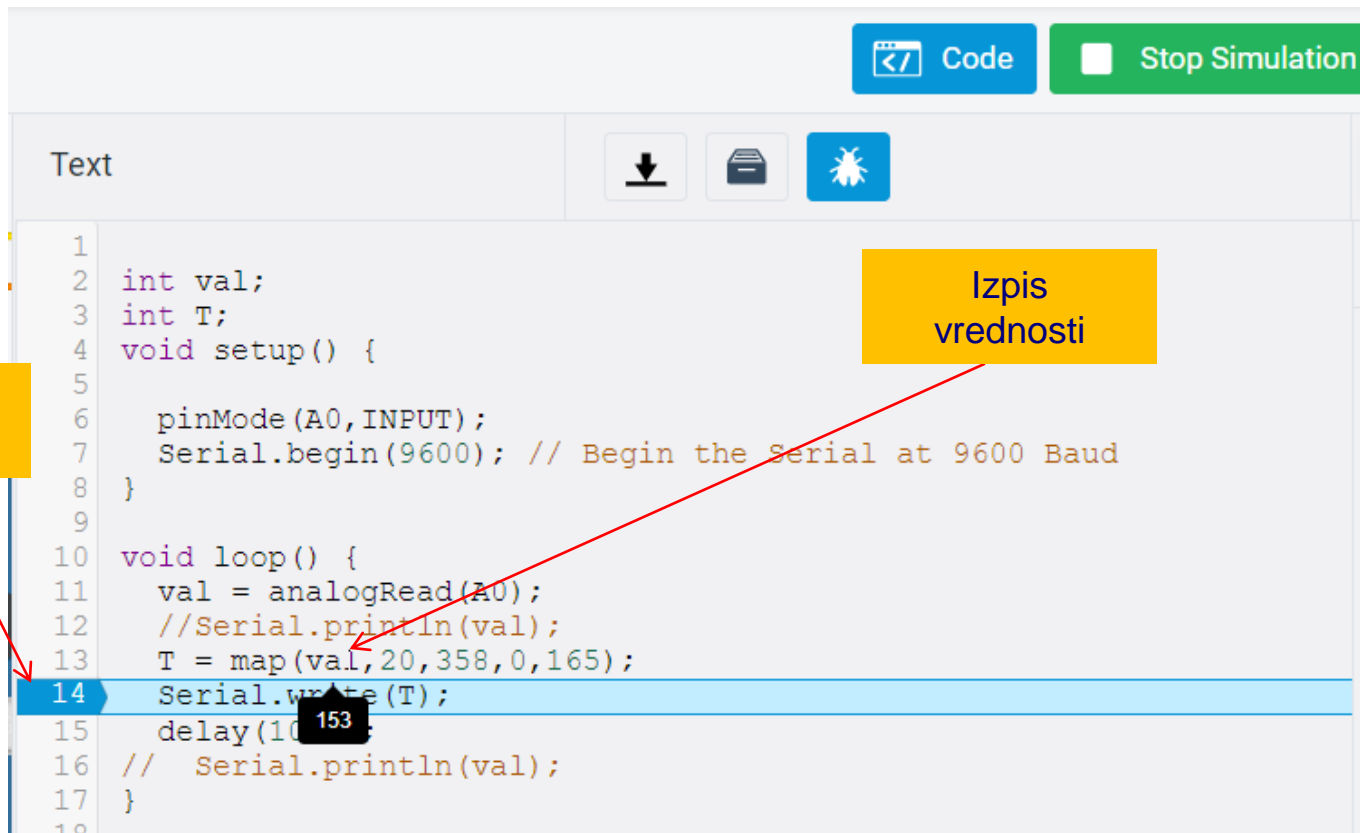
GLOSSARY

The Arduino Reference text is licensed under a [Creative Commons Attribution-Share Alike 3.0 License](#).

Find anything that can be improved? [Suggest corrections and new documentation via GitHub](#).

Doubts on how to use Github? Learn everything you need to know in [this tutorial](#).

TinkerCad – razhroščevanje (debugging)



The screenshot shows the TinkerCad code editor interface. At the top right, there are two buttons: 'Code' (blue) and 'Stop Simulation' (green). Below these are three icons: a download arrow, a folder icon, and a star icon. The main area is a text editor with a light gray background. The code is as follows:

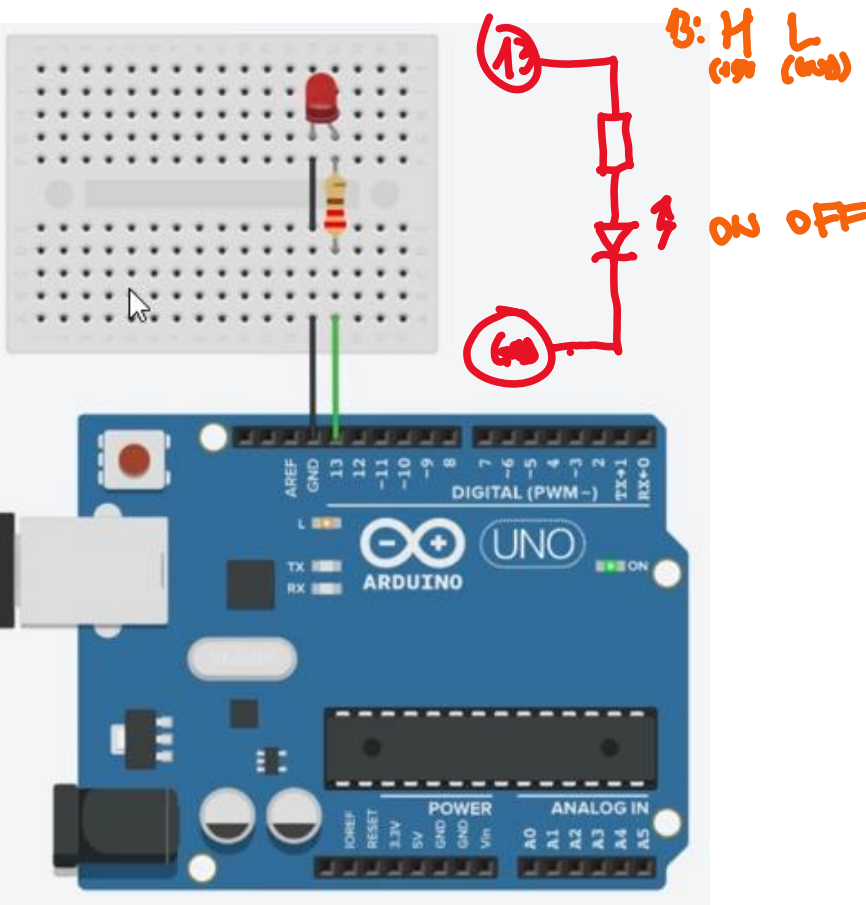
```
1
2 int val;
3 int T;
4 void setup() {
5
6     pinMode(A0, INPUT);
7     Serial.begin(9600); // Begin the Serial at 9600 Baud
8 }
9
10 void loop() {
11     val = analogRead(A0);
12     //Serial.println(val);
13     T = map(val, 20, 358, 0, 165);
14     Serial.write(T);
15     delay(1000);
16     // Serial.println(val);
17 }
18
```

Annotations in the image:

- A yellow box labeled "Prekinitev (Breakpoint)" has a red arrow pointing to line 14.
- A yellow box labeled "Izpis vrednosti" has a red arrow pointing to the value "153" in the console output area below the code.

<https://www.instructables.com/Arduino-Serial-Monitor-in-Tinkercad/>

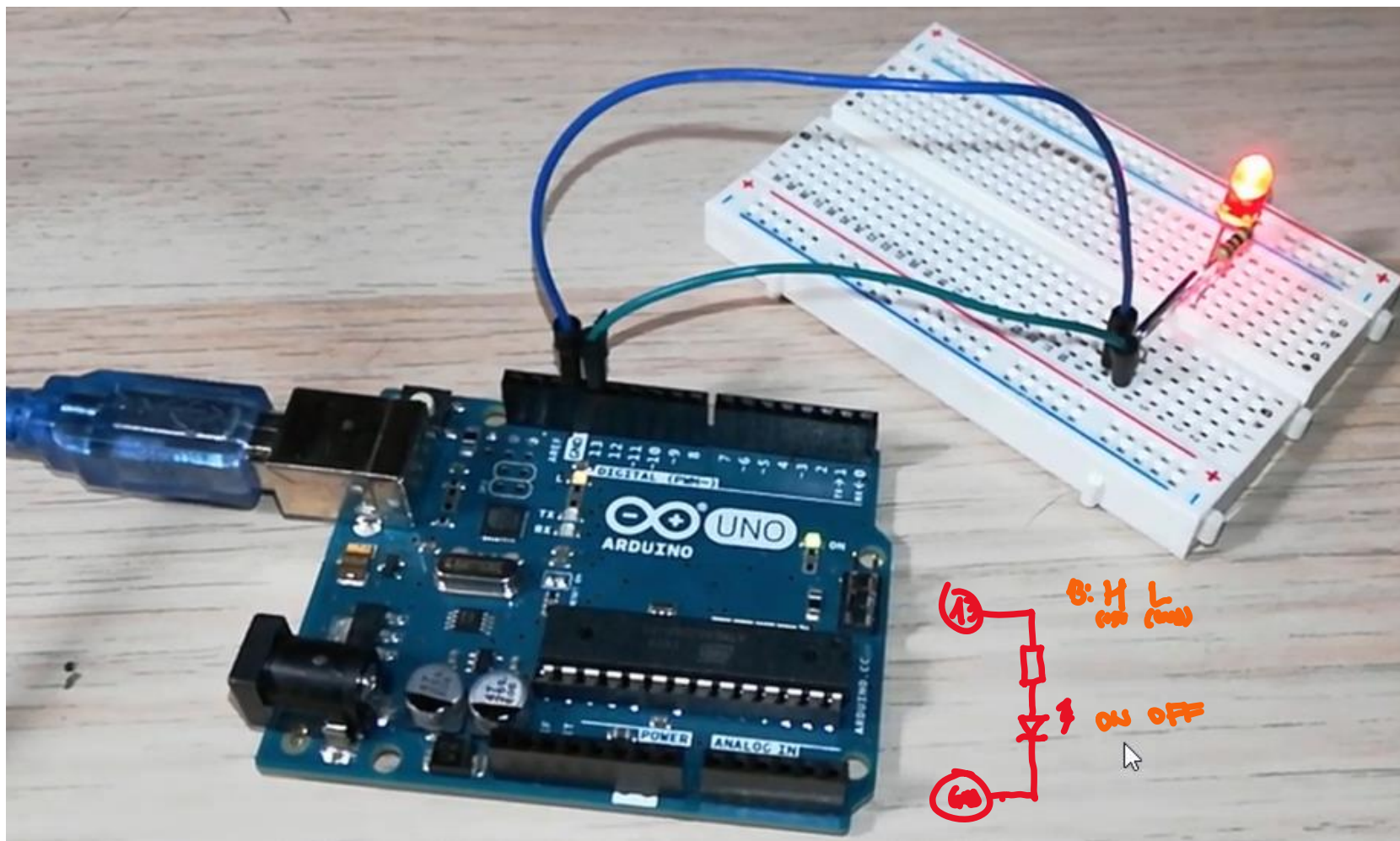
Preprosto vezje z LED diodo in program



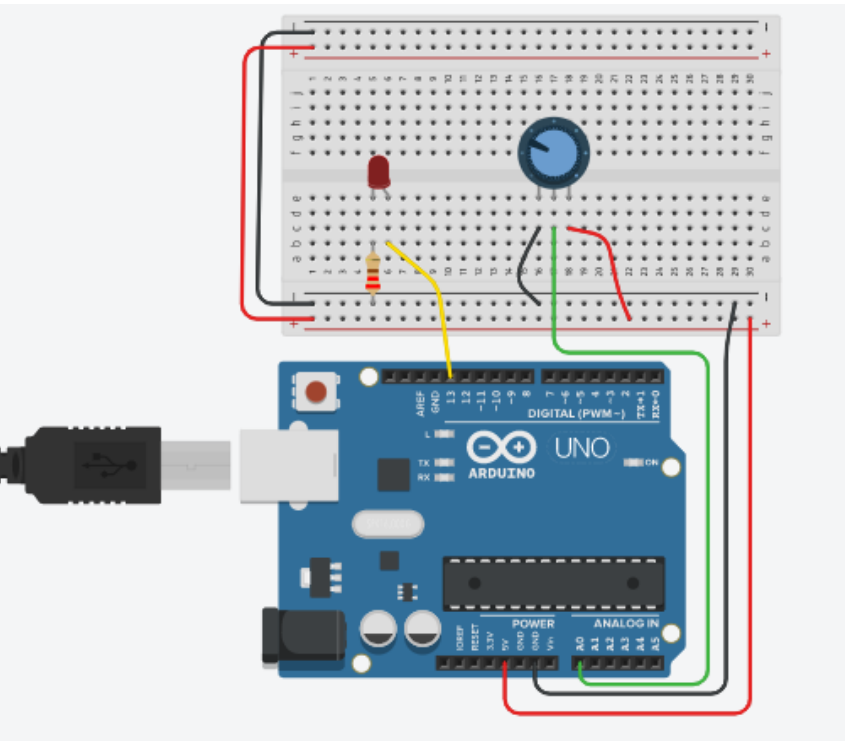
```
hello_world
1 /*
2  This program blinks pin 13 of the Arduino (the
3  built-in LED)
4  */
5
6 void setup()
7 {
8   pinMode(13, OUTPUT);
9 }
10
11 void loop()
12 {
13   // turn the LED on (HIGH is the voltage level)
14   digitalWrite(13, HIGH);
15   delay(1000); // Wait for 1000 millisecond(s)
16   // turn the LED off by making the voltage LOW
17   digitalWrite(13, LOW);
18   delay(1000); // Wait for 1000 millisecond(s)
19 }
```

<https://www.tinkercad.com/things/llkRDbp1u2C>

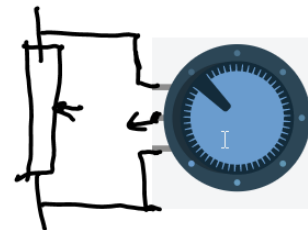
Preprosto vezje z LED diodo



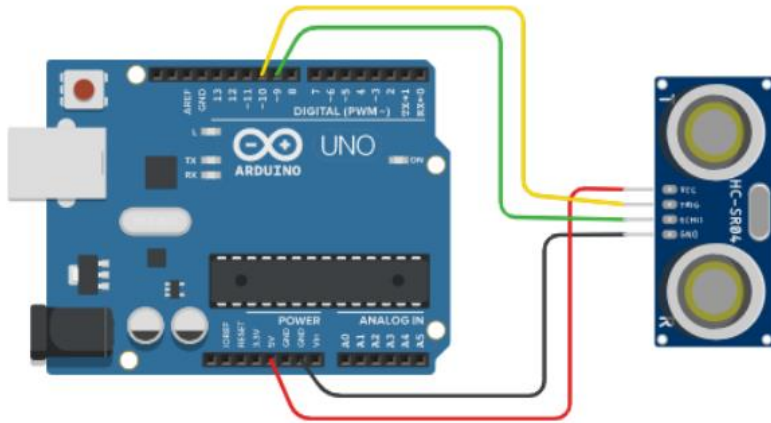
■ Vezje z uporovnim „tipalom“ (potenciometrom) - ADC



```
Text 1 (Arduino Uno R3)
1 int sensorValue = 0;
2
3 void setup()
4 {
5   pinMode(A0, INPUT);
6   pinMode(13, OUTPUT);
7 }
8
9 void loop()
10 {
11   // read the value from the sensor
12   sensorValue = analogRead(A0);
13   // turn the LED on
14   digitalWrite(13, HIGH);
15   // pause the program for <sensorValue> milliseconds
16   delay(sensorValue); // Wait for sensorValue millisecond(s)
17   // turn the LED off
18   digitalWrite(13, LOW);
19   // pause the program for <sensorValue> milliseconds
20   delay(sensorValue); // Wait for sensorValue millisecond(s)
21 }
```



■ Preprosto vezje z UZ tipalom – Časovnik (Timer)



```
Text [Download] [Save] [Run] 1 (Arduino Uno R3)
6 void setup() {
7   Serial.begin(9600); //Initialize Serial communication
8   pinMode(echo_Pin, INPUT); //Echo pin as Input
9   pinMode(trigger_Pin, OUTPUT); //Trigger pin as Output
10 }
11
12 void loop() {
13   digitalWrite(trigger_Pin, LOW); //Make Trigger pin Low at start
14   delay(1);
15   digitalWrite(trigger_Pin, HIGH);
16   delayMicroseconds(10); //Make Trigger pin High for 10 uS to st
17   digitalWrite(trigger_Pin, LOW);
18   duration = pulseIn(echo_Pin, HIGH); //Save the time it took ul
19   // distance = duration * 0.017; //((340*100)/10e6)/2
20   distance = duration / 58; //((340*100)/10e6)/2
21   /* Speed of the sound in Air = 340 m/S
22   * multiply it by 100 to get the data in cm
23   * divide by 1,000,000 as duration is measured in microseconds
24   * divide by 2 as ultrasound signal travels to object and comes b
25   */
26   Serial.print("Distance (cm) : ");
27   Serial.println(distance);
28 }
```

<https://www.tinkercad.com/things/kAlkT1BfjB0>

Vežje z ultrazvočnim senzorjem SR04



```
const byte trigger_Pin = 9; //Initialize I/O pins
const byte echo_Pin = 10;
unsigned long duration; //Since PulseIn return an unsigned Long
unsigned int distance; //To save the distance
```

void setup() {

```
  Serial.begin(9600); //Initialize Serial communication
  pinMode(echo_Pin, INPUT); //Echo pin as Input
  pinMode(trigger_Pin, OUTPUT); //Trigger pin as Output
```

```
}
```

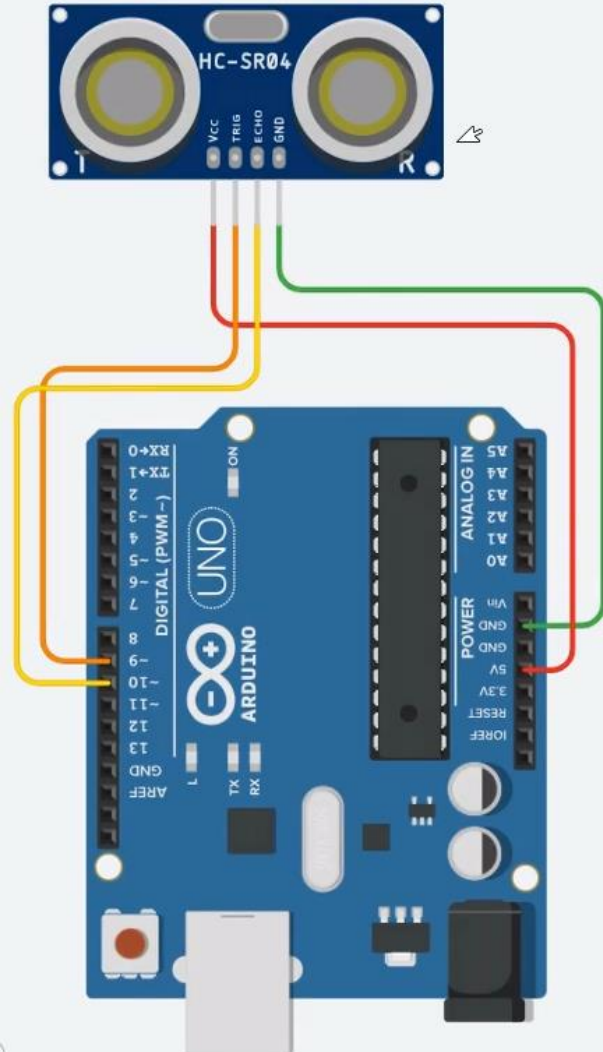
void loop() {

```
  digitalWrite(trigger_Pin, LOW); //Make Trigger pin Low at start
  delay(1);
  digitalWrite(trigger_Pin, HIGH);
  delayMicroseconds(10); //Make Trigger pin High for 10 uS to start sending the pulse
  digitalWrite(trigger_Pin, LOW);
```

```
  duration = pulseIn(echo_Pin, HIGH); //Save the time it took ultrasonic wave to come back
  distance = duration * 0.017; //(((340*100)/10e6)/2
  /* Speed of the sound in Air = 340 m/s, multiply it by 100 to get the data in cm
   * divide by 1,000,000 as duration is measured in microseconds
   * divide by 2 as ultrasound signal travels to object and comes back
   */
  Serial.print("Distance (cm) : ");
  Serial.println(distance);
  delay(100);
```

```
}
```

```
Distance (cm) : 106
Distance (cm) : 103
Distance (cm) : 94
Distance (cm) : 88
Distance (cm) : 84
Distance (cm) : 84
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Distance (cm) : 84
```



Vezje z ultrazvočnim senzorjem SR04 - program

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const byte trigger_Pin = 9; //Initialize I/O pins
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  duration = pulseIn(echo_Pin, HIGH); //Save the time it took ultrasonic wave to come back
  distance = duration * 0.017; //(((340*100)/10e6)/2
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```
/* Speed of the sound in Air = 340 m/s, multiply it by 100 to get the data in cm
```

```
* divide by 1,000,000 as duration is measured in microseconds
```

```
* divide by 2 as ultrasound signal travels to object and comes back
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```
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  Serial.print("Distance (cm) : ");
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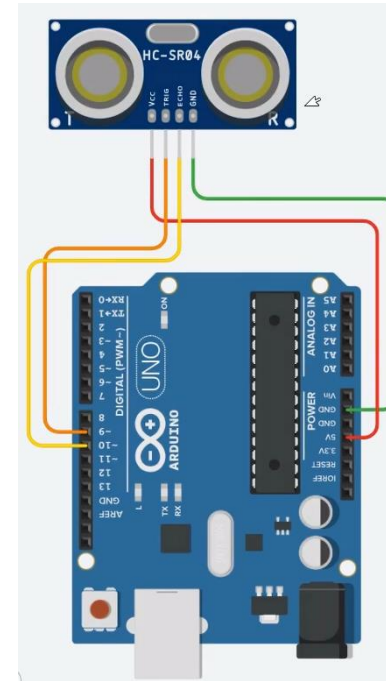
```
  Serial.println(distance);
```

```
  delay(100);
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<https://www.tinkercad.com/things/kAlkT1BfjB0>

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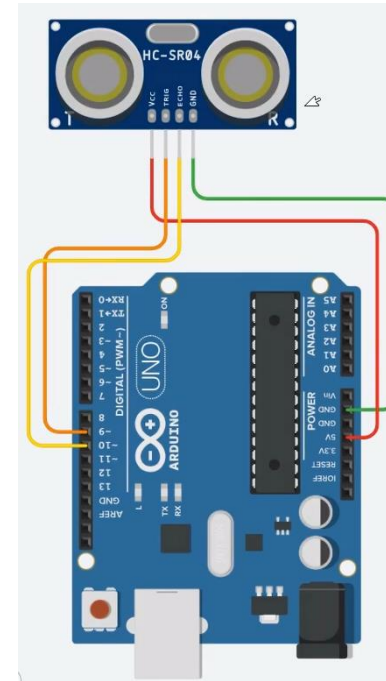
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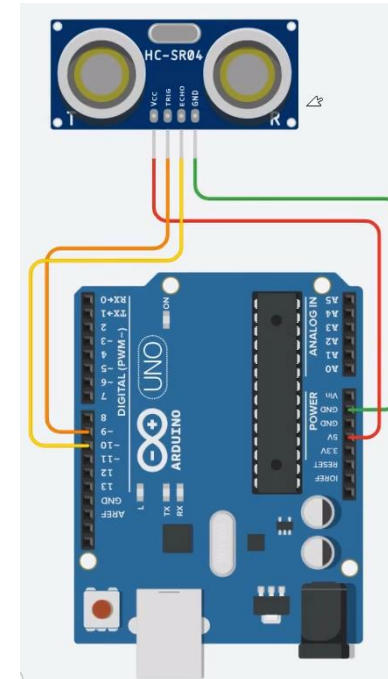
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Distance (

```



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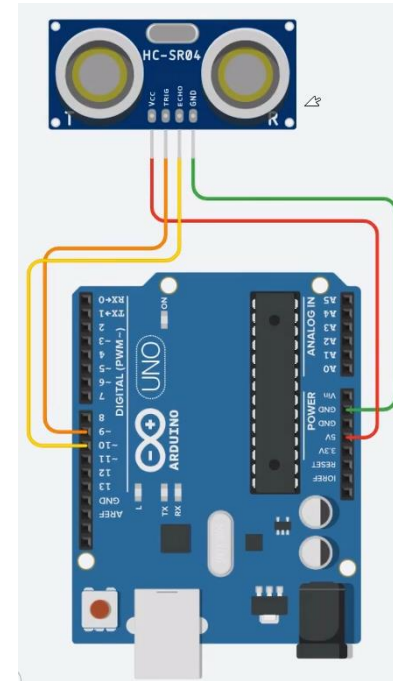
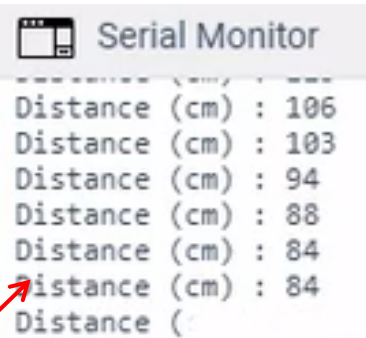
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<https://www.tinkercad.com/things/kAlkT1BfjB0>

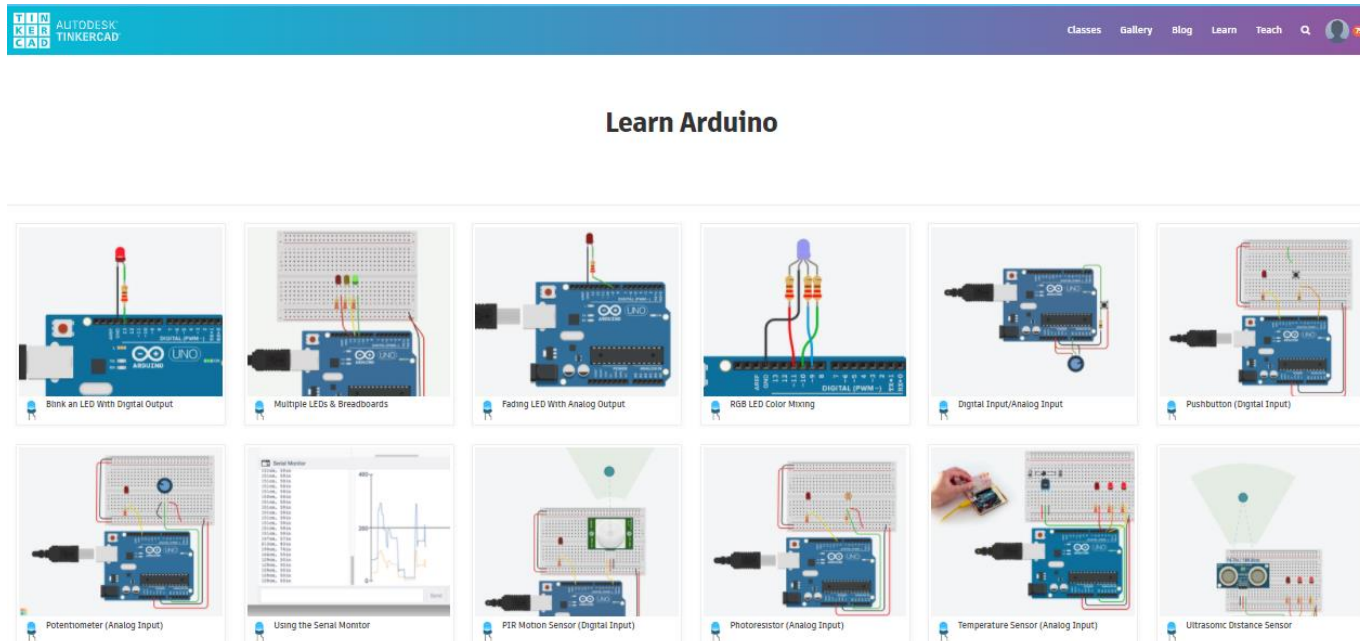
■ Viri – TinkerCad + Arduino :

□ GitHub :

- https://github.com/LAPSyLAB/Arduino_projects

□ TinkerCad – Learn – Arduino

- <https://www.tinkercad.com/learn/circuits/projects>



Dodatni viri (po potrebi) :

■ GET STARTED PROGRAMMING ARDUINO TODAY!

- Learn the 2 most important Arduino programming functions
- Get familiar with Arduino coding
- Understand your Arduino hardware
- Learn the Arduino software setup
- 12 engaging video lessons
- Z naslova <<https://www.programmingelectronics.com/arduino-crash-course/>>

■ Coursera: Interfacing with the Arduino

- University of California, Irvine
- Z naslova <<https://www.coursera.org/lecture/interface-with-arduino/module-1-introduction-video-VgZmt>>

Poglabljena gradiva

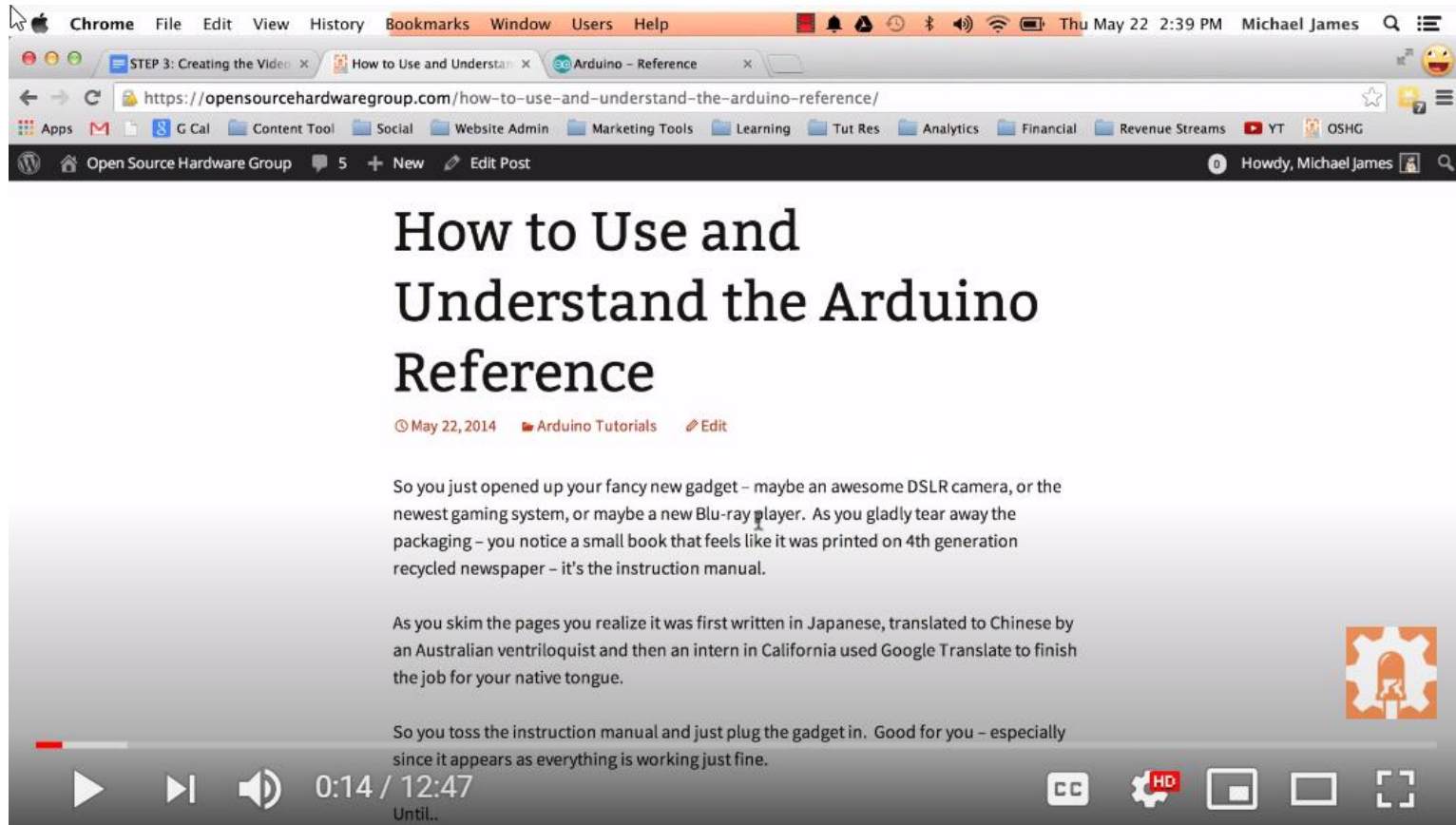
■ How to Use and Understand the Arduino Reference :: Open Source Hardware Group Arduino Tutorials

- Z naslova <https://www.youtube.com/watch?time_continue=739&v=f3h4pV_B2Dg&feature=emb_logo>

■ LED Blinking code with and without using Arduino library

- Z naslova <<http://electronicswithyou.com/arduino/led-blinking-code-with-and-without-using-arduino-library/>>

How to Use and Understand the Arduino Reference (neobvezno)



The screenshot shows a video player interface. At the top, there's a Chrome browser window with several tabs open: 'STEP 3: Creating the Video', 'How to Use and Understand the Arduino Reference', and 'Arduino - Reference'. The address bar shows the URL: <https://opensourcehardwaregroup.com/how-to-use-and-understand-the-arduino-reference/>. The page content is a blog post with the title 'How to Use and Understand the Arduino Reference' and a date of 'May 22, 2014'. The text of the post is as follows:

So you just opened up your fancy new gadget – maybe an awesome DSLR camera, or the newest gaming system, or maybe a new Blu-ray player. As you gladly tear away the packaging – you notice a small book that feels like it was printed on 4th generation recycled newspaper – it's the instruction manual.

As you skim the pages you realize it was first written in Japanese, translated to Chinese by an Australian ventriloquist and then an intern in California used Google Translate to finish the job for your native tongue.

So you toss the instruction manual and just plug the gadget in. Good for you – especially since it appears as everything is working just fine.

The video player controls at the bottom show a play button, a progress bar at 0:14 / 12:47, and various settings icons like CC, HD, and a gear icon.

VIN projekt - VP2: TinkerCad, Breadboard, Arduino

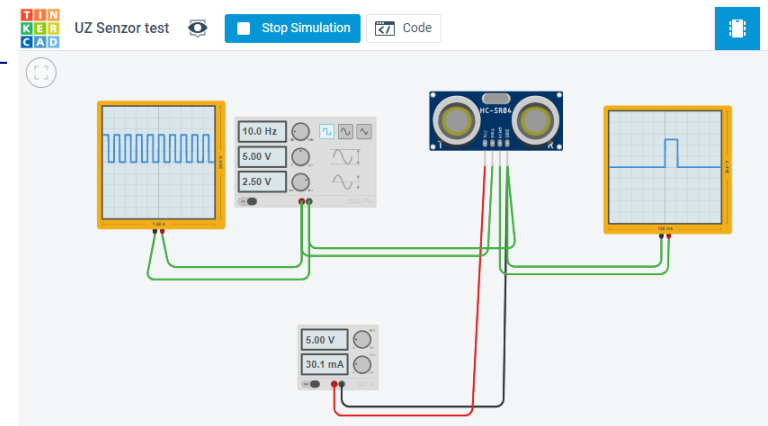
- TinkerCad - ponovitev
- Breadboard – osnovne vezave
- TinkerCad + Arduino

- Domača naloga (DN2-1, DN2-2)

VP1: TinkerCad in osnovne vezave

TinkerCad – DN2-1 :

- Spada v sklop poročila z LAB vaj
- Naredite sebi zanimivo osnovno vezje(a),
 - še brez uporabe mikrokrmilnika (Arduino)
- Objavite v OneNote delovnem zvezku
 - _Prostor za sodelovanje, razdelek DN2-1 TinkerCad_Osnova



OneNote za Windows 10

Osnovno Vstavljanje Risanje **Ogled** Pomoč Zvezek za predavanja

Novo okno Preklopite ozadje Potopni bralnik Barva strani Črtovje Izbrisani zapiski Prevedi Preveri

VIN-VSP 2022-23 zvezek

Dobrodošli Preberi.me

_Knjižnica vsebine

_Prostor za sodelovanje

DN2-1 TinkerCad

DN2-2 TinkerCad+Arduino

DN1 V-I naprave

VIN Projekt Viri

VIN Projekt Ideje

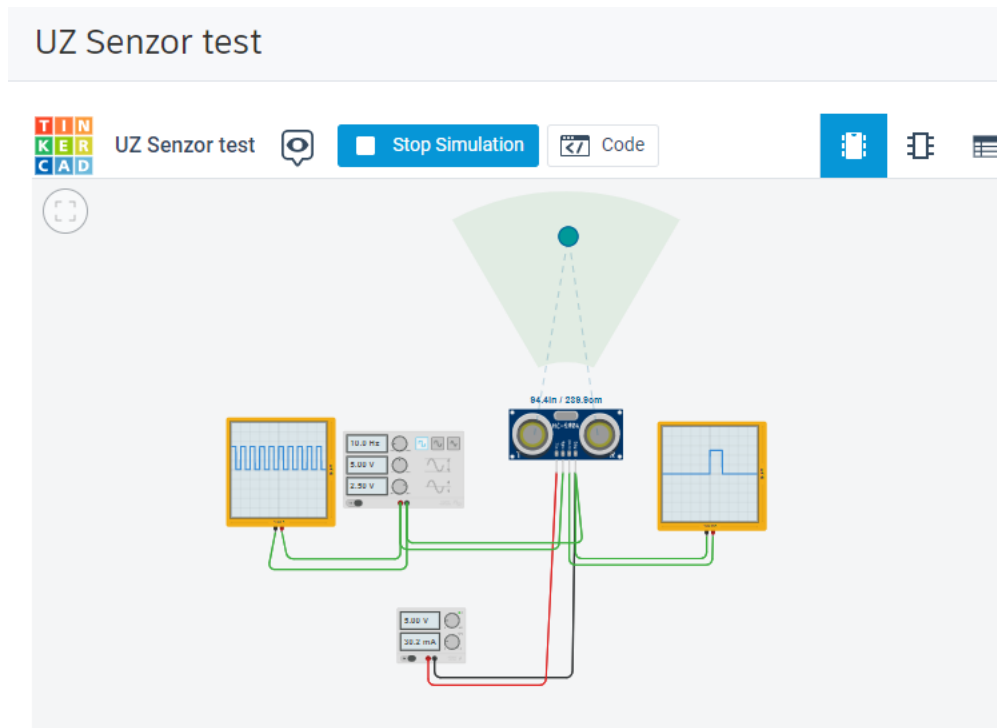
Preberi.me

sreda, 16. marec 2022 18:09

Tukaj objavite svoje rešitve naloge:

- Naredite svojo stran z naslovom rešitve
- Par stavkov opisa, slika in povezava na TinkerCad vezje
- Rešitev shranite v svojem zvezku za vključitev v poročilo z laboratorijskih vaj

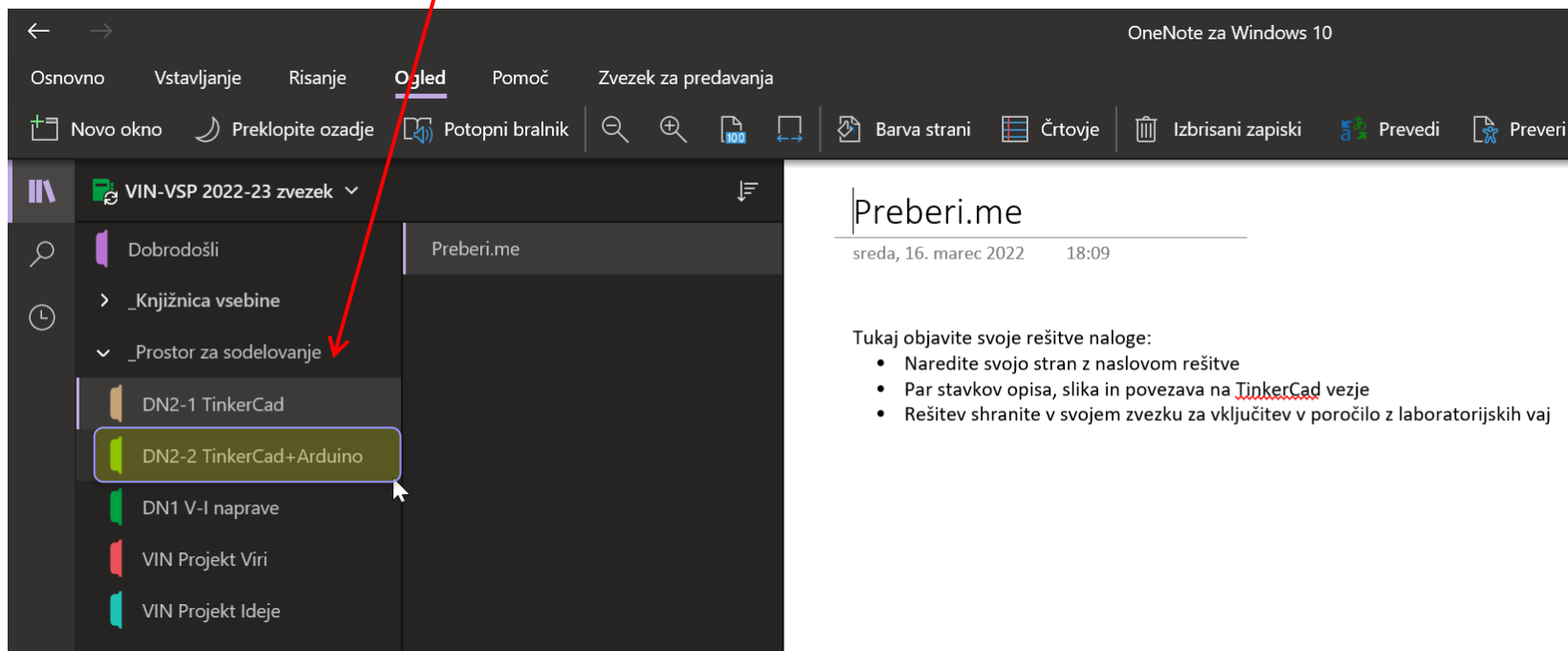
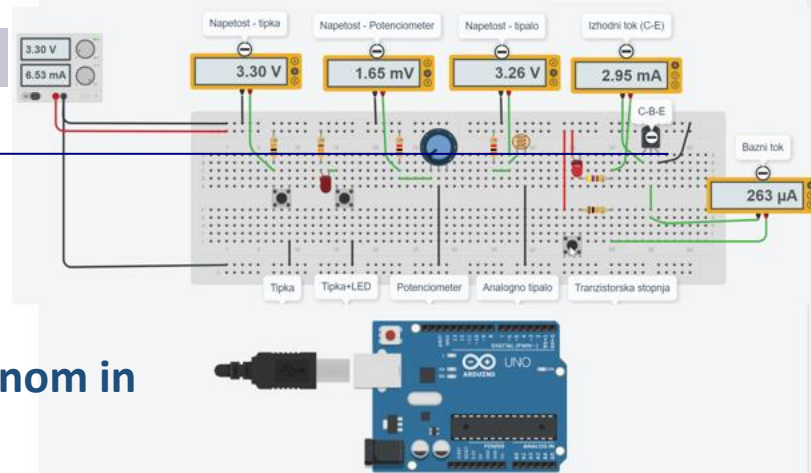
TinkerCad – DN2-1 : Primer



<https://www.tinkercad.com/things/k6it1PauvwW>

TinkerCad – DN2-2:

- Spada v sklop poročila z LAB vaj
- Naredite sebi zanimivo osnovno vezje(a) z Arduino in ustrezno kodo
- Objavite v OneNote delovnem zvezku
 - Prostor za sodelovanje, razdelek DN2-2 TinkerCad+Arduino



TinkerCad – Domača naloga 2-2:

The screenshot displays a TinkerCad simulation of an Arduino Uno board connected to a breadboard. The breadboard contains several components: a push button, a potentiometer, an analog sensor, and a transistor in a common-emitter (C-E) configuration. A digital pin (13) is connected to the base of the transistor. The simulation results are shown in several meters:

- Napetost - tipka: 3.30 V
- Napetost - Potenciometer: 1.65 mV
- Napetost - tipalo: 3.26 V
- Izhodni tok (C-E): 2.95 mA
- Bazni tok: 263 μ A

The code editor on the right shows the following C++ code:

```

1 void setup()
2 {
3   pinMode(13, OUTPUT);
4 }
5
6 void loop()
7 {
8   digitalWrite(13, HIGH);
9   delay(1000); // Wait for 1000 millisecond(s)
10  digitalWrite(13, LOW);
11  delay(1000); // Wait for 1000 millisecond(s)
12 }
    
```

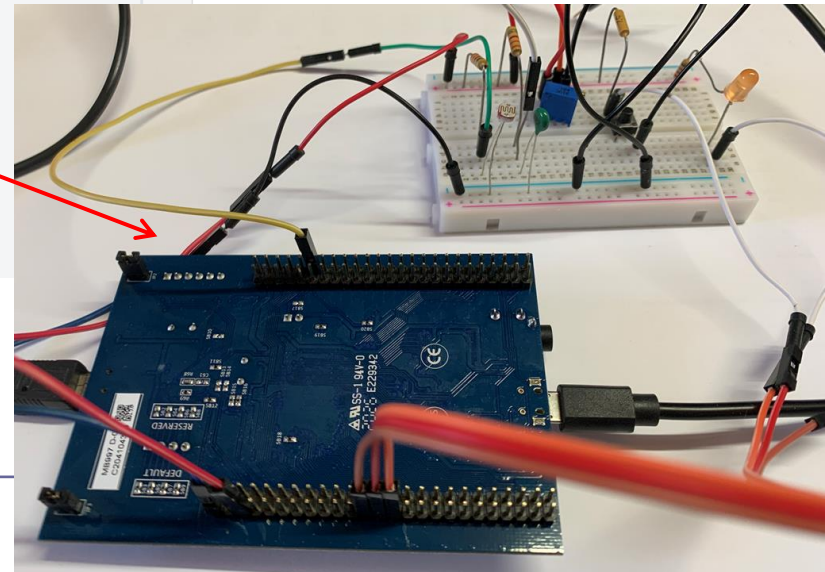
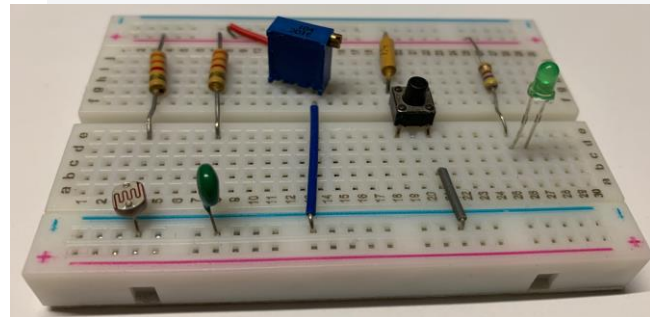
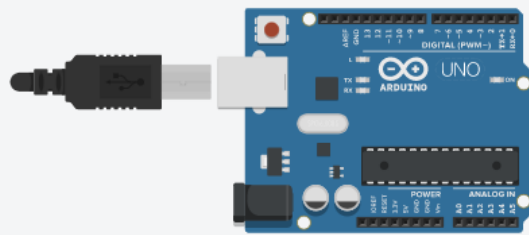
Napoved LAB vaje VP4: Breadboard + STM32

3.30 V
6.53 mA

Napetost - tipka: 3.30 V
Napetost - Potenciometer: 1.65 mV
Napetost - tipalo: 3.26 V
Izhodni tok (C-E): 2.95 mA
Bazni tok: 263 µA

Tipka, Tipka+LED, Potenciometer, Analogno tipalo, Tranzistorska stopnja

```
Code Start Simulation Exp  
Text 1 (Ardui  
1 void setup()  
2 {  
3   pinMode(13, OUTPUT);  
4 }  
5  
6 void loop()  
7 {  
8   digitalWrite(13, HIGH);  
9   delay(1000); // Wait for 1000 millisecond(s)  
10  digitalWrite(13, LOW);  
11  delay(1000); // Wait for 1000 millisecond(s)  
12 }
```

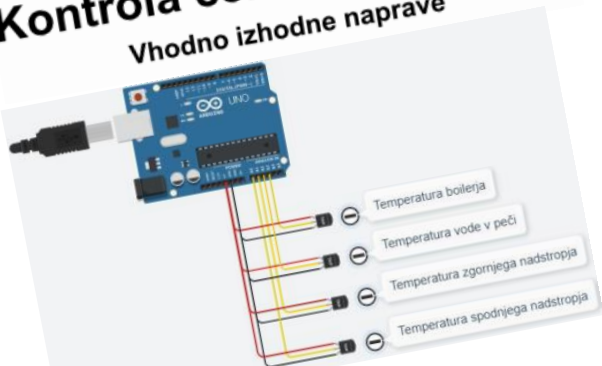


VIN Projekt Arduino – Primeri iz I. 19/20

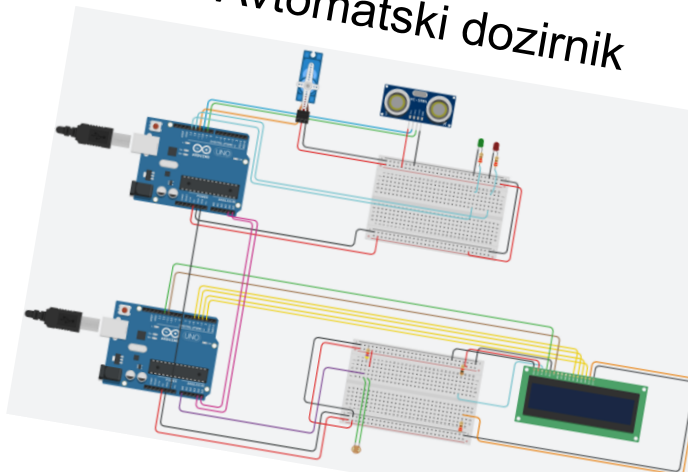
TinkerCad

Arduino projekt,
Kontrola centralne kurjave

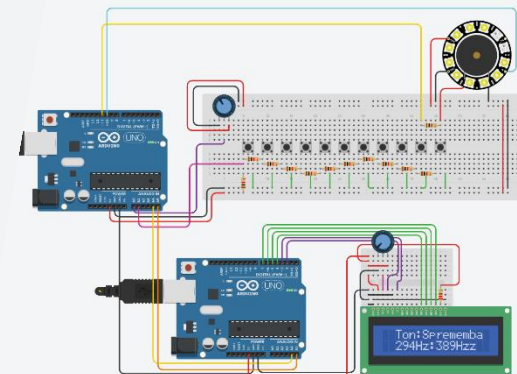
Vhodno izhodne naprave



Avtomatski dozirnik



Mini Piano



Sledenje



HW izvedba

SENZOR ZA ZAPORNICO

Varnostni sistem za preprečitev zaprtja parkirne zapornice v primeru, da je pod njo objekt.

