Robotics: Calibration

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Why Calibrate?

Calibration
Teaching the sensor what the correct value is

When you use EV3 Color Sensor in Light Sensor Mode (e.g., reflected light mode), you should calibrate it (not for Color Mode)

You need to “teach” the sensor what is “Black” and what is “White”

White reads as 100 and Black reads as 0

Perform calibration whenever light conditions change
Why Calibrate?

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Teaching the sensor what the correct value is

- When you use EV3 Color Sensor in Light Sensor Mode (e.g., reflected light mode), you should calibrate it (not for Color Mode)
- You need to “teach” the sensor what is “Black” and what is “White”
- White reads as 100 and Black reads as 0
- Perform calibration whenever light conditions change
A program that calibrates EV3 Color Sensors for black and white.

- Reset the existing calibration values
- Place the robot on “black”
- Read the data from the robot and calculate adjustment if needed for black.
- Repeat above steps for calibrating “white”.
Calibration

- Gyro in leJOS has `reset()` method for calibration mode
- Other sensor calibration steps:
  - Record the true value
  - Record the sensor value
  - Adjust the sensor value based on the true value
Calibrating non-sensors

Robotic measurements (e.g., wheels)

- Measure the wheel diameter
- Enter the measured diameter as the first parameter (in cm) in the DifferentialPilot's instance
- Run the program and check if the robot traveled the actual distance (e.g., `travel(100)``
- Adjust the diameter value (e.g., if distance traveled shorter than the actual distance, decrease the diameter)
Calibrating non-sensors

Robotic measurements (e.g., wheels)

- Next, measure the track width (distance between the center of the right and left wheels)
- Enter the track width as the second parameter in the DifferentialPilot’s instance
- Run the program and check if the robot rotated the actual distance (e.g., \texttt{rotate(360)})
- Adjust the track width (e.g., if over-rotated, decrease the track width)