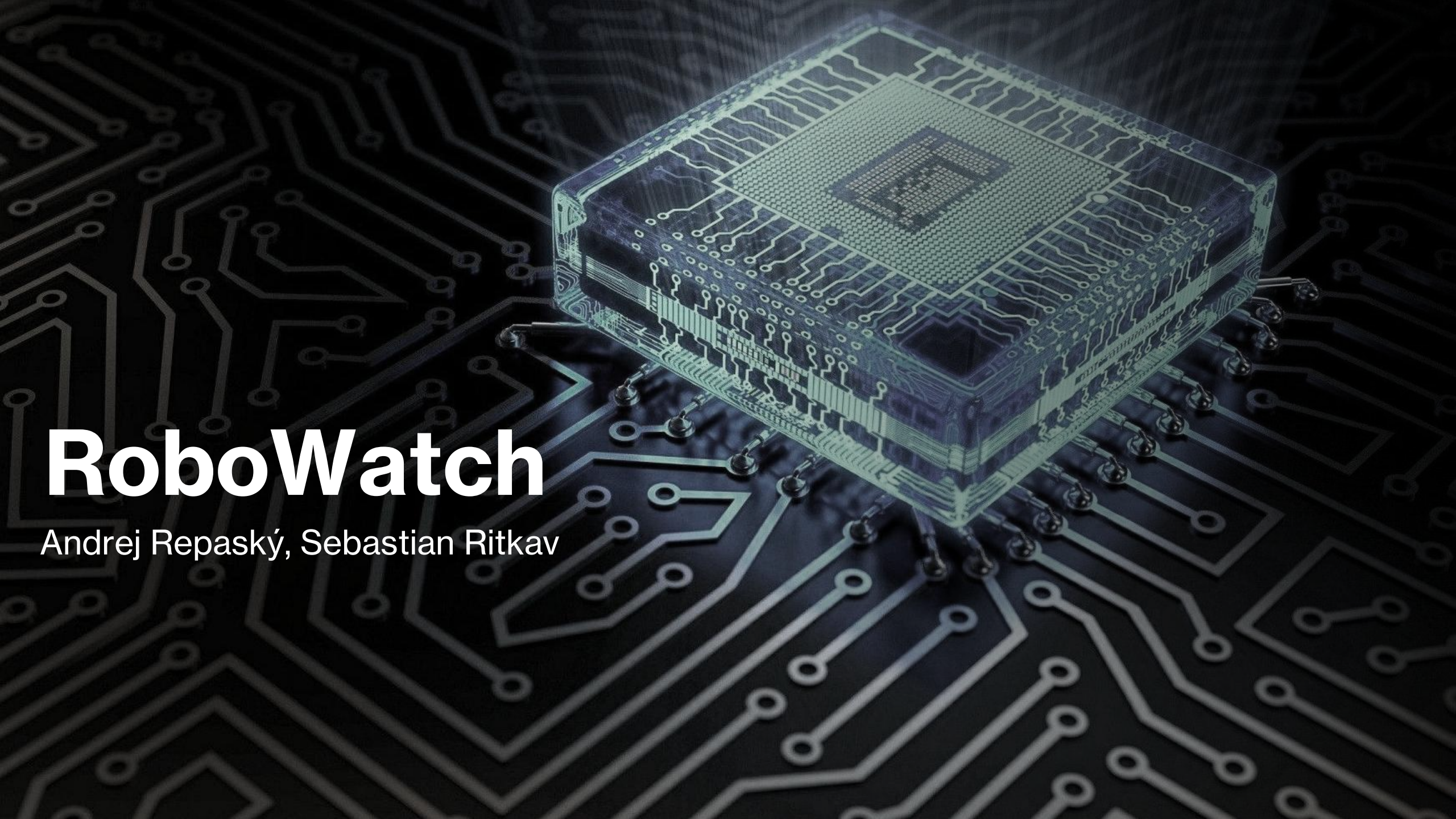
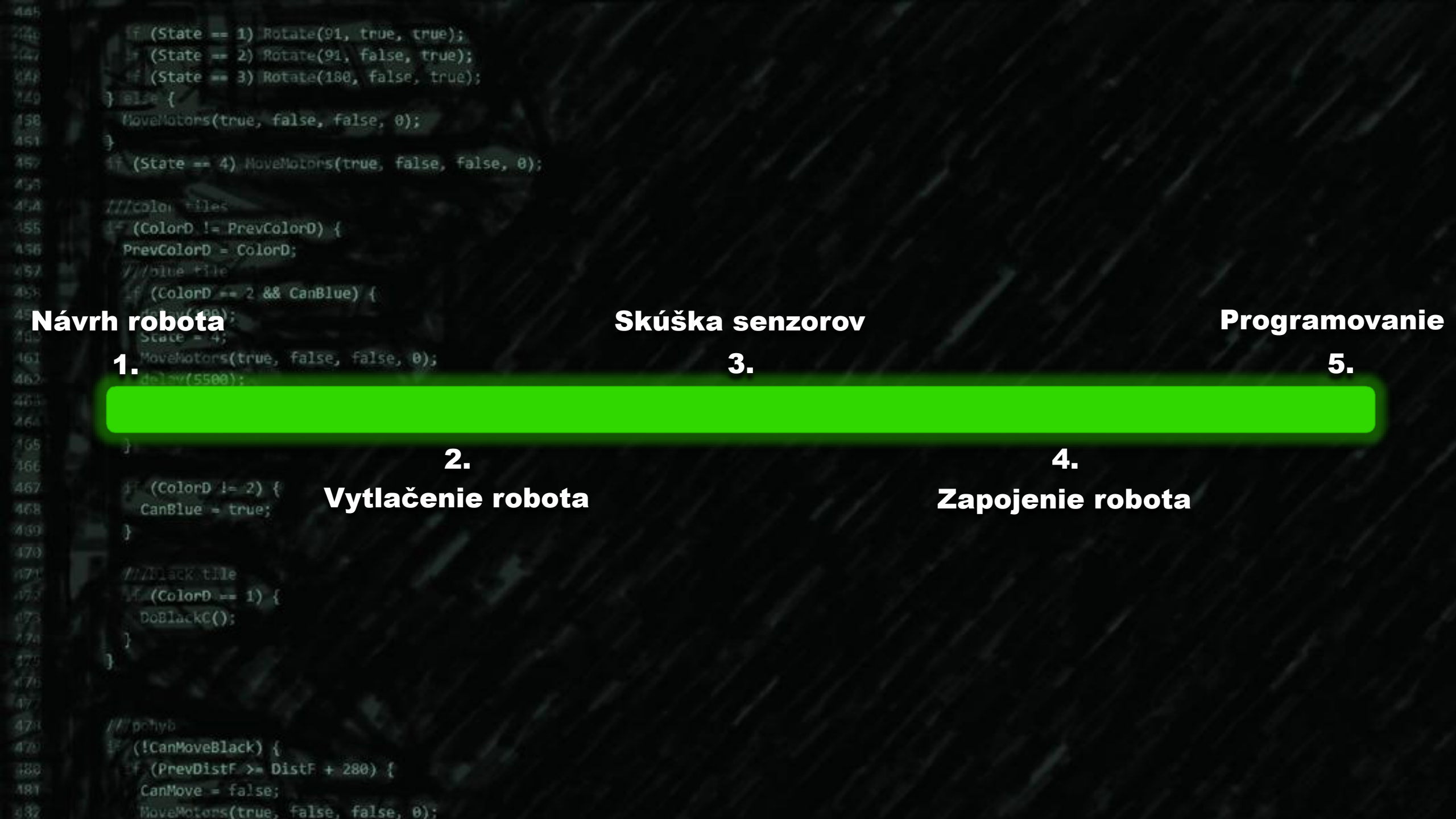
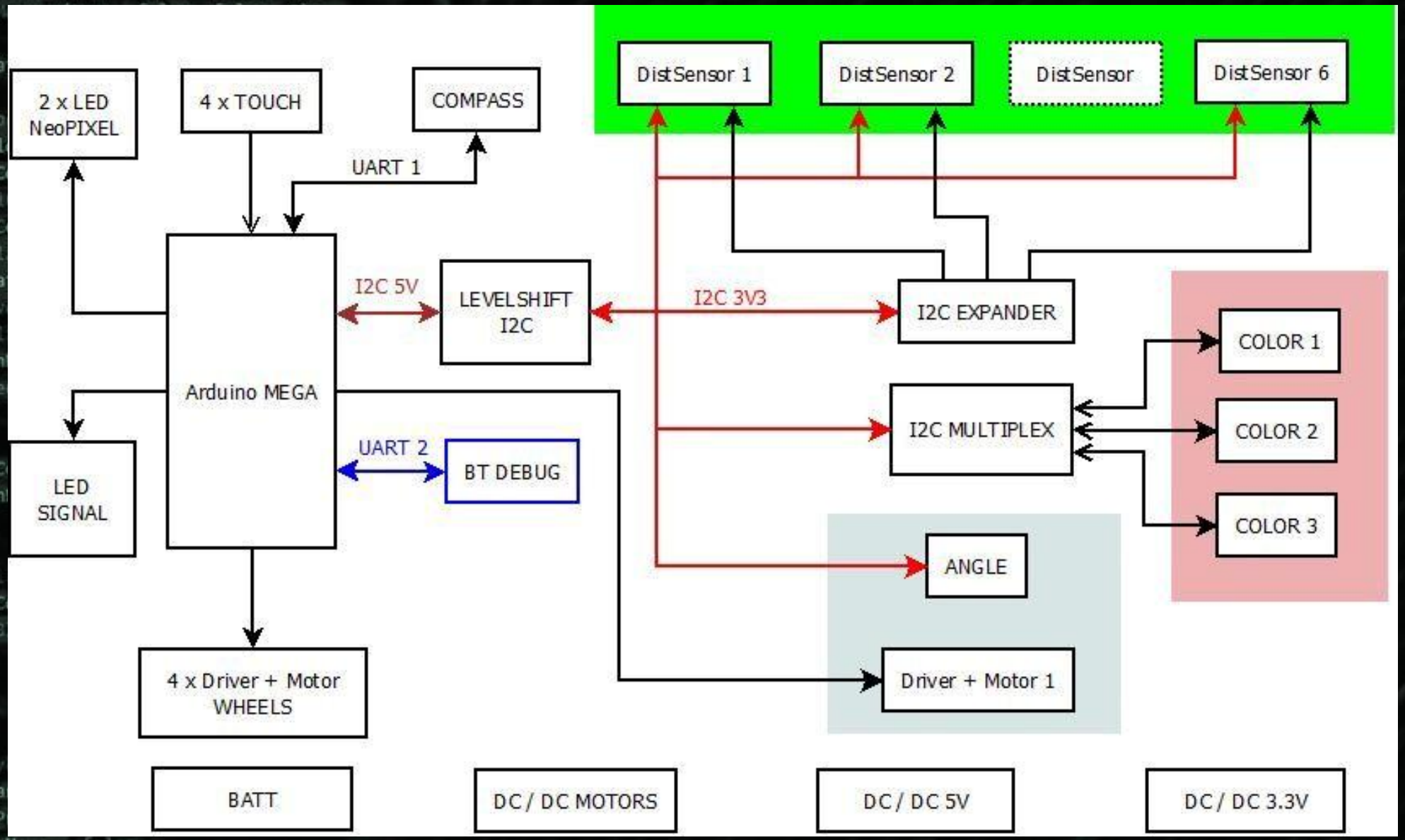


RoboWatch

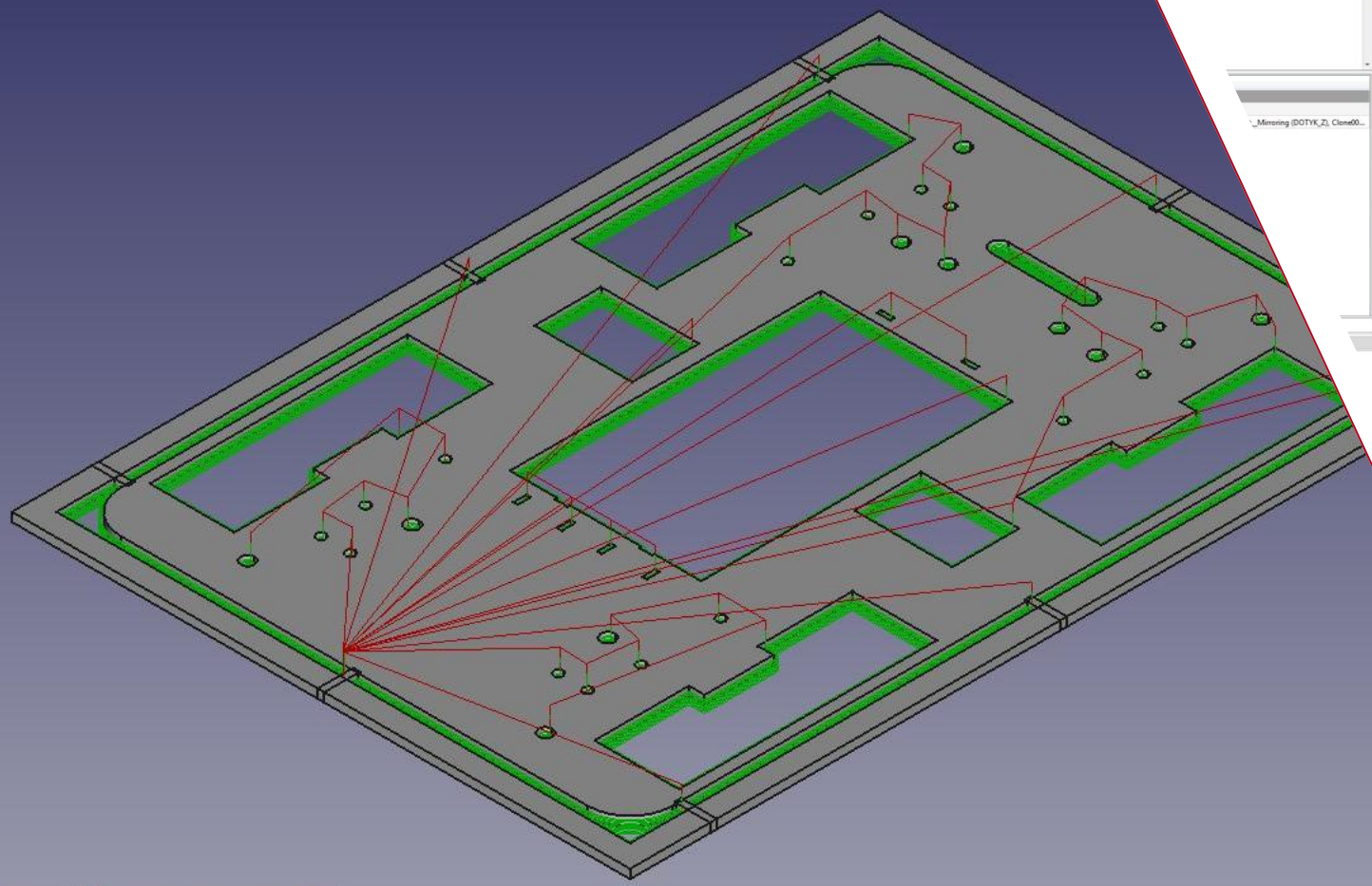
Andrej Repaský, Sebastian Ritkav

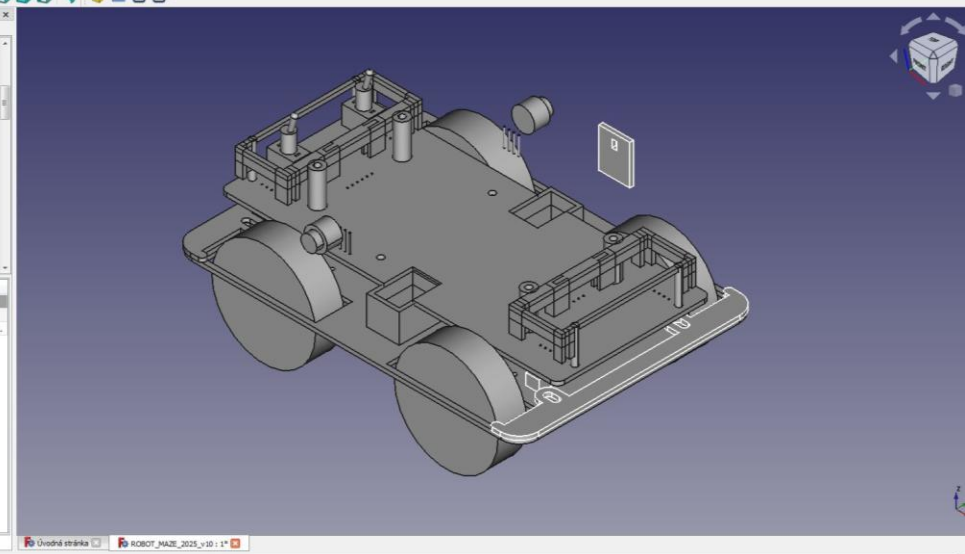

Návrh robota
1.
Skúška senzorov
3.
Programovanie
5.
2.
Vytlačenie robota
4.
Zapojenie robota

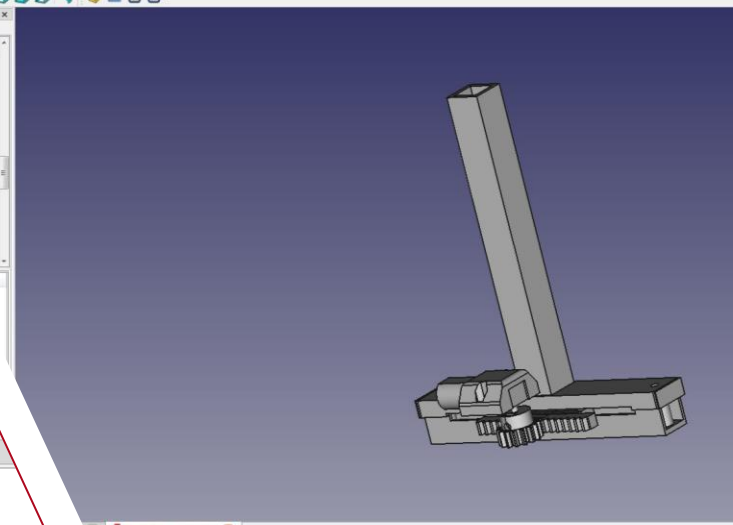
Schéma


DistSensor 1
DistSensor 2
DistSensor
DistSensor 6
2 x LED NeoPIXEL
4 x TOUCH
COMPASS
UART 1
I2C 5V
LEVELSHIFT I2C
I2C 3V3
I2C EXPANDER
COLOR 1
COLOR 2
COLOR 3
Arduino MEGA
I2C MULTIPLEX
UART 2
BT DEBUG
LED SIGNAL
ANGLE
Driver + Motor 1
4 x Driver + Motor WHEELS
BATT
DC / DC MOTORS
DC / DC 5V
DC / DC 3.3V

Návrh



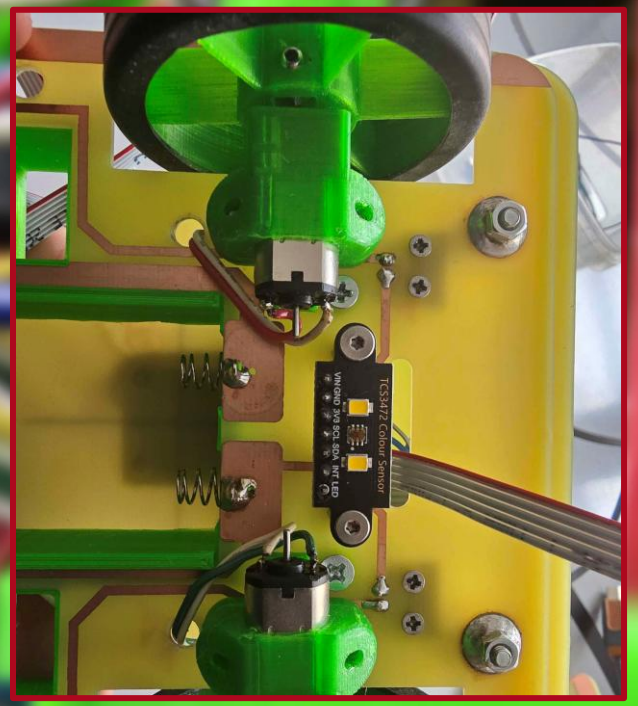


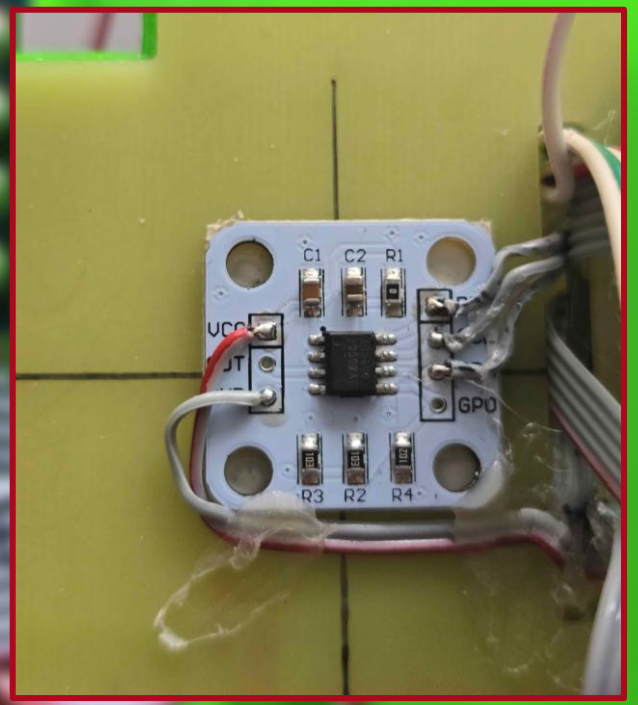


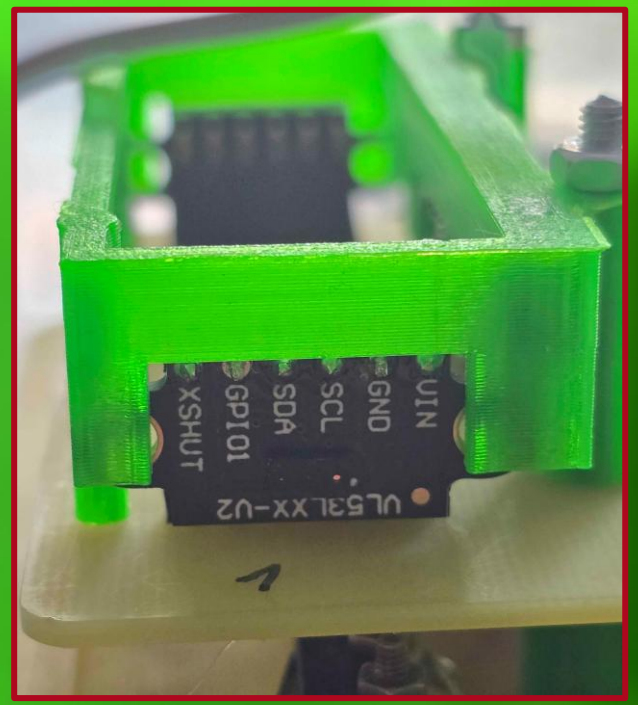
Hardware

Použili sme:

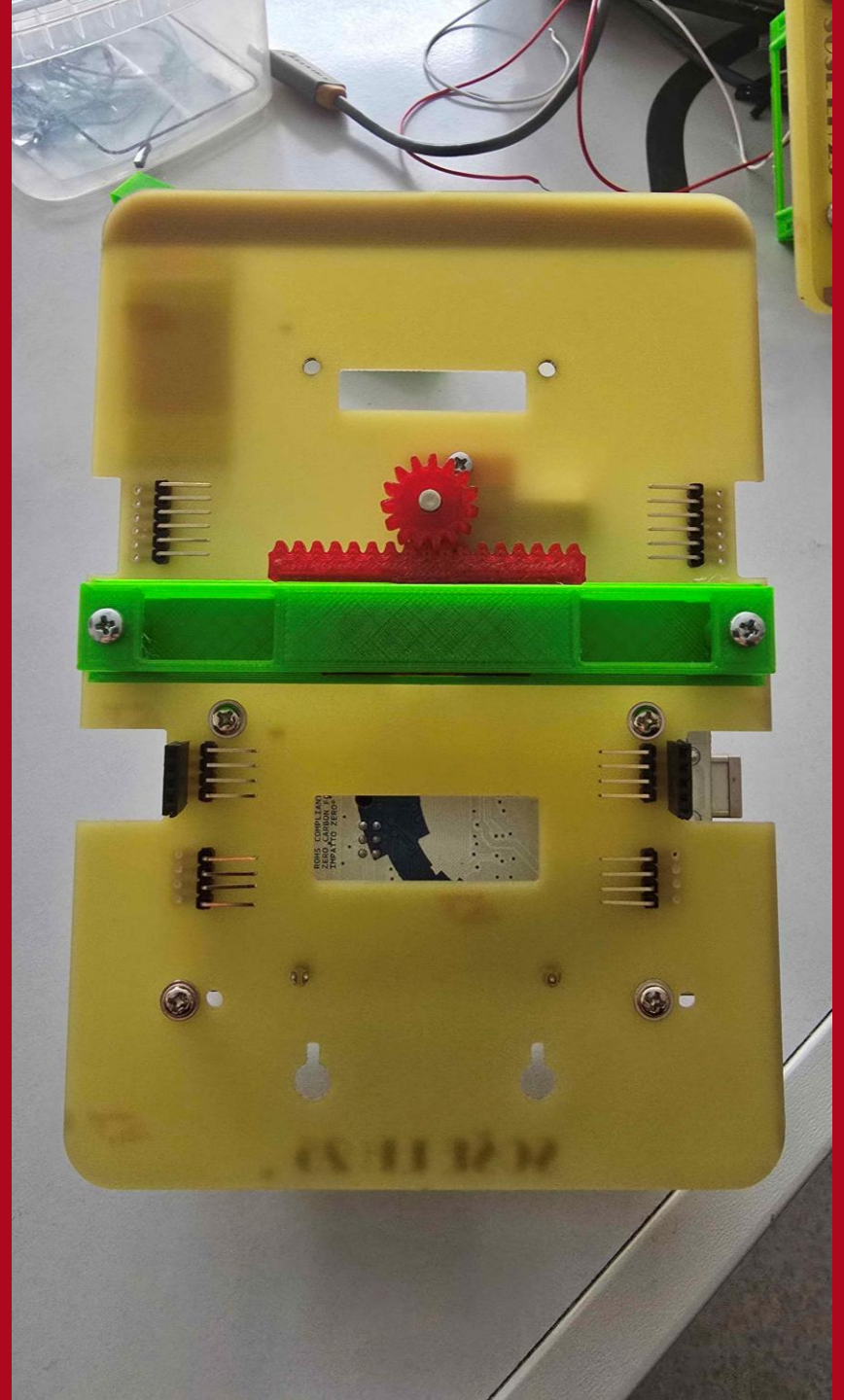
- Arduino Mega
- Senzory
  - 6x Laser senzor VL53LOX-V2 → použité na meranie vzdialenosti
  - 4x Color senzor TCS34725 → použité na rozpoznávanie farby obetí
  - 1x Magnetický senzor AS5600 → použité na meranie rotácie vyhadzovacieho mechanizmu pre záchranné balíčky
  - 1x Gyro senzor GY-25 → použité na meranie rotácie robota
  - 4x Tlačítko→ použité na snímanie nárazu
- 5x Mikro motor s prevodovkou N20 → použité na pohyb robota
- 1x Stabilizátor XL6009
- 2x Mini DC stabilizátor
- 1x I2C Multiplexer TCA9548A
- 1x I2C Expander PCF8574T
- Externé nasvietenie Color senzorov

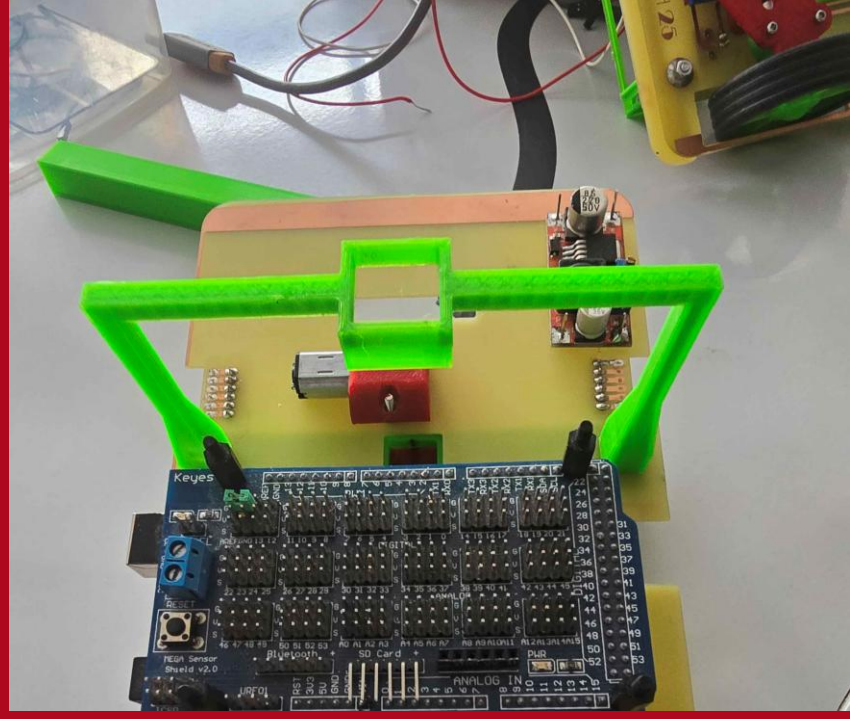


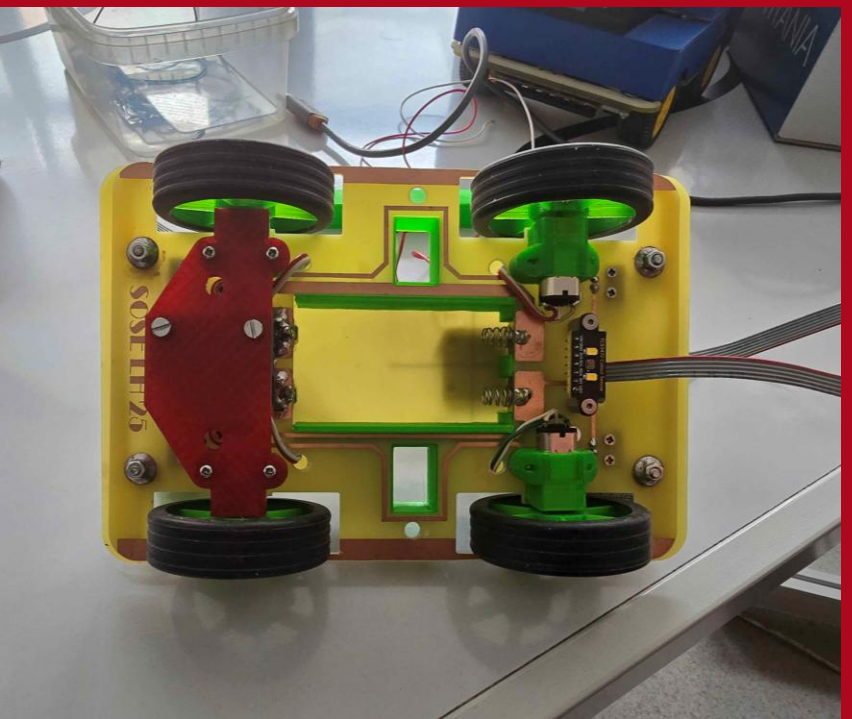


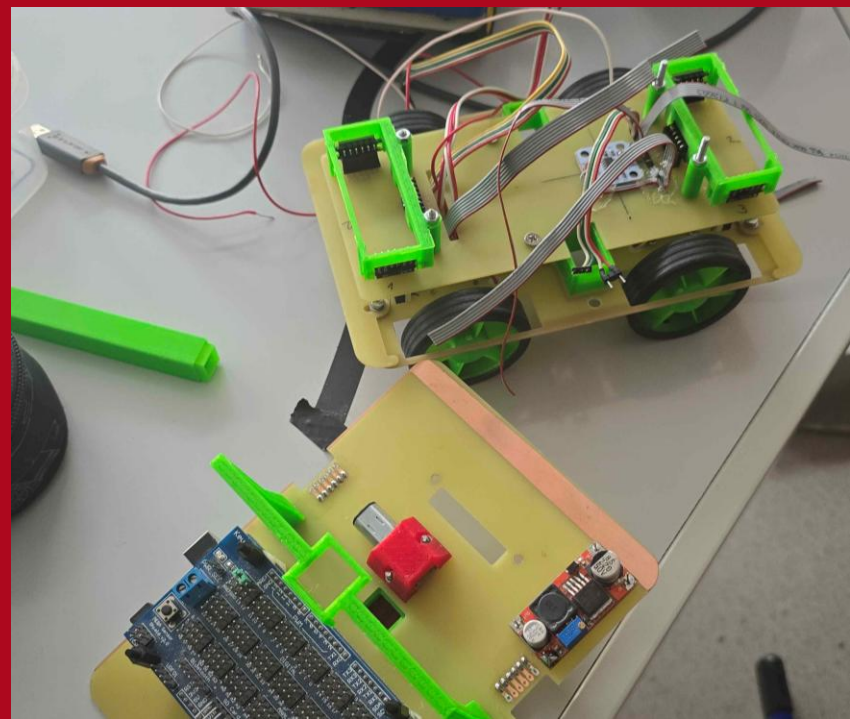


Zostavenie









Software

- Programovali sme v Arduino IDE
- **Použili sme tieto knižnice:**
  - Wire.h
  - Adafruit_TCS34725.h
  - Arduino.h
  - TCA9548A.h
  - PCF8574.h
  - Adafruit_VL53L0X.h
  - Adafruit_NeoPixel.h
  - avr/power.h
- **Riešili sme:**
  - Správny pohyb robota
  - Správne čítanie senzorov
  - Snímanie obetí
  - Vyhadzovanie záchranných balíčkov

Otáčanie robota:

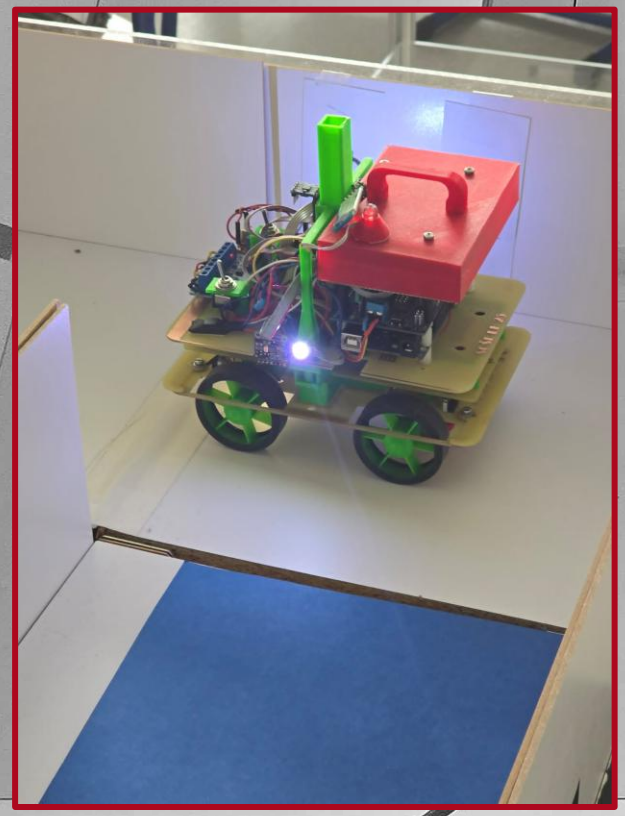
```
506  void Rotate(float Angle, bool Left, bool Settle) {
507    float delta = Yaw - LYaw;
508    if (delta > 180) YawPlus -= 1;
509    if (delta < -180) YawPlus += 1;
510    CYaw = Yaw + (360 * YawPlus);
511    LYaw = Yaw;
512
513    if (!Left) {
514      if (!IsTurningRight) {
515        SYaw = CYaw;
516        IsTurningRight = true;
517      }
518      if (CYaw > SYaw + Angle) {
519        State = 0;
520        IsTurningRight = false;
521        if (Settle) {
522          IsSettling = true;
523          SettlingLeft = false;
524        }
525      } else {
526        MoveMotors(true, false, true, 80);
527      }
528
529    } else {
530      if (!IsTurningLeft) {
531        SYaw = CYaw;
532
533        IsTurningLeft = true;
534      }
535      // Read();
536      if (CYaw < SYaw - Angle) {
537        State = 0;
538        IsTurningLeft = false;
539        if (Settle) {
540          IsSettling = true;
541          SettlingLeft = true;
542        }
543      } else {
544        MoveMotors(true, true, false, 80);
545      }
546    }
547  }
```

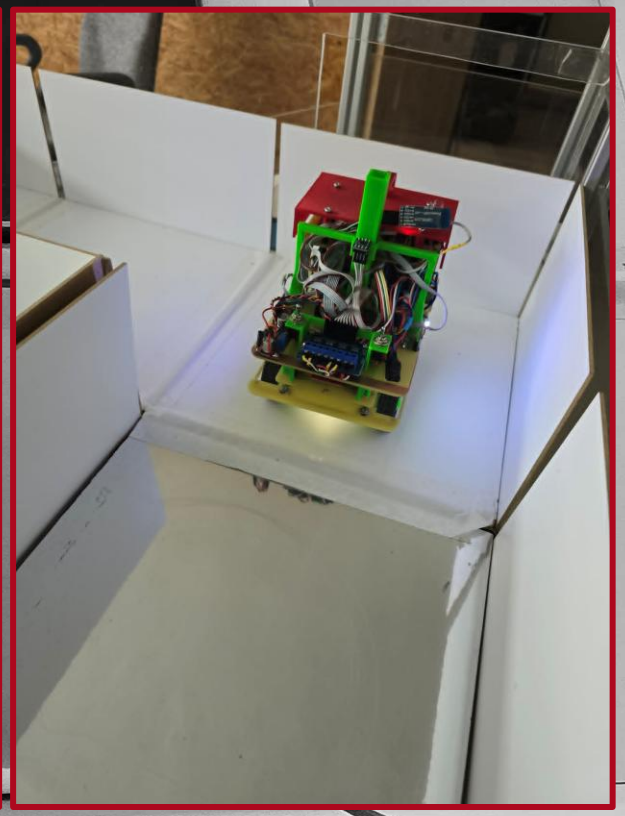
Dorovnávanie robota:

```
713  void RunSettling() {
714    if (!SettlingLeft) {
715      PPL.rangingTest(&PP, false);
716      DistFR = PP.RangeMilliMeter;
717
718      ZPL.rangingTest(&PZ, false);
719      DistRR = PZ.RangeMilliMeter;
720
721      if (DistFR > DistRR + 15) {
722        MoveMotors(true, !false, !true, 60);
723      } else {
724        //   State = 0;
725        //    CanStopFront = true;
726        //   x = false;
727        ReverseSettle();
728      }
729    } else {
730      PLL.rangingTest(&pL, false);
731      DistFL = pL.RangeMilliMeter;
732
733      ZLL.rangingTest(&LZ, false);
734      DistRL = LZ.RangeMilliMeter;
735      if (DistFL > DistRL + 20) {
736        MoveMotors(true, !true, !false, 60);
737      } else {
738        //  State = 0;
739        //  CanStopFront = true;
740        //  x = false;
741        ReverseSettle();
742      }
743    }
744    // delay(10);
745  }
```

Testovanie

- Vybudovali sme cvičné bludisko
- Nakreslili sme si znaky, ktoré predstavujú obete
- Simulovali sme jazdu v prostredí a dávali sme robotovi rôzne prekážky





RoboWatch