

**Gymnázium Sv. Moniky, Prešov**

**Wall-E**



Technická dokumentácia

**OnStage**

**Angry Birds**

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# Všetky roboty

Na zrekonštruovanie našich robotov sme použili:

- 2 kontrolné jednotky **LEGO® Technic Veľký Hub pre SPIKE Prime**
  - Robot využíva kocky SPIKE na realizáciu autonómnych úloh. Kocky medzi sebou komunikujú prostredníctvom Bluetooth technológie, čo umožňuje synchronizáciu ich pohybov a zdieľanie informácií v reálnom čase. Každá kocka má svoju špecifickú úlohu, ktorú vykonáva, a ak je potrebné, odovzdáva informácie ďalšej kocke, aby robot vedel, kde sa nachádza alebo aký je stav jeho pohybového systému.
- **Cutebot** - Micro:bit inteligentné pretekárske auto V3
- 2 jednotky BBC **micro:bit**

Súčiastky:

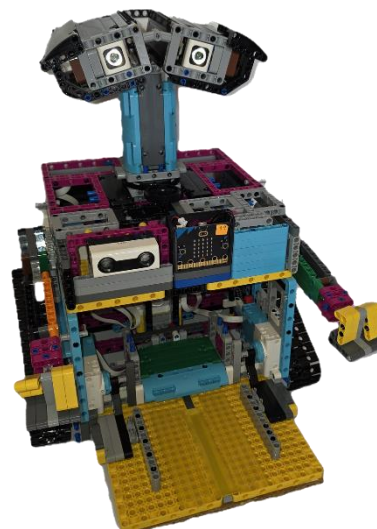
- LEGO Education SPIKE Prime Základná súprava
- LEGO Education SPIKE Prime Doplnkovou súpravou
- LEGO Mindstorms Rozšírenie pre EV3
- LEGO Mindstorms EV3 Core Set

Využili sme:

- LEGO® Education SPIKE Prime Veľký motor
- LEGO® Education SPIKE Prime Stredný motor
- LEGO® Technic Senzor farby
- LEGO® Technic Senzor vzdialenosti

Programovanie:

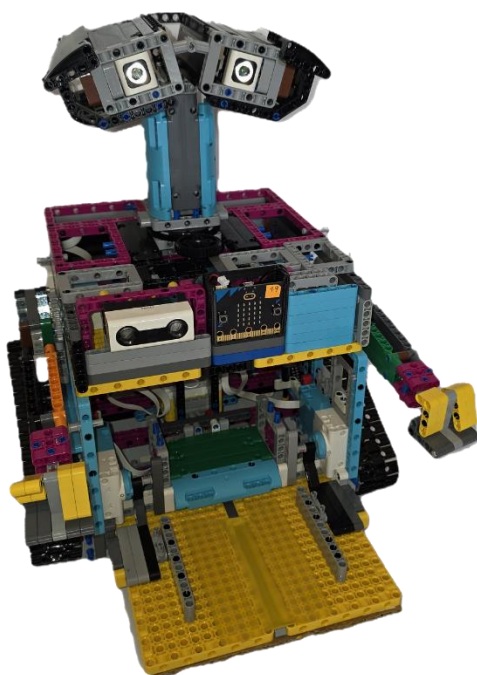
Pre účely komunikácie medzi kockami sme museli odstrániť pôvodný softvér LEGO Education Spike Prime a nahradiť ho novým programom z aplikácie Lego MINDSTORMS.



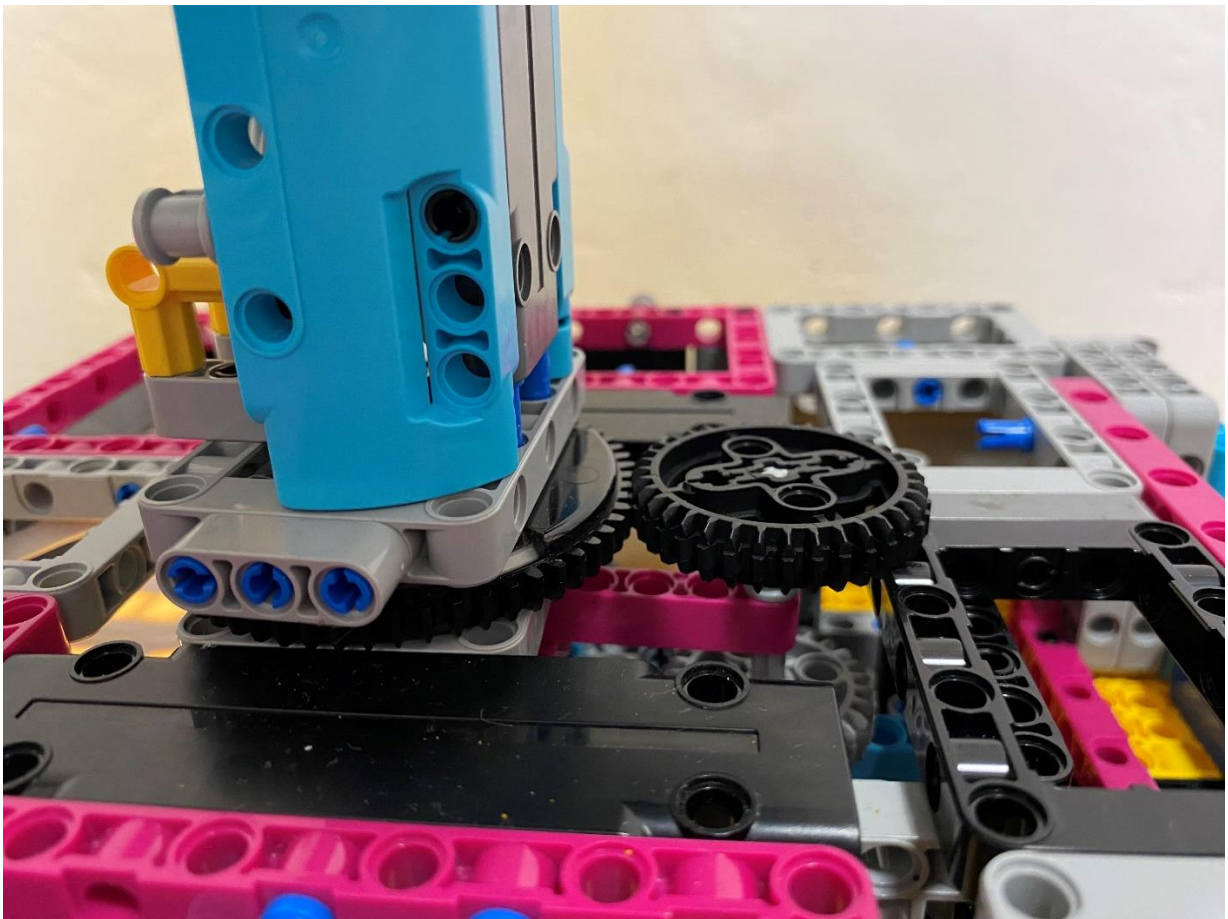
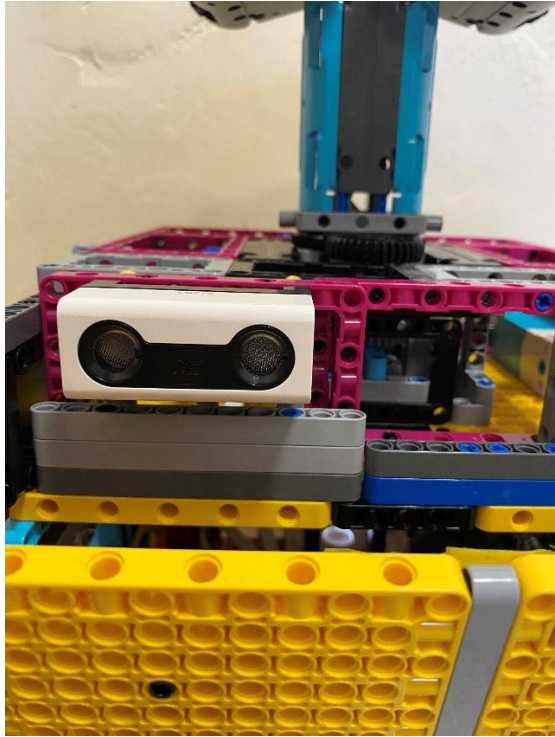
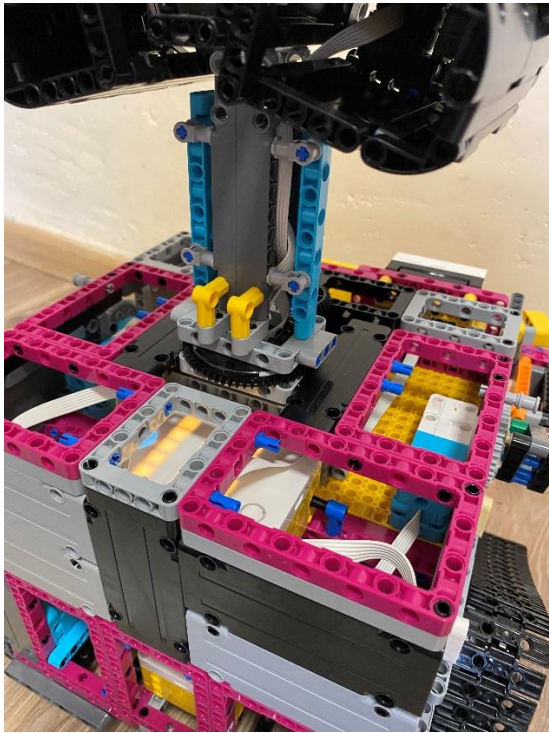
# Wall – E

## Zloženie a použitie robota:

- **2 × kontrolné jednotky SPIKE Prime LEGO Education**
  - Pohyb hlavného robota
  - Programované v LEGO Mindstorms
- **2 × LEGO® Education SPIKE Prime Veľký motor**
  - Pohyb dverí na robotovi
- **2 × LEGO® Education SPIKE Prime Veľký motor**
  - Pohyb nôh (pásy) robota
- **2 × LEGO® Education SPIKE Prime Stredný motor**
  - Pohyb rúk robota
- **1 × LEGO® Education SPIKE Prime Stredný motor**
  - Pohyb krku – otáčanie
- **1 × LEGO® Technic Senzor farby**
  - Detekovanie farby
- **1 × LEGO® Technic Ultrazvukový Senzor vzdialenosti**
  - Signalizáciou ruky začne hrať zvuk
- **1 × BBC micro:bit**
  - Odoslanie signálu do druhého micro:bitu na zapnutie programu Cutebota







Program – robot – 1. kocka:

The image displays two columns of Scratch code blocks. The left column is triggered by the signal 'ruky' and contains four conditional blocks for values 0, 1, 2, and 3. The right column is triggered by the signal 'hlava' and contains three conditional blocks for values 0, 1, and 2. Each conditional block contains a sequence of motor control and movement blocks, including 'wait', 'set movement speed to', 'set movement motors to', and 'move' blocks.

**Left Column (ruky signal):**

- Value 0:** wait 2.6 seconds, set movement speed to 15 %, set movement motors to F+D, move down for 0.2 rotations, wait 3.8 seconds, move up for 0.2 rotations.
- Value 1:** wait 0.4 seconds, set movement speed to 15 %, set movement motors to F+D, move down for 0.2 rotations, wait 3.7 seconds, move up for 0.2 rotations.
- Value 2:** wait 0.25 seconds, set movement speed to 15 %, set movement motors to F+D, move down for 0.2 rotations, wait 2.7 seconds, move up for 0.2 rotations.
- Value 3:** set movement speed to 20 %, set movement motors to F+D, move down for 0.2 rotations.

**Right Column (hlava signal):**

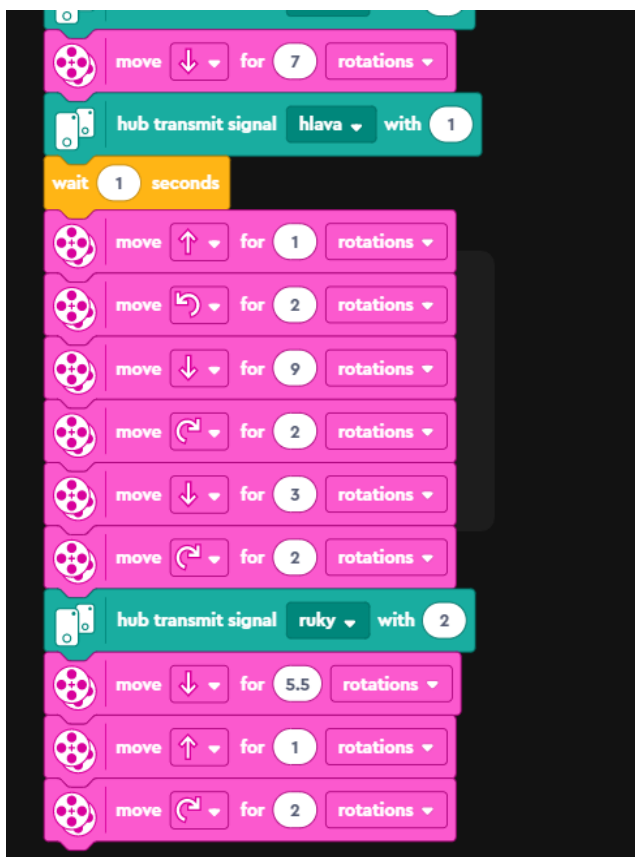
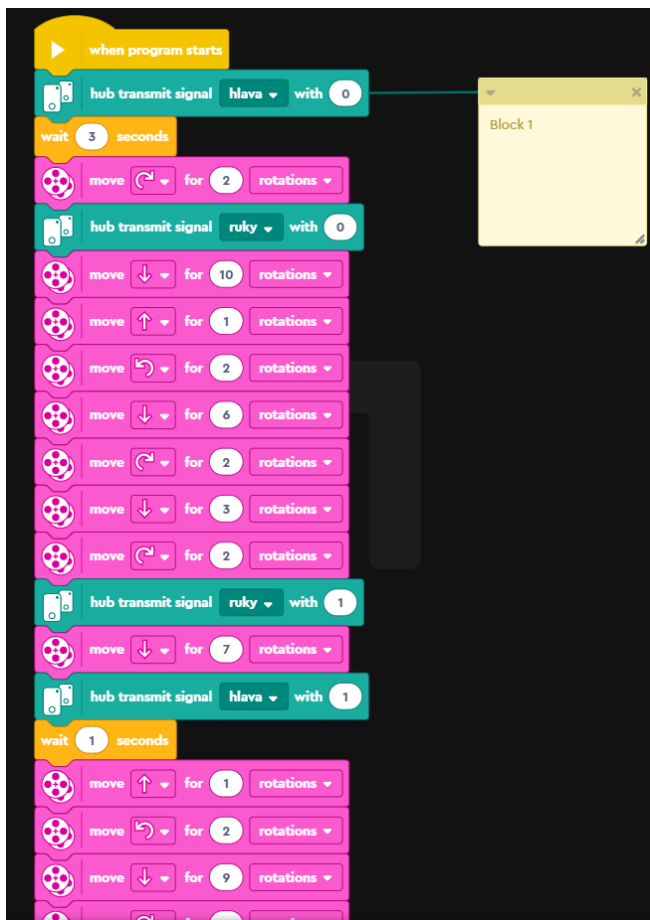
- Value 0:** set speed to 20 %, run clockwise for 0.5 rotations, wait 1.5 seconds, set speed to 17 %, run counter-clockwise for 0.5 rotations.
- Value 1:** set speed to 20 %, run counter-clockwise for 0.3 rotations, wait 1.5 seconds, set speed to 12 %, run clockwise for 0.3 rotations.
- Value 2:** set speed to 20 %, run counter-clockwise for 0.3 rotations, wait 1.5 seconds, set speed to 12 %, run clockwise for 0.3 rotations.

```
when hub receives signal Tanec-hlava
if received Tanec-hlava value = 0 then
  C set speed to 25 %
  C run for 0.15 rotations
  C run for 0.15 rotations
if received Tanec-hlava value = 1 then
  C set speed to 25 %
  C run for 0.15 rotations
  C run for 0.15 rotations

when hub receives signal Tanec-ruky
if received Tanec-ruky value = 0 then
  D set speed to 20 %
  D run for 0.2 rotations
  wait 1.5 seconds
  D run for 0.2 rotations
if received Tanec-ruky value = 1 then
  F set speed to 20 %
  F run for 0.2 rotations
  wait 1.5 seconds
  F run for 0.2 rotations

when B is closer than 5 cm ?
  hub transmit signal Sensor with 0
```

Program – robot – 2. kocka:





```

when hub receives signal Sensor
wait until received Sensor value = 0
play sound Walle until done
wait 0.5 seconds
play sound Awhhh until done
wait 1 seconds
hub transmit signal hlava with 2
set movement speed to 80 %
move ↓ for 7 rotations
move ↻ for 2 rotations
move ↓ for 5 rotations
set movement motors to C+F
set movement speed to 20 %
move ↑ for 0.7 rotations
play sound Tadaa until done
wait 3.5 seconds
set movement speed to 30 %
set movement motors to A+B
move ↑ for 3 rotations

```

Dance

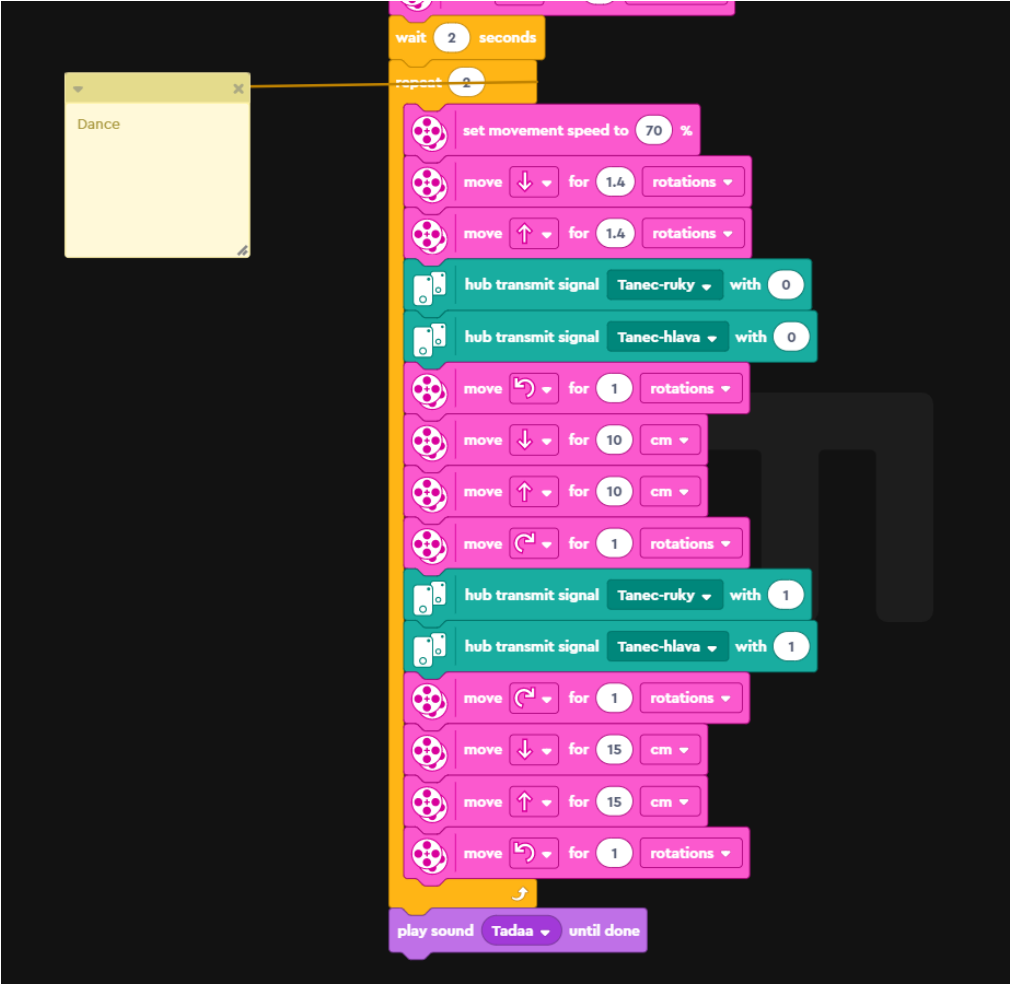
Dvere

```

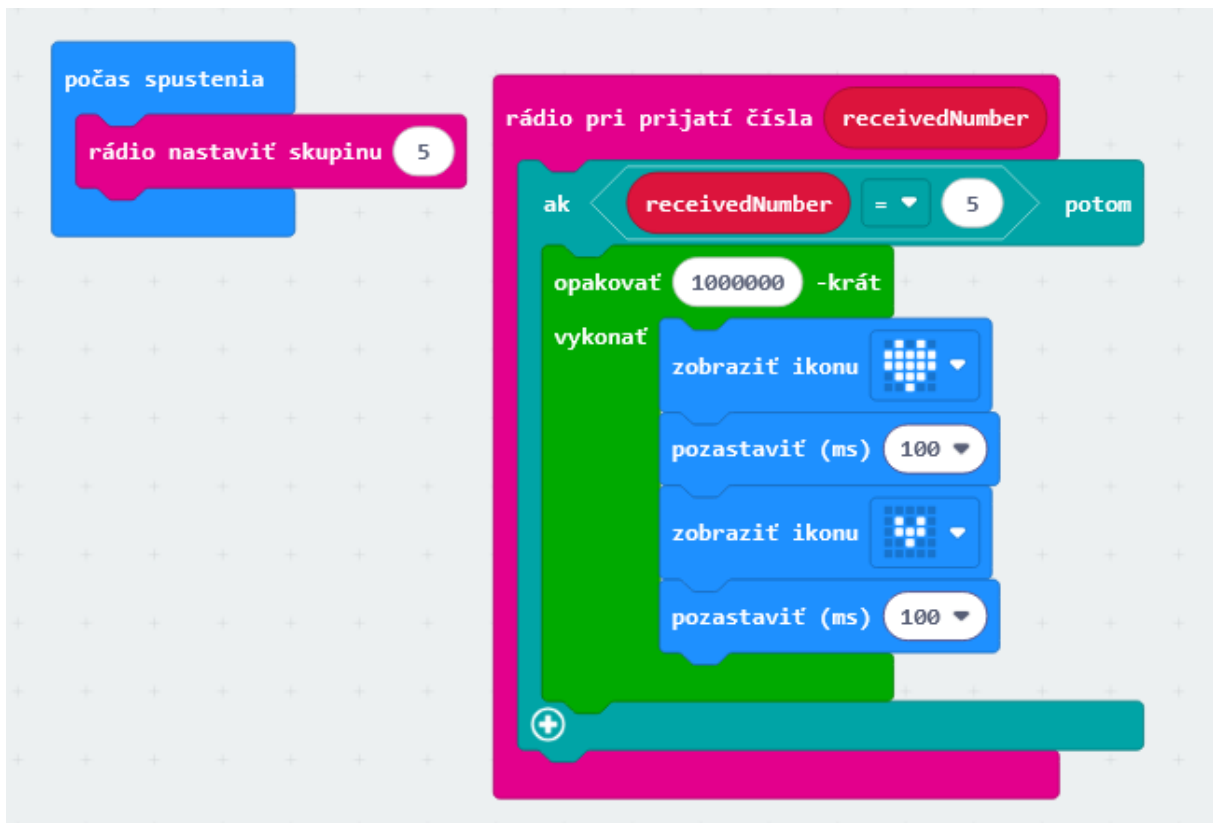
set movement motors to A+B
move ↑ for 3 rotations
set movement motors to C+F
set movement speed to 7 %
move ↓ for 1 rotations
set movement motors to A+B
set movement speed to 50 %
move ↻ for 2 rotations
wait 2 seconds
set movement speed to 70 %
move ↓ for 1.4 rotations
move ↑ for 1.4 rotations
hub transmit signal Tanec-ruky with 0
hub transmit signal Tanec-hlava with 0
move ↻ for 1 rotations
move ↓ for 10 cm
move ↑ for 10 cm
move ↻ for 1 rotations

```

Dance



Program – micro:bit – srdce Wall-E:



# Rastlinka života

## Zloženie a použitie robota:

- **Cutebot** - Micro:bit inteligentné pretekárske auto V3
- 2 jednotky BBC **micro:bit**

## Ostatné prvky:

**3D prvky** – Topánka vytlačená na 3D tlačiarňami



Program- micro:bit – Rastlinka:

The code block is titled "počas spustenia" (during start). It contains the following blocks:

- Set LED headlights ALL color (green circle)
- radio nastaviť skupinu 5
- pozastaviť (ms) 10000
- Always loop: volanie line\_tracking

Below is a function block named "line\_tracking":

- ak Tracking state is 0 potom: Set left wheel speed 35 % right wheel speed 5 %
- ak Tracking state is 1 potom: Set left wheel speed 5 % right wheel speed 35 %
- ak Tracking state is 2 potom: Set left wheel speed 15 % right wheel speed 15 %

The code block is titled "vždy" (always) and contains the following blocks:

- pozastaviť (ms) 2000
- nastaviť sonar na HC-SR04 Sonar unit cm
- ak sonar >= 0.5 a sonar <= 20 potom: Set left wheel speed 0 % right wheel speed 0 %
- inak: Set left wheel speed 60 % right wheel speed 60 %
- radio odoslať číslo 5
- zobraziť ikonu (grid icon)
- pozastaviť (ms) 100
- zobraziť ikonu (grid icon)
- pozastaviť (ms) 100

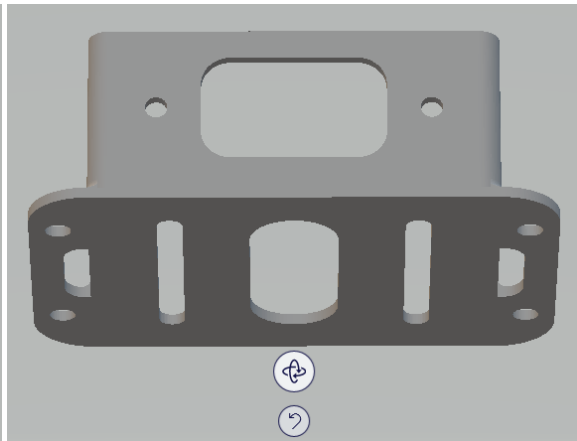
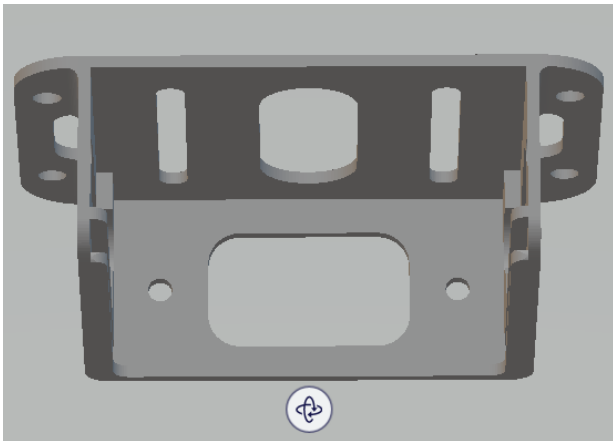
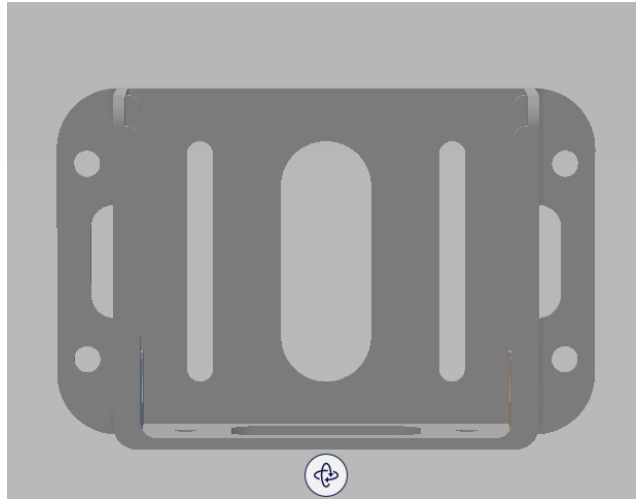
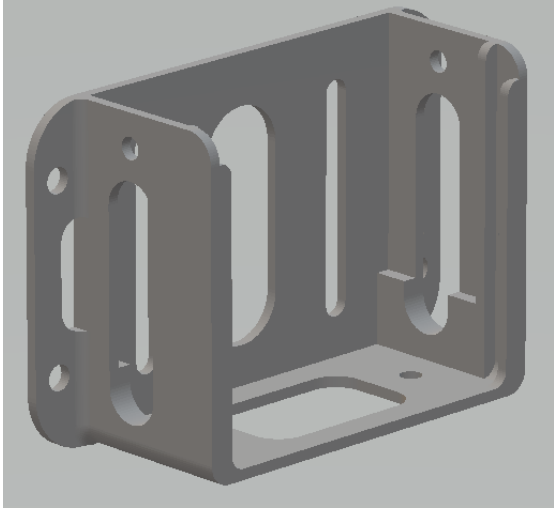


# Kulisy



# 3D Prvky

- Micro:bit obal



- Topánka



- Šváb

