

Day 1:

24 – 04 – 2023

Alessandro Chiarulli

- Received project assignment to construct a robot for the rescue line category.
- Analyzed the requirements: 3 color sensors for line following, 1 gyroscope for stability, and 4 infrared sensors to detect obstacles.
- Researched and gathered necessary materials and components.
- Assembled the EV3 bricks and connected them via Bluetooth.
- Software problem: Encountered connectivity issues between the EV3 bricks ([log](#)).
  - o Solution: Updated the firmware and reset the Bluetooth settings to establish a stable connection.

Day 2:

27 – 04 – 2023

Mario Recchia

- Focused on designing the chassis for the robot.
- Created a detailed blueprint and began assembling the initial prototype using LEGO Technic pieces.
- Hardware problem: Difficulty in fitting all the required sensors and components within the chassis design.
  - o Solution: Made adjustments to the prototype, optimizing its size and considering the placement of sensors and components. Created a rough prototype to test feasibility.

Day 3:

03 – 05 – 2023

Mario Recchia

- Continued refining the chassis design based on feedback from the initial prototype's performance.
- Incorporated structural reinforcements to enhance stability and durability.
- Added mounting points for the color sensors, gyroscope, and infrared sensors.
- Adjusted the position of the EV3 bricks to optimize balance and weight distribution.

Day 4:

05 – 05 – 2023

Gabriele Montrone

- Installed the three color sensors onto the front of the chassis.
- Ensured precise alignment and calibrated the color sensors for accurate line detection. ([log](#))
- Hardware problem: Inconsistent readings from one of the color sensors ([log](#)).
  - o Solution: Replaced the faulty sensor with a new one and retested to ensure reliable performance.

Day 5:

12 – 05 – 2023

Giuseppe Clemente

- Integrated the gyroscope into the chassis.
- Connected the gyroscope to one of the EV3 bricks to measure the robot's orientation accurately.
- Software problem: Difficulty in obtaining stable gyroscope readings due to vibrations from the robot's movement ([log](#)).

- Solution: Implemented software filtering techniques, to reduce noise and improve gyroscope data reliability.

Day 6:

09 – 05 – 2023

Alessandro Chiarulli

- Began working on the obstacle detection system using the four infrared sensors.
- Experimented with different sensor placements and angles on the robot's chassis to optimize obstacle detection range.
- Hardware problem: Intermittent detection issues with one of the infrared sensors ([log](#)).
  - Solution: Discovered a loose connection and securely reconnected the sensor to resolve the issue.

Day 7:

12 – 05 – 2023

Mario Recchia

- Faced ongoing difficulties with the Bluetooth connection between the two EV3 bricks.
- Conducted extensive troubleshooting, including firmware updates, resetting Bluetooth settings, and adjusting transmission power.
- Resolved the connectivity issues by improving the line of sight between the EV3 bricks and reducing wireless interference.

Day 8:

16 – 05 – 2023

Giuseppe Clemente

- Implemented code for the color sensors to enable accurate line following.
- Programmed the robot to interpret color sensor data and make appropriate adjustments to stay on the rescue line ([log](#)).
- Software problem: Inconsistent line detection due to variations in lighting conditions.
  - Solution: Improved the color sensor calibration process and implemented adaptive algorithms to handle lighting changes effectively.

Day 9:

19 – 05 – 2023

Alessandro Chiarulli

- Developed code to utilize the gyroscope data for stabilizing the robot's movement.
- Incorporated the gyroscope readings into the robot's control system to maintain balance.
- Software problem: Excessive gyro drift causing inaccurate angle measurements.
  - Solution: Implemented gyro drift compensation techniques and performed extensive calibration to mitigate the drift effect.

Day 10:

23 – 05 – 2023

Gabriele Montrone

- Integrated the infrared sensors into the obstacle detection system.
- Programmed the robot to detect obstacles using the infrared sensors and make necessary decisions to avoid collisions.
- Software problem: Difficulty in distinguishing between different types of obstacles based on sensor readings.

- Solution: Implemented advanced algorithms and threshold-based techniques to improve obstacle recognition accuracy.

Day 11:

26 – 05 – 2023

Mario Recchia

- Detected a minor bug in the obstacle detection system, causing occasional false positives.
- Analyzed the issue and modified the code to refine the obstacle detection logic.
- Conducted rigorous testing with various obstacle configurations to ensure accurate detection and avoidance.

Day 12:

29 – 05 – 2023

Alessandro Chiarulli

- Focused on optimizing the robot's navigation algorithm for improved performance.
- Fine-tuned the control system parameters to optimize speed, responsiveness, and smooth line following.
- Software problem: Latency in the control system affecting real-time control.
  - Solution: Made adjustments to minimize latency and improve real-time control responsiveness.

Day 13-14:

30/31 – 05 – 2023

Mario Recchia, Giuseppe Clemente

- The process for the evacuation zone has begun. The robot correctly checks the reflective paper at the start of the evacuation zone.
- Earn the center of the evacuation zone without problems, even with obstacles.
- Detects victims with the infrared sensor and catches them with the paper tube.
- Hardware problem: Tube not stiff enough, breaks after coming down.
  - Solution: changed tube material, now it's in stronger paper and does not break
- Software problem: balls detection not precise enough for the small area of the tube
  - Solution: used a different algorithm to center the ball with the robot and changed tube dimension to have more chances to catch the balls

Day 15:

05 – 06 – 2023

Gabriele Montrone

- Conducted a comprehensive final evaluation of the robot's capabilities and performance, corrected all possible errors and bugs.
- Compared the results with the project requirements and made any necessary adjustments.
- Prepared a detailed documentation of the construction process, including hardware and software configurations, challenges faced, and their corresponding solutions.