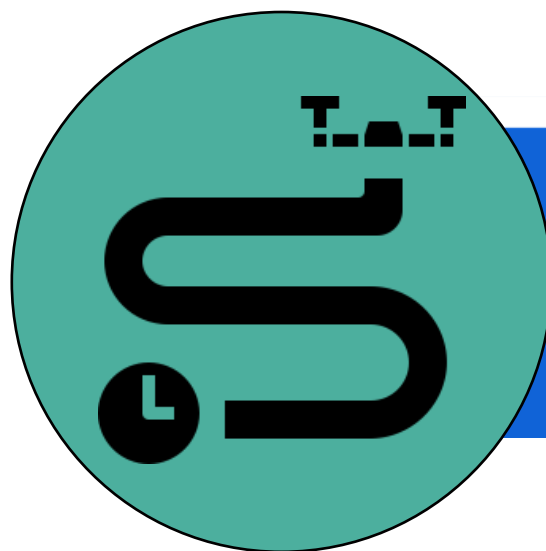


Poglavje 4:

Primeri programiranja

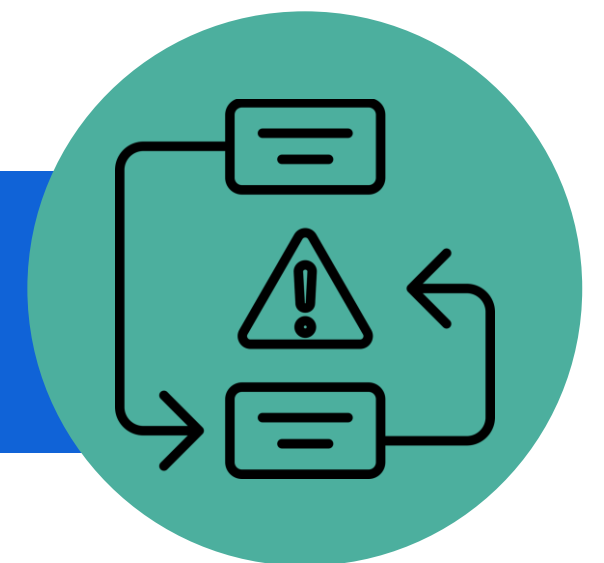
Cilji lekcije

Nauči se uporabljati programsko blokovno kodo za upravljanje drona.



Napiši program, da dron vzleti, poleti v kvadratni poti in pristane.

Pogovorite se o varnostnih protokolih in izrednih.



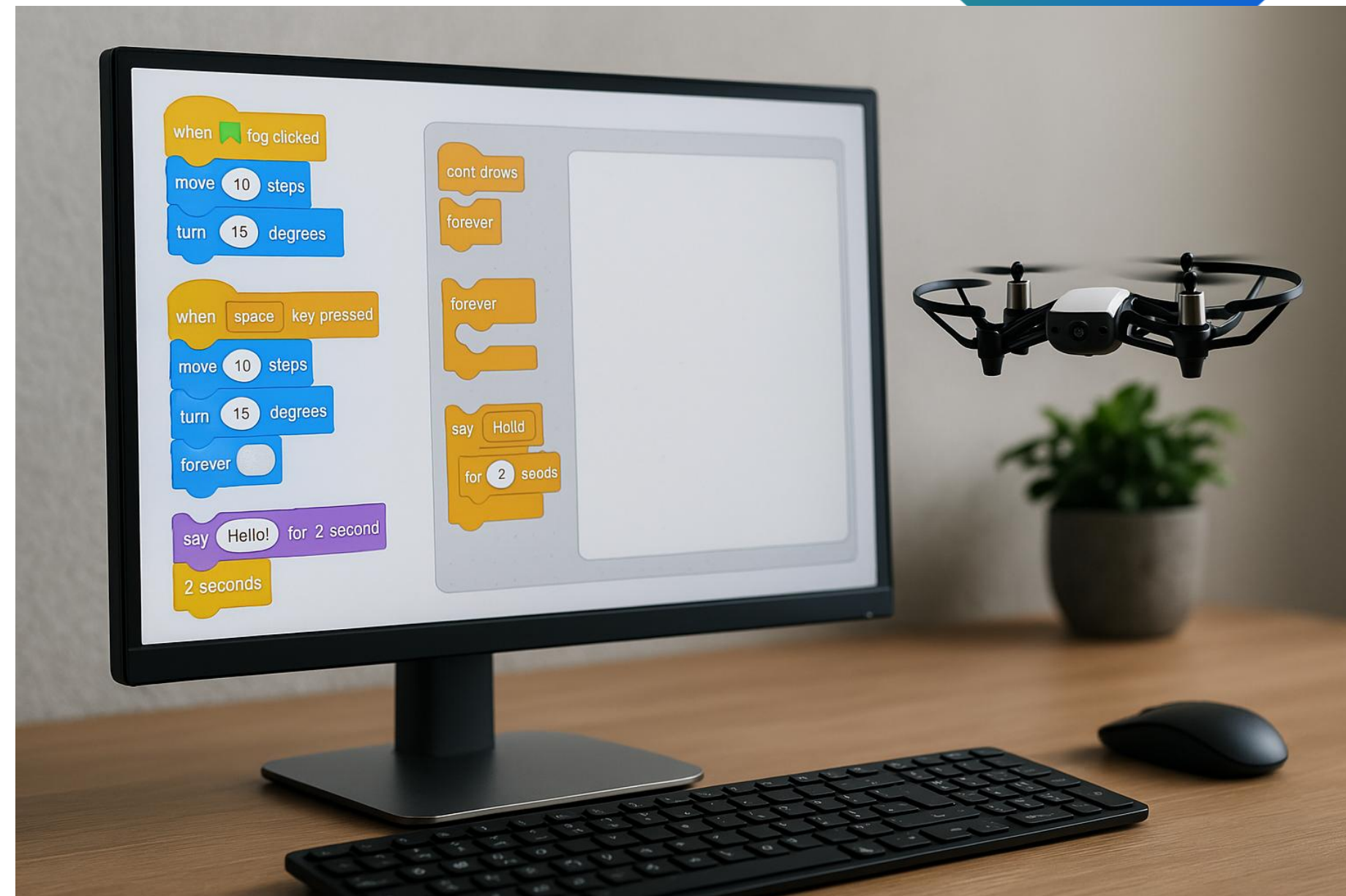
Potrebni materiali



- DJI Robomaster TT Drone,
- PC z WI-FI connection,
- MIND+ Scratch GUI program
- Merilni trak

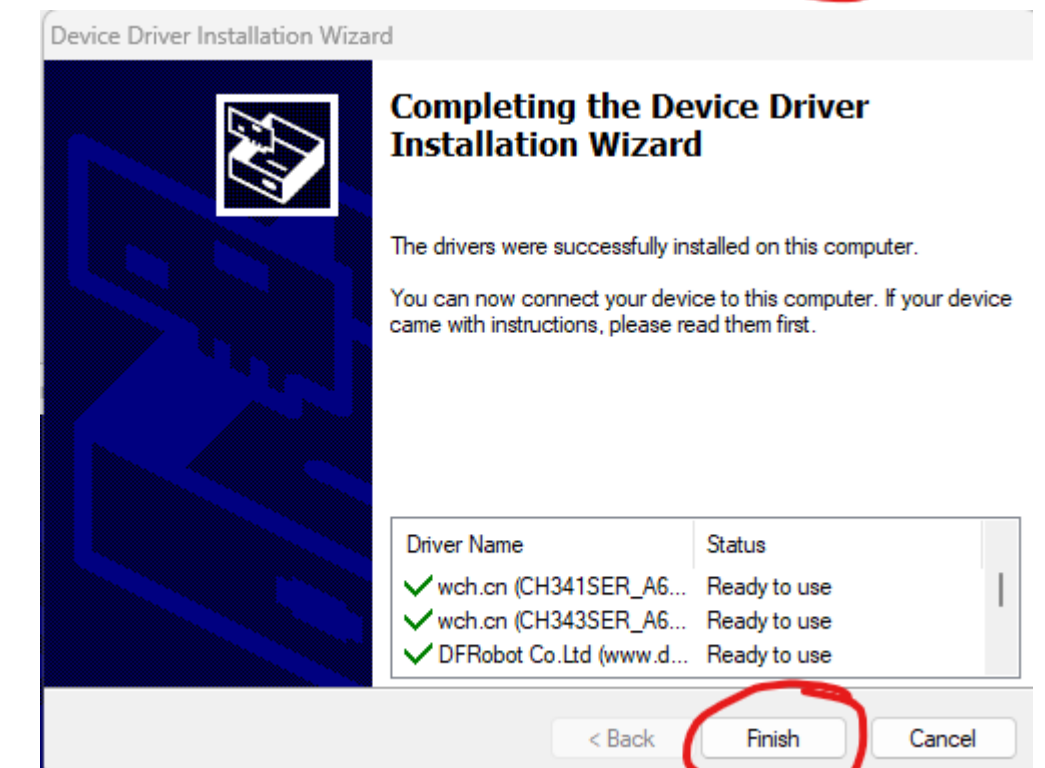
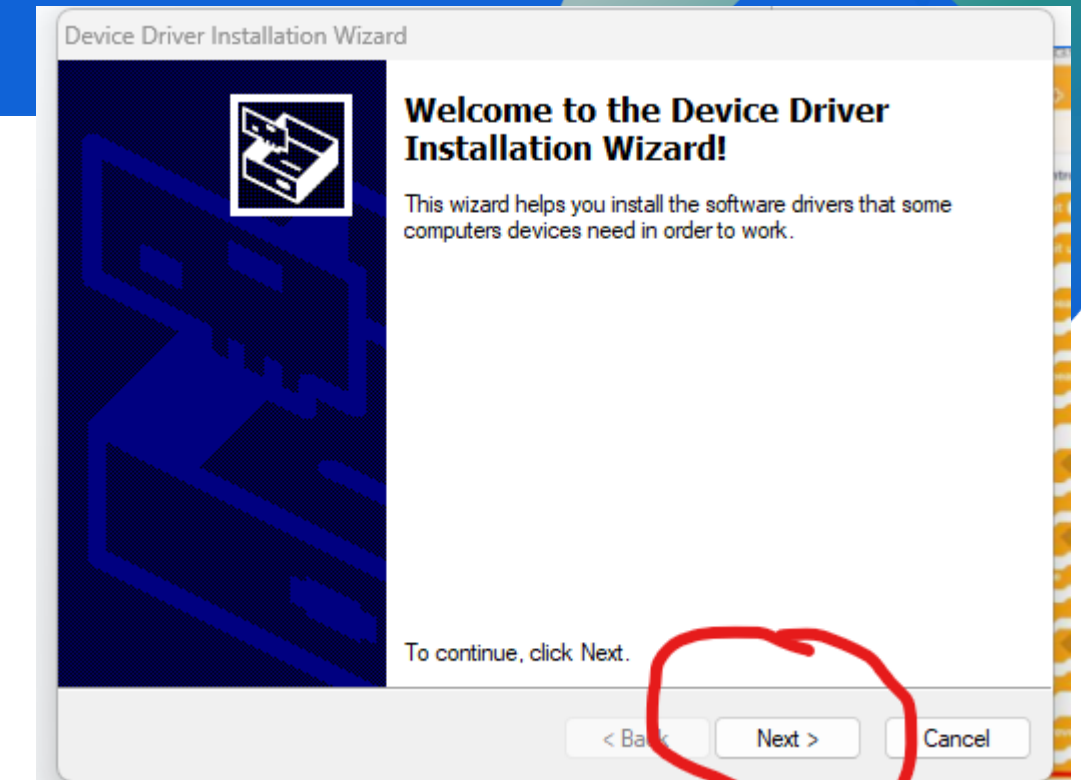
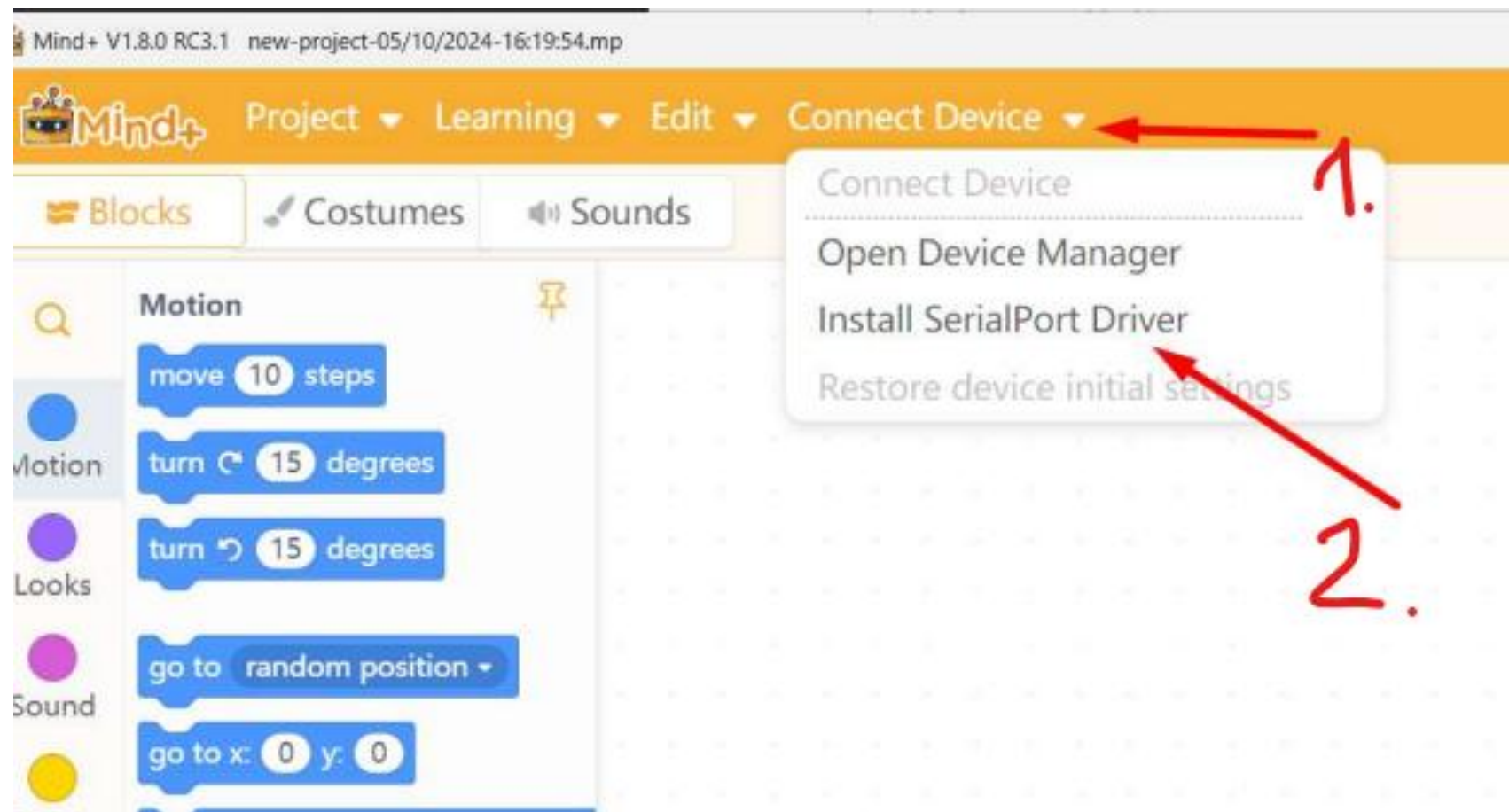
Vzpostavljanje povezave za izvedbo operacij

- Povezava med Mind+ in dronom TELLO
- Wi-Fi povezava med računalnikom in dronom TELLO

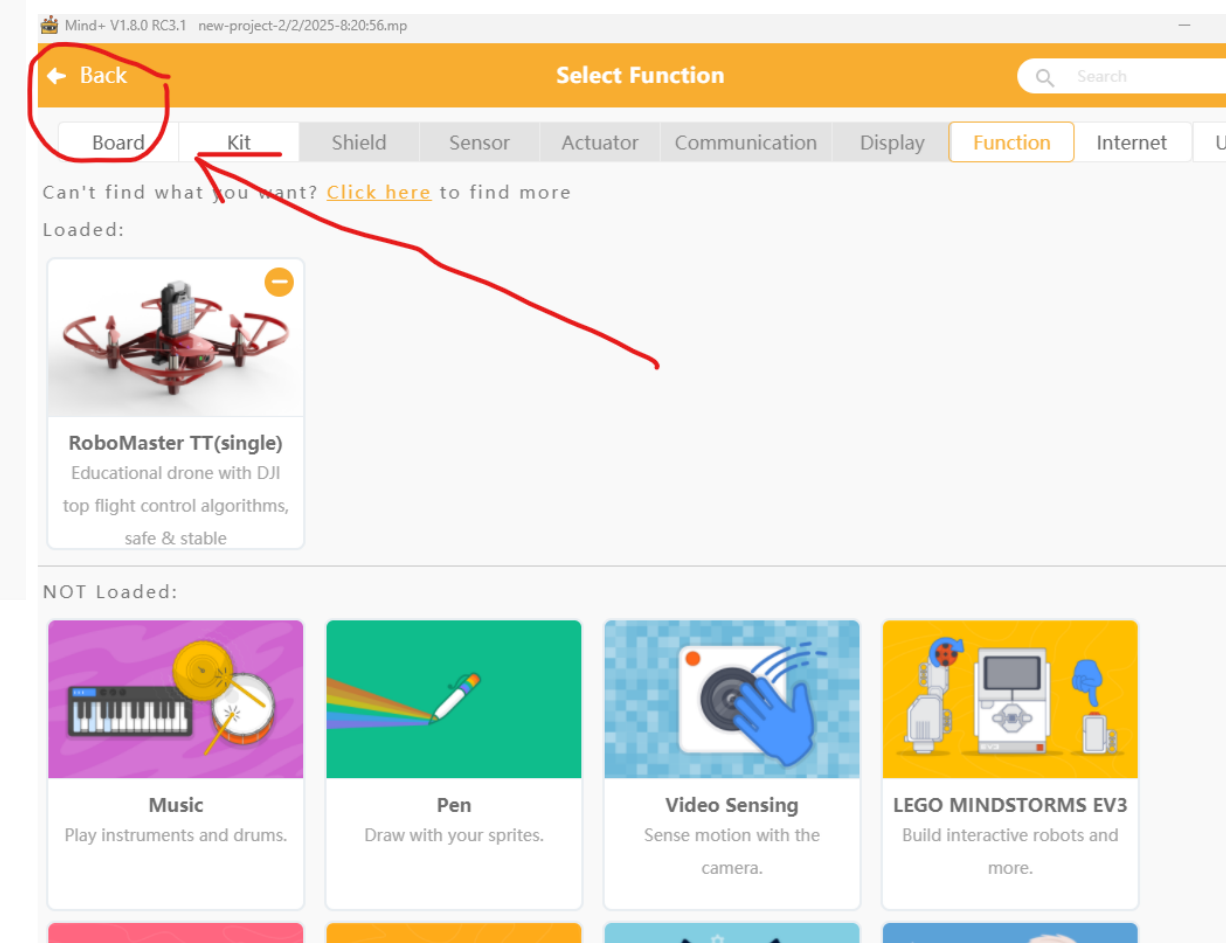
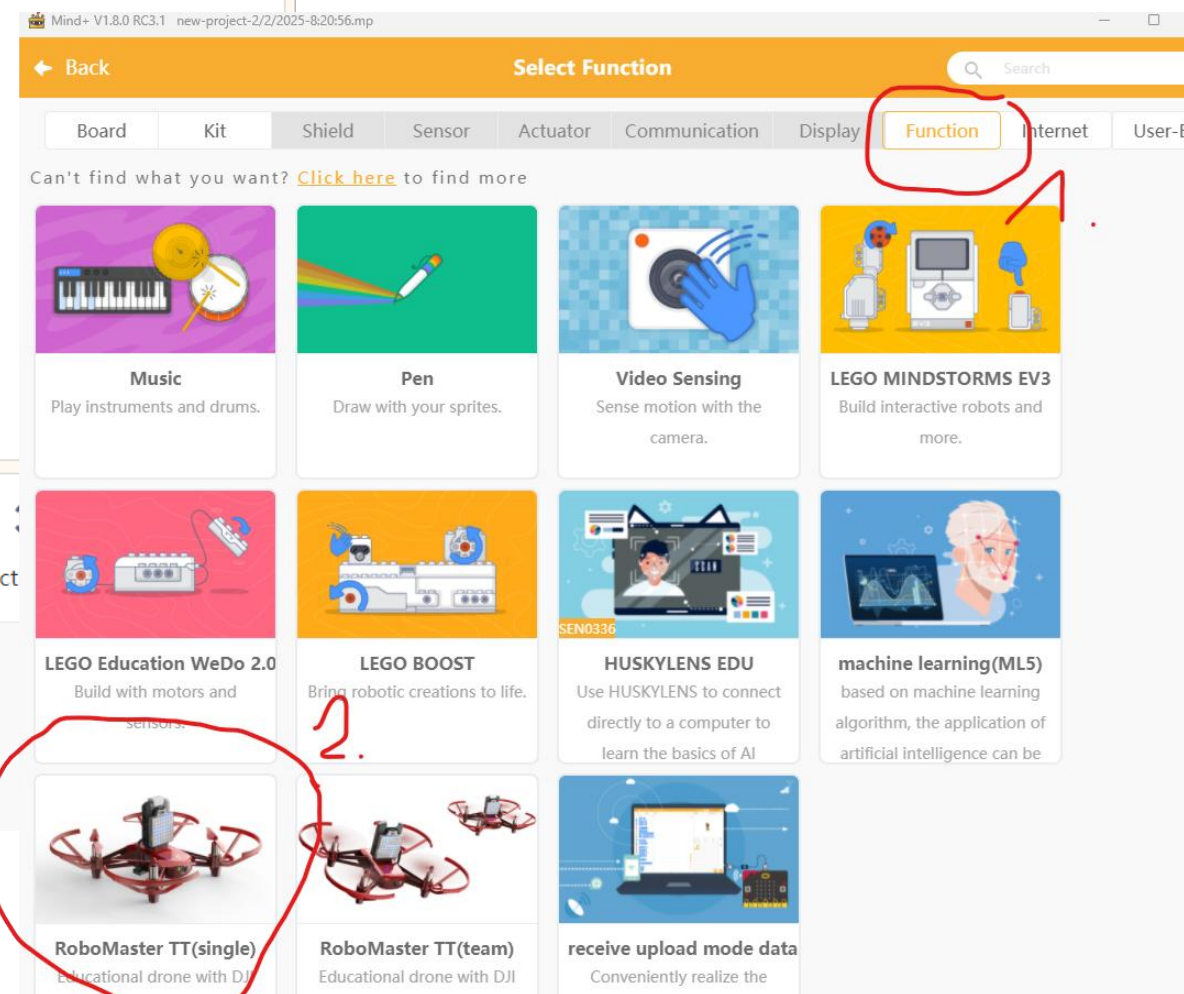
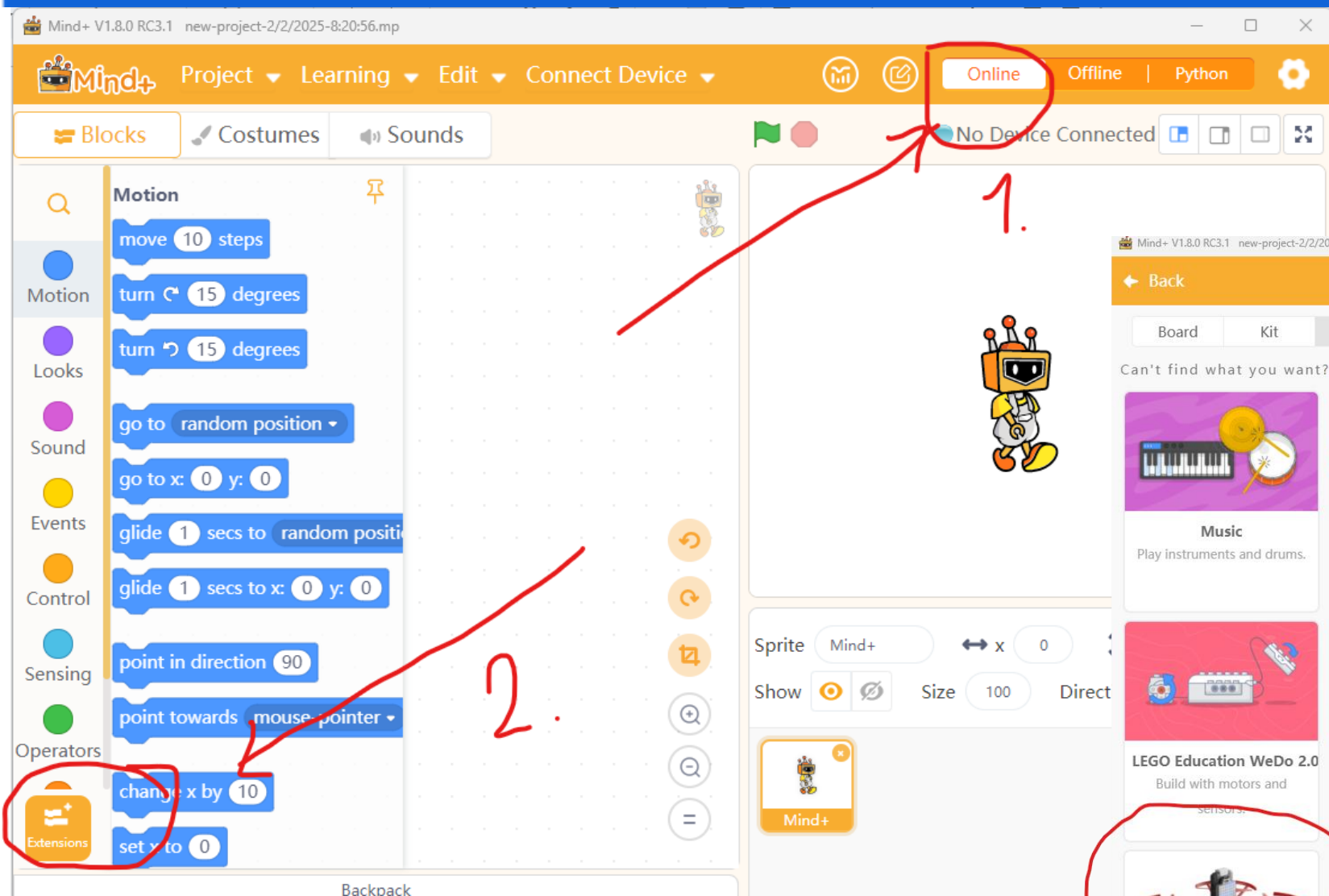


Vzpostavitev povezave za delo

V programu Mind+ moramo nastaviti določene funkcije, ki upravljajo povezavo med dronom Tello in programom Mind+.

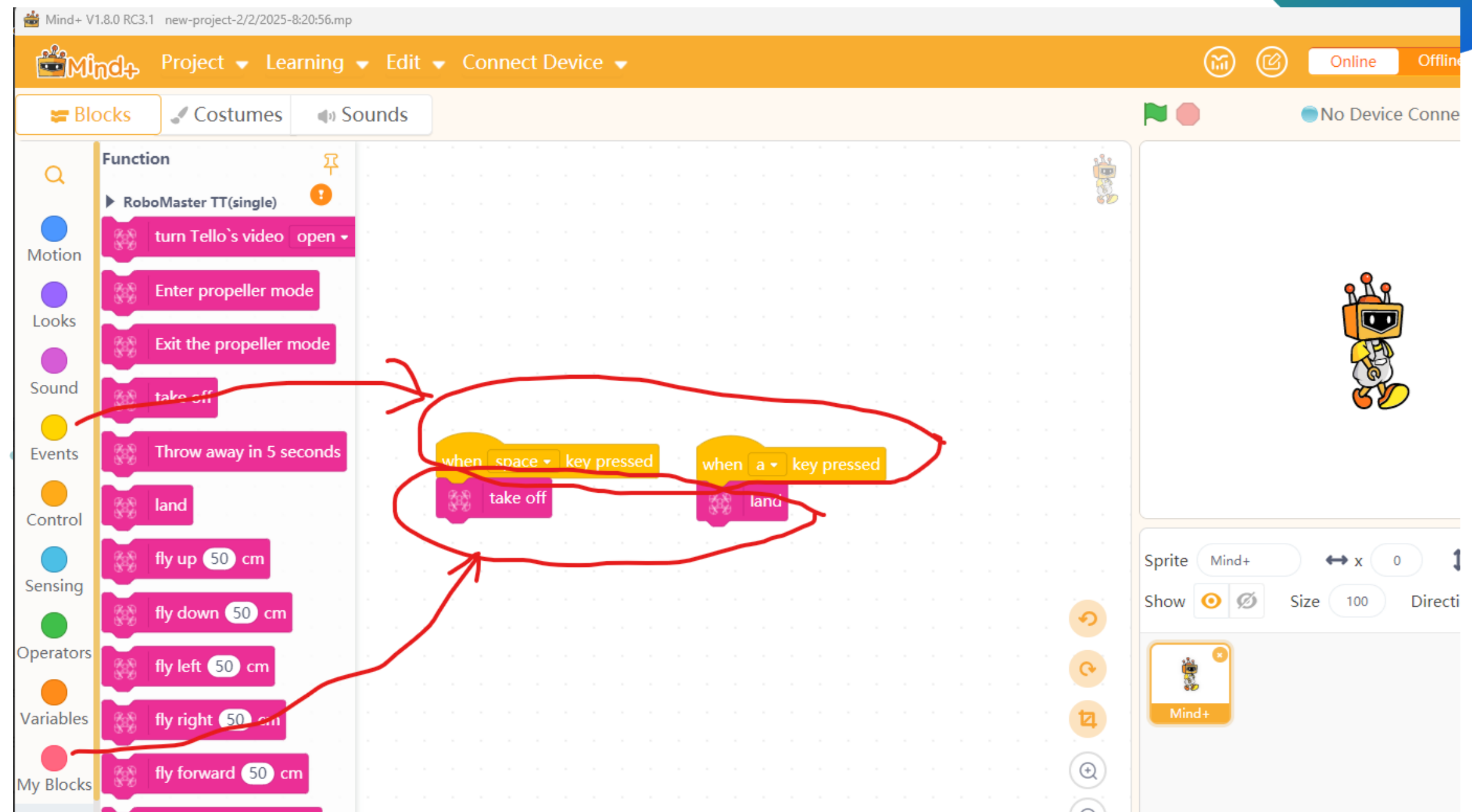


Vzpostavitev povezave za delo



Vzpostavitev povezave za delo

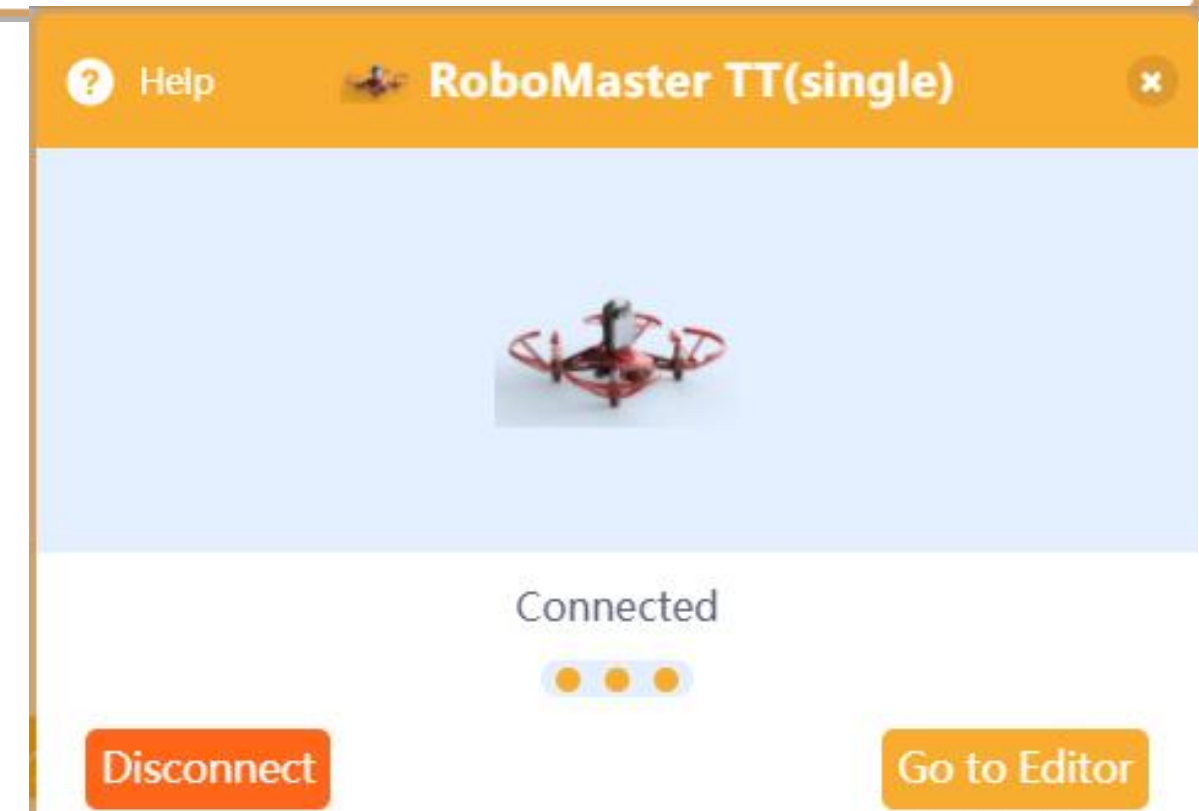
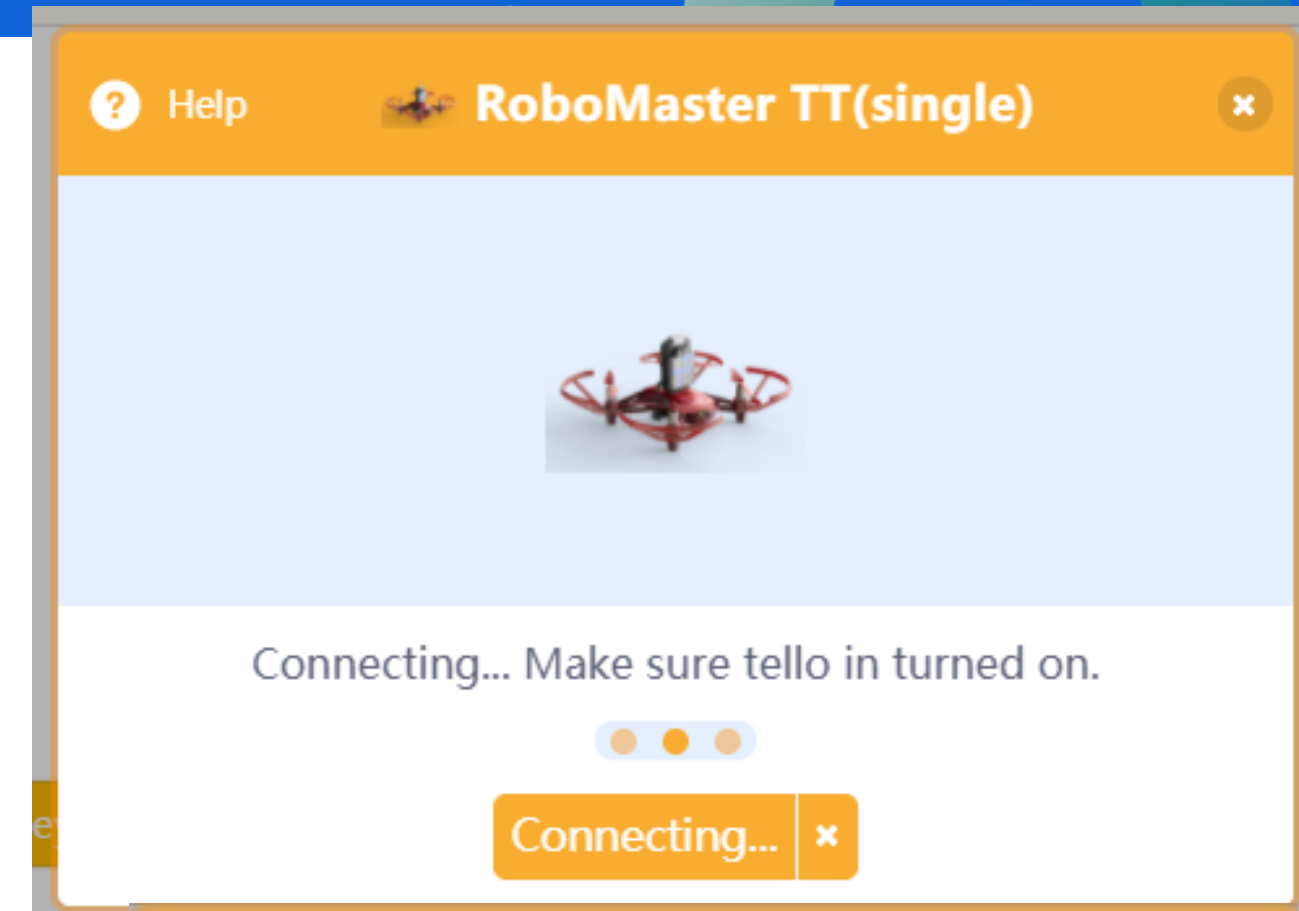
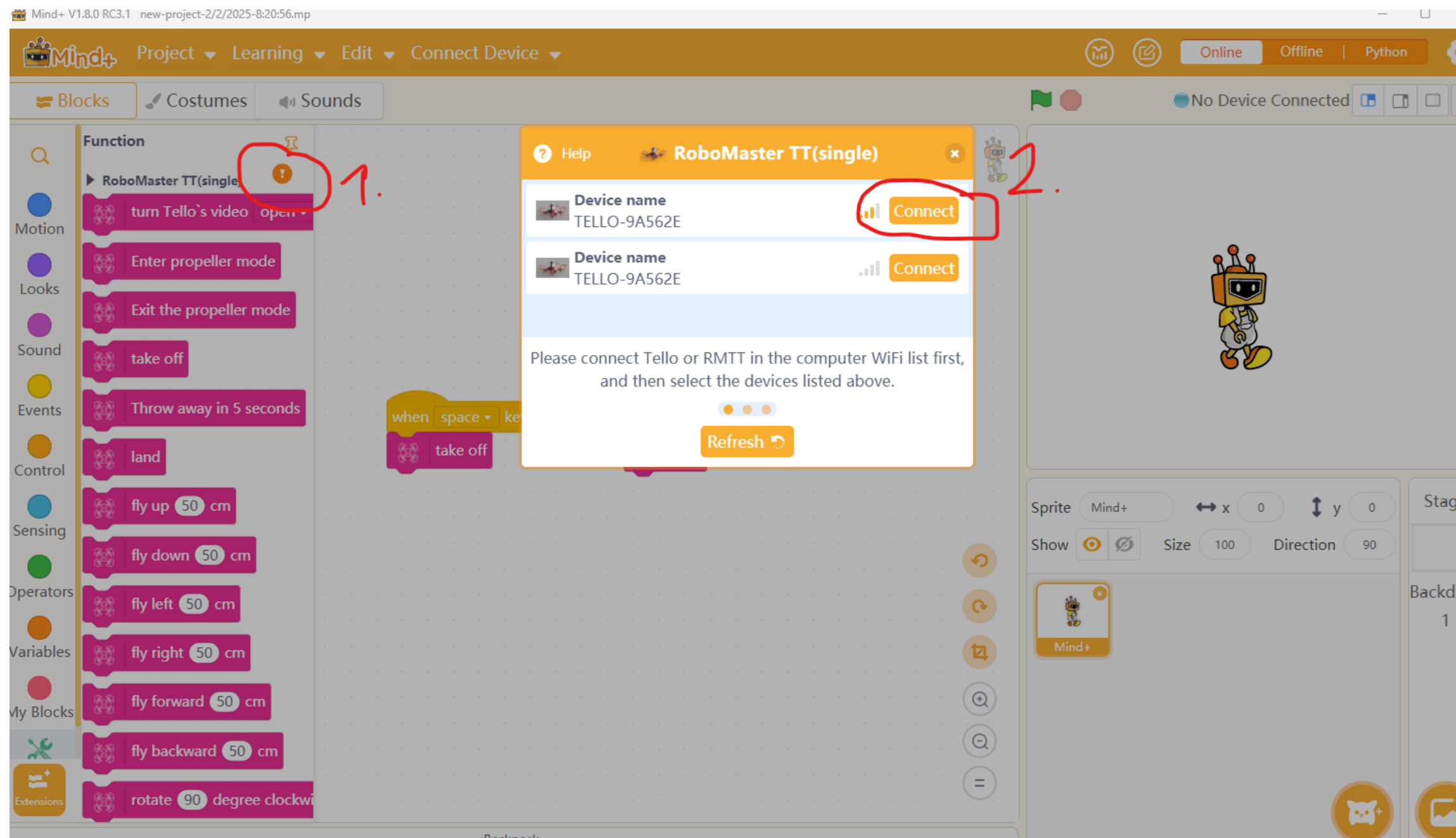
ENOSTAVEN PROGRAM



Vzpostavitev povezave za delo

- Naslednji korak je, da vklopite dron in omogočite Wi-Fi na računalniku. Med razpoložljivimi Wi-Fi napravami, ki jih zazna vaš računalnik, izberite napravo z imenom TELLO.
- Nato v programu Mind+ izberite levi zavihek "MyBlocks" in kliknite klicaj zraven "RoboMaster TT (single)". S tem boste vzpostavili povezavo med dronom Tello in programom Mind+.

Vzpostavitev povezave za delo



Vzpostavitev povezave za delo



RDEČA LUČ NE GORI - NI
POVEZAVE



RDEČA LUČ GORI -
POVEZAVA JE AKTIVNA

Pravila varnega letenja drona v zaprtih prostorih

1 Preden začnemo leteti:

- Pregled Drona
 - Pregled odvitih ali poškodovanih propelerjev
 - Preverimo stanje baterije.
- Pripravljanje okolja
 - Odmaknimo predmete kot so mize stoli in ostali predmeti.
 - Zagotovimo prostoren in odprt prostor.
 - Zaprimo okna ali vire zraka.
- Obvestite prisotne
 - Seznanite vse z varnostnimi protokoli.
 - Ohranjajte varno razdaljo vsaj 2 metra od drona.

Pravila varnega letenja drona v zaprtih prostorih

2 Med samim letom:

- Nadzorovan vzlet in spust
 - Vzlet in pristanek iz ravne površine.
 - Izogibaj se letom nad ljudmi in mimo predmetov.
- Meje letenja
 - Dron ohranjate znotraj vidnega polja
 - Letimo na nižji višini izogibajmo se trkom v strop .
 - Pristanimo ko pade baterija pod 20%.
- Varnostni protokol
 - Izklopite dron, takoj če izgubite nadzor. (SPACE tipka sproži pristanek)
 - Uporabite gumb za izklop v sili. ("e tipka" ustavi motorje)

Pravila varnega letenja drona v zaprtih prostorih

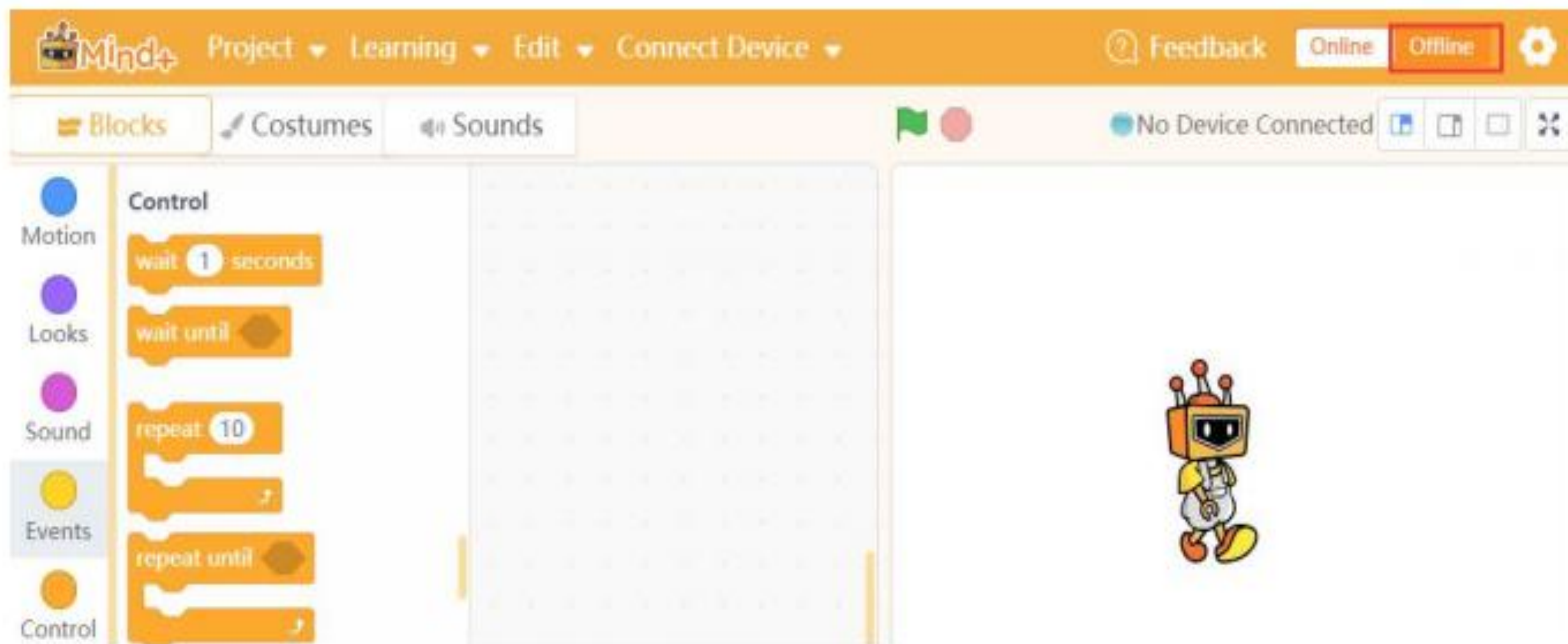
3 Po zaključenem letu:

- Izklopimo varnostno napravo
 - Izklopimo dron in odklopimo baterijo.
- Pregled škode na dronu
 - Pregled za možne napake na dronu.
- Varno shranjevanje
 - Shranimo dron na varnem mestu

VEDNO BODIMO MIRNI IN ZBRANI!

Prikaz programiranja z uporabo blokov

Uvod v programski vmesnik (MIND+)



Prikaz programiranja z uporabo blokov

Inštalacijski postopek

- Naložite iz from <https://mindplus.cc/>
- Izberite EXTENSIONS->FUNCTIONS->ROBOMASTER (SINGLE)
- My Blocks
 - TELLO TT Specific functions (Camera,QR,ETC)

Turn on Challenge Card Detection

Set the detection position Down View

fly to MissionPad x 50 cm y 50 cm z 80 cm with 50 cm/s Mid m-1

Flying arc line under challenge card x1 20 cm y1 20 cm z1 80 cm and x2 40 cm y2 60

Jump along challenge card x 100 cm y 0 cm z 80 cm speed 50 cm/s yaw 0 degree fr

The aircraft rotates to the 0 angle relative to the challenge card m-1

☐ Challenge Card Number

☐ Challenge Cardx(cm)

Control

Sensing

Operators

Variables

My Blocks

Function

RoboMaster TT(single)

turn Tello's video open

Enter propeller mode

Exit the propeller mode

take off

Throw away in 5 seconds

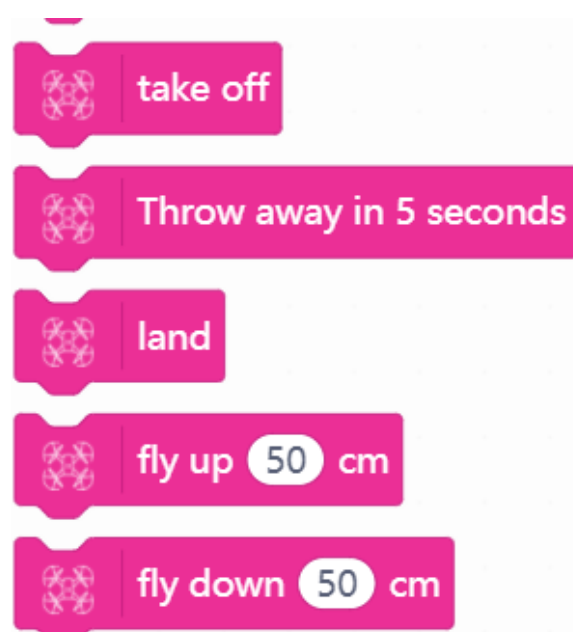
land

Funkcije kode, prikaz v živo in pregled primerne kode



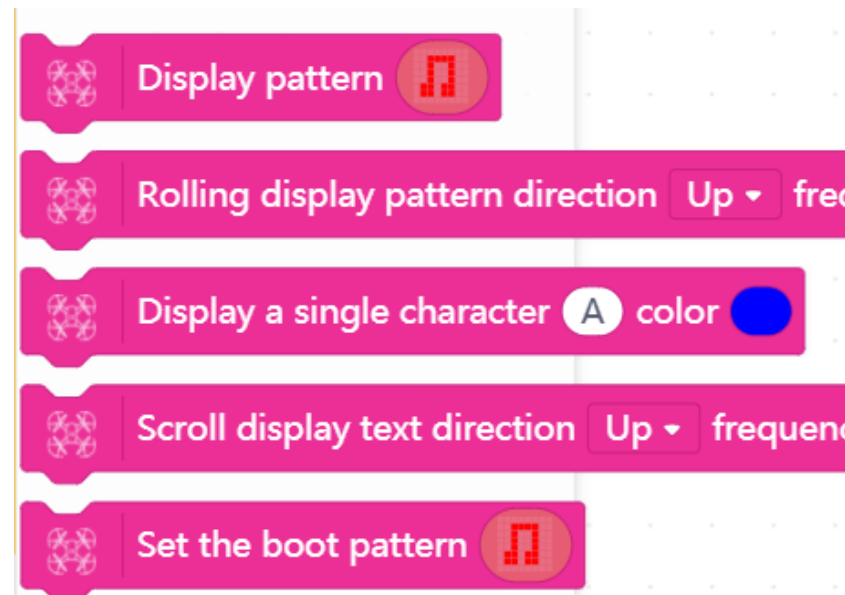
Funkcije letenja

- Vzlet / pristanek
- Premik
- Zasuk
- Obrat



Dogodki

- Prepoznavanje kartic
- Merjenje razdalije do objekta
- Barva LED diode
- Sporočila na LED matričnem zaslonu



Varnostne funkcije

- Varnostna ustavitev
- Izogibanje objektom

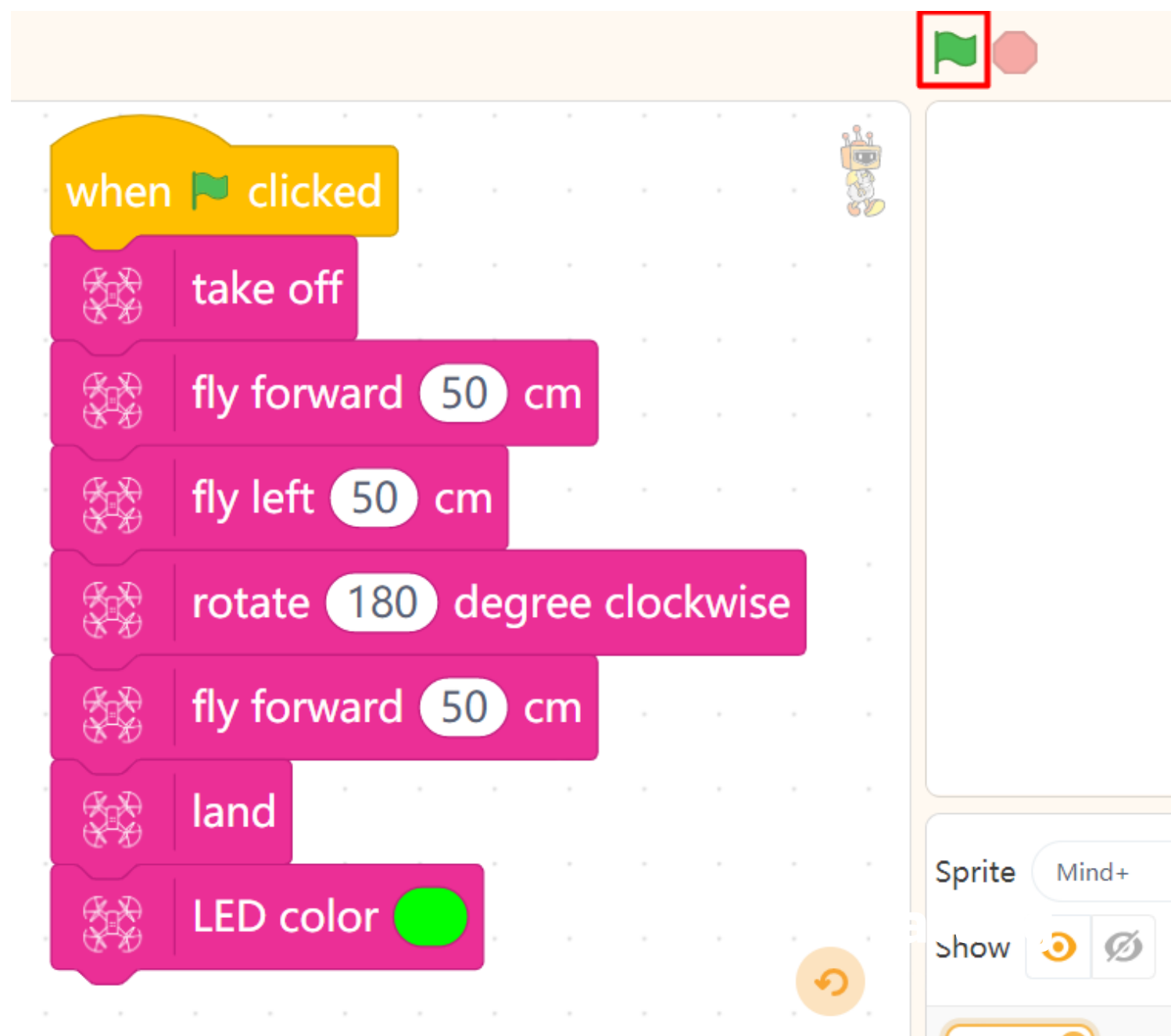
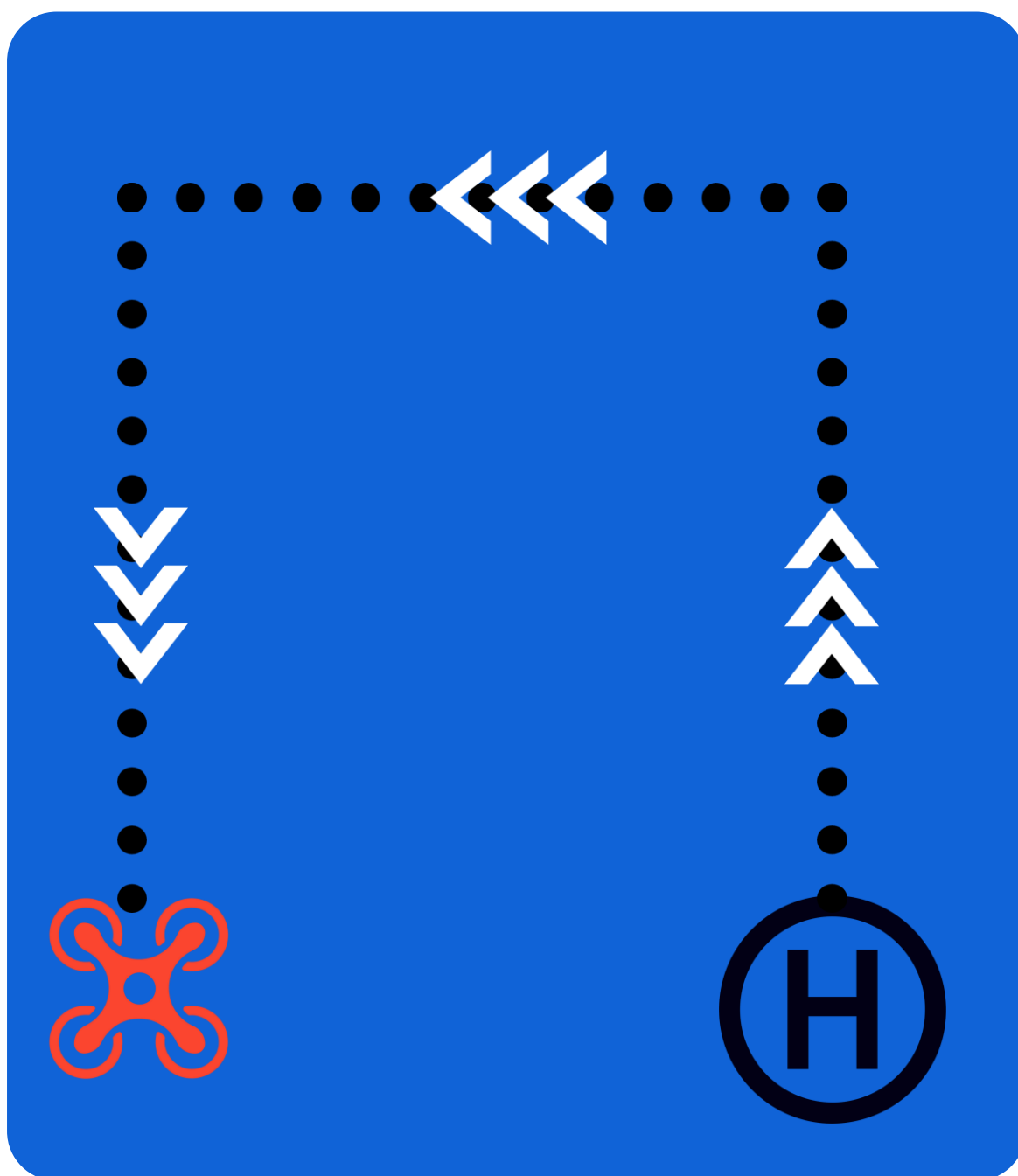


Funkcije kode, prikaz v živo in korak-po-koraku pregled primerne kode

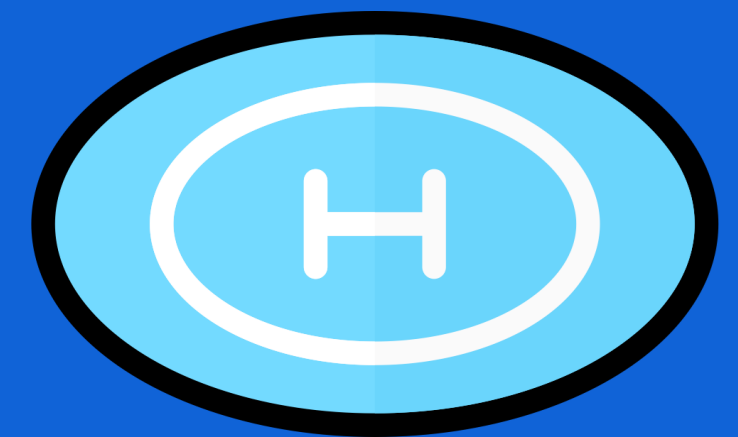
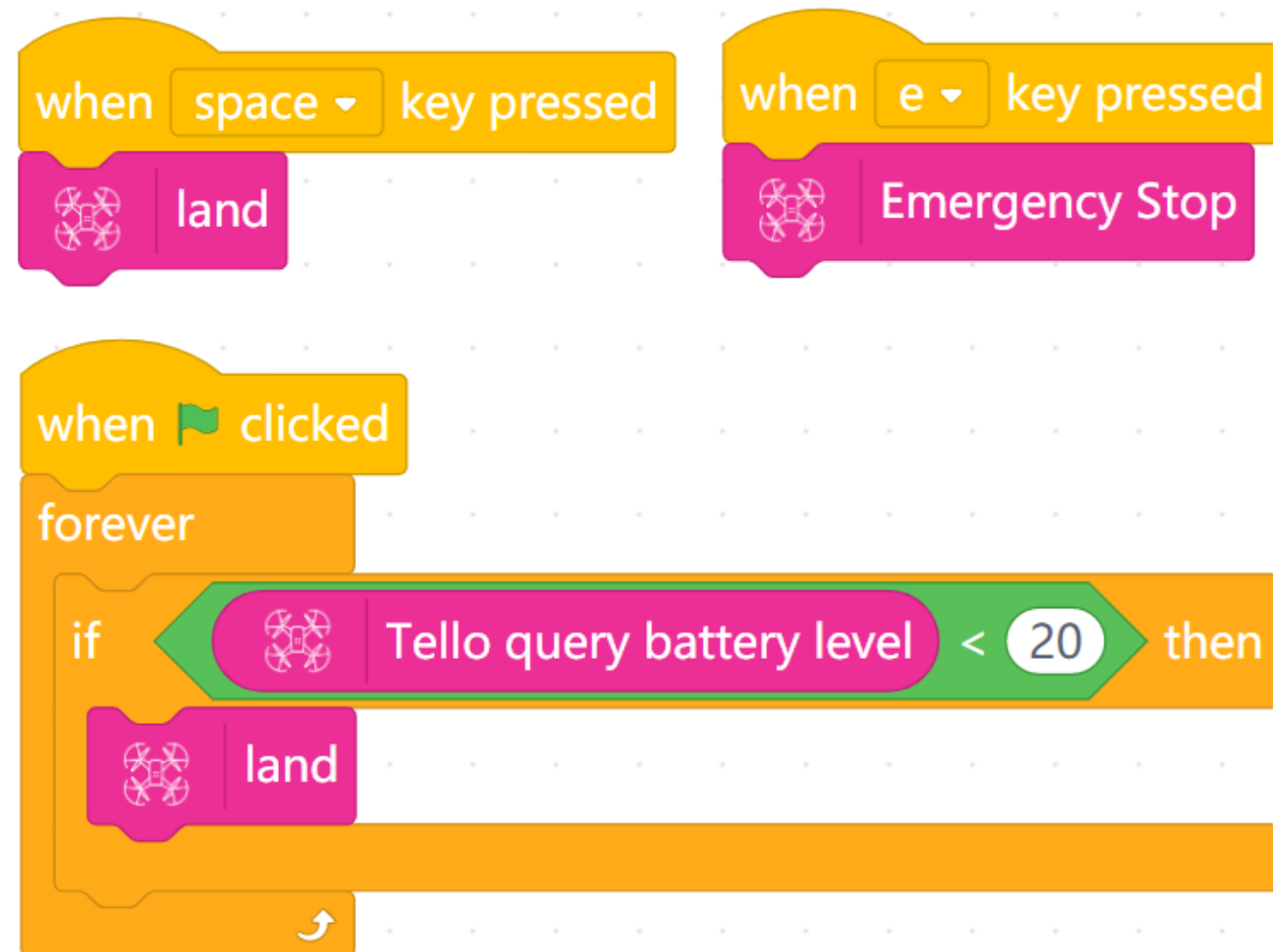
Programiranje drona, da vzleti, preleti kratko razdaljo in pristane.



Funkcije kode, prikaz v živo in pregled primerne kode korak za korakom



Demostracija v živo (kratek prelet)

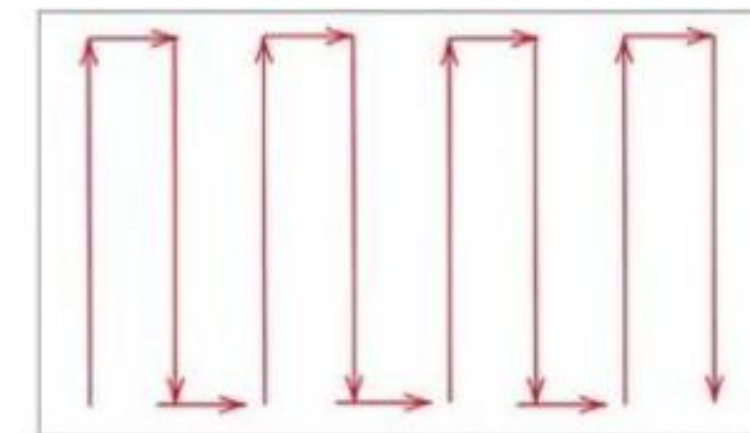


Aktivnost : Programiranje leta po kvadratni poti

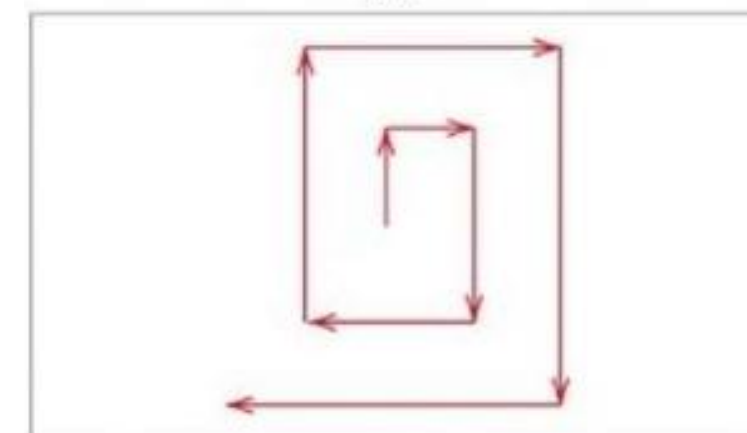
- Dvig drona
- Let naravnost
- Obrat
- Ponovite da naredite kvadrat
- Pristanite



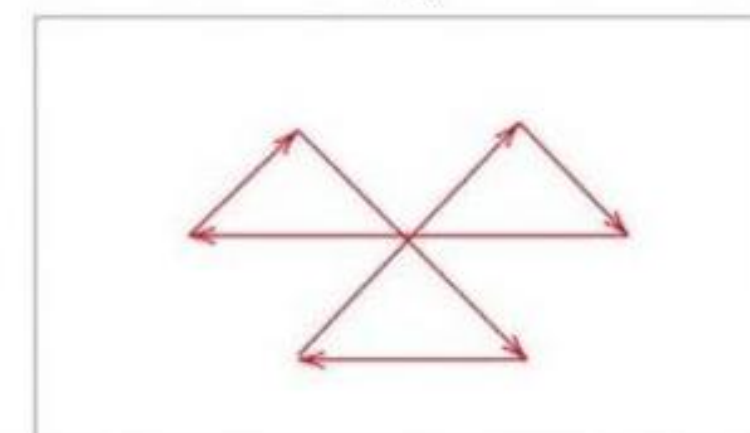
(a)



(b)



(c)



(d)

"Ali lahko programiramo dron, da poleti po popolnem kvadratu in varno pristane?"

Vodena programerska vaja – programiranje letenja po kvadratni poti in varnostni del

Step 1: Events – When __ key pressed

Guide students to use the "When space key pressed" block to make the drone start operating based on the next step.

Step 2: My Blocks – Take Off

Guide students to use the "take off" block to initiate the drone's flight.

Step 3: My Blocks – Fly Left

Use the "fly left" block to move left the drone a 50 cm distance.

Step 4: My Blocks – Fly forward

Use the "fly forward" block to move forward the drone a 50 cm distance.

Step 5: My Blocks – Fly Right

Use the "fly right" block to move right the drone a 50 cm distance.

Step 6: My Blocks – Fly backward

Use the "fly backward" block to move forward the drone a 50 cm distance.

Step 7: My Blocks – Land

Use the "land" block to safely land the drone.



Vodena programerska vaja – programiranje letenja po kvadratni poti in varnostni del

Step 8: Saftey part Events – When __ key pressed

Guide students to use the "When a key pressed" block to make the drone start operating based on the next step.

Step 9: Saftey part My Blocks – Land

Use the "land" block to safely land the drone.



Iskanje napak

1 Povezava Drona

- Ali je dron povezan?
- Ponovno vzpostavite povezavo

2 Začetek misije

- Ali ste dodali ADD dogodek?
- Ali ste dodali dogodek za spust drona?

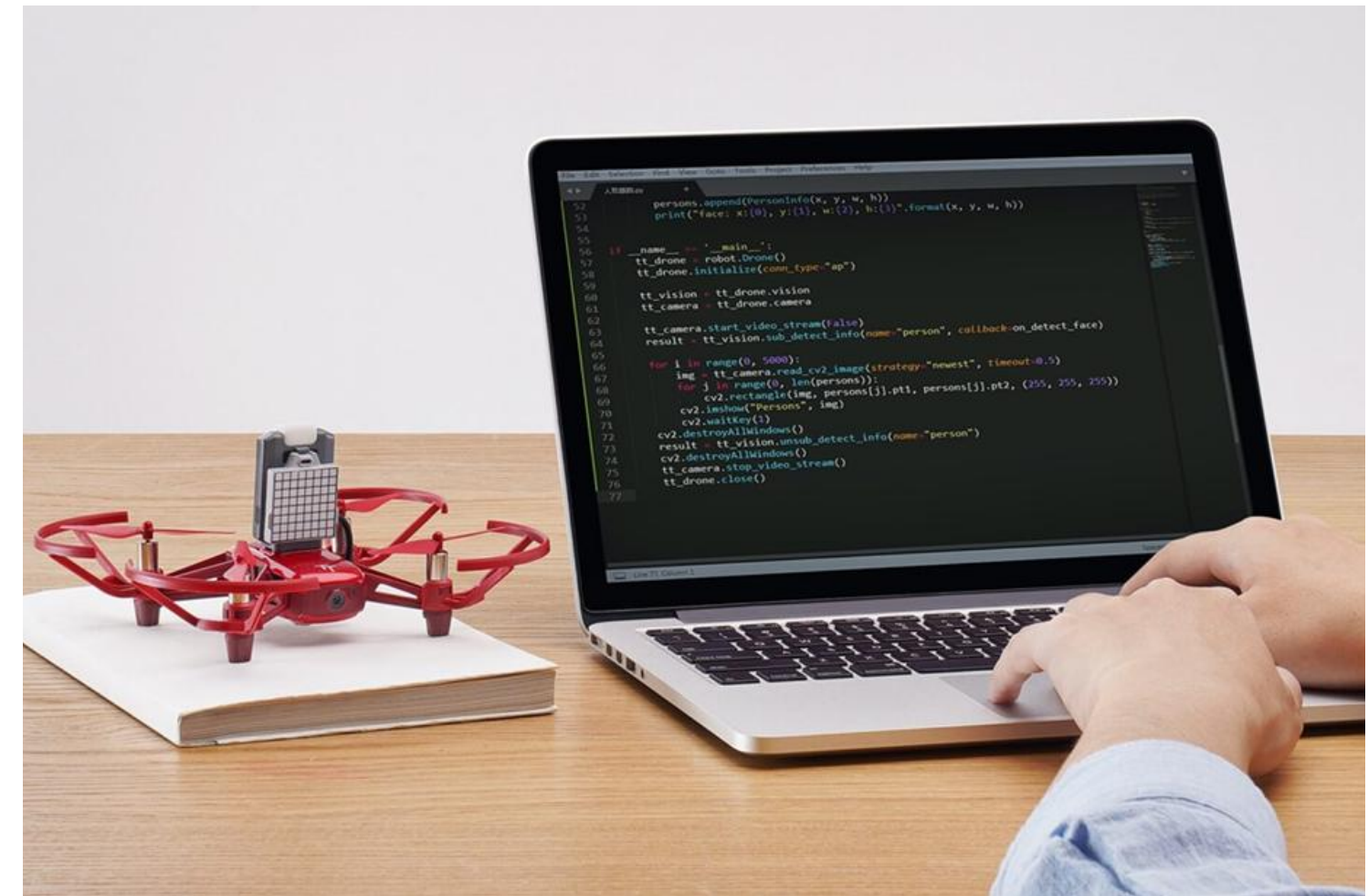
3 Let drona

- Preverite če so pravilne komande.
- Smer urinega kazalca in obratna smer urinega kazalca.



Povzetek s sejo vprašanj in odgovorov

- Povzemite ključne korake pri programiranju drona.
- Izpostavite pomen vsakega uporabljenega programskega bloka.
- Odprt diskusija za vprašanja študentov
- Obravnavajte morebitne težave ali pomisleke, ki so se pojavili med vajo.



Dodatni viri

Dodatno branje

<https://unece.org/un-decade-ecosystem-restoration>

Video material

[Environment \(ecosystem\) restoration](#)



Hvala za vašo pozornost!



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