The EV3-G educational edition is a powerful, easy-to-use icon-based software application for quick and easy programming of the LEGO MINDSTORMS robots. The educational edition of EV3-G is a greatly expanded version of the more limited program that comes with the retail set. It has more features such as data-logging, advanced programming and subroutine capabilities. The EV3 Software follows the very latest developments in intuitive software design, is optimized for classroom use, and is very student friendly. Programming with the EV3 Software is done by dragging and dropping icons into a line in order to form commands. The language’s graphical interface lets students build simple programs and then easily and intuitively build on their skills until they are developing complex algorithms.

The software comes with Robot Educator, the learning tool that includes 48 step-by-step multimedia tutorials designed to help educators and students master basic and advanced programming as well as hardware and data-logging functions. Every lesson is broken up into five parts: a video explaining the goals of the lesson; robot building instructions; a video on programming instructions; programming testing by the students; and finally program modification for continued learning. Students can learn all aspects of the programming interface. After completing all the lessons, students are prepared to program almost any kind of robot they can dream up, having learned all the principles of programming, sensor inputs, and motor outputs.

The software’s data-logging feature is a powerful science tool for carrying out experiments. It is easy to collect, view, analyze, and manipulate data from sensors and see the data in interactive graphs. Its unique feature, graph programming, makes experiments come alive as students can set threshold values for sensors, such as making a sound when a certain temperature is detected by the sensor. The educational edition of EV3-G also includes full data logging functionalities (including a graph viewer) that make it easy to collect data from sensors on the robot over time and later download it onto the students’ computers to analyze the data collected and export it into Excel or other spreadsheet or analysis software.

The built-in content editor enables teachers to customize the curriculum and create their own lessons. It enables students to capture their work directly inside the content creating their own digital workbook, making classroom management and assessment easier.

**Learning Values:**
- Using input and output devices and producing a simple set of sequential instructions linking cause and effect
- Developing and testing a system to monitor and control events
- Using intuitive prediction tools to get firsthand experience with making hypothesis
- Using the scientific inquiry process when gathering and analyzing data sets
- Integrating Math and Science using physical constants, units of measurement, coordinate systems, min, max, mean and linear formulas

**Unique Student Benefits:**
- Icon based, user-friendly programming tool
- Progressive platform for students from primary school to university (easy to advanced)
- User Guide with chapters covering programming and Data acquisition (DAQ)
- Capable of programming the EV3 brick to work with former NXT sensors and motors

**EV3 Model Designs Included with the Software**

**Driving Base with Arm** – The Driving Base is the primary model used with the Robot Educator. It uses all 3 motors, the Color Sensor, the Gyro Sensor, the Ultrasonic Sensor, and one of the Touch Sensors.

**Gyro Boy** – Gyro boy is a self-balancing robot that takes advantage of all EV3 motors and sensors as well as advanced programming to control its behaviors.

**Color Sorter** – Scan and load colored object and let the Color Sorter place them in the right area. The Color Sorter uses the Touch Sensor, Color Sensor and motors to control its movements.

**Puppy** – Interact with this charming robot. Pet it, feed it and experience its reactions. The Puppy uses the Color Sensor, Touch Sensor and advanced programming to control its behaviors.

**Robot Arm H25** – Pick up objects in specific locations and deliver them to another. The Robot Arm H25 uses the Color Sensor and Touch Sensor to control its movements.
The project-based lessons included in Robot Educator are task-oriented, hands-on and progressively ordered and broken up into skill groups:

**BASICS (Basic Programming)**
1. **Configuring Blocks** – Learn how to configure Programming Block modes, parameters and values.
2. **Straight Move** – Investigate different ways of controlling a Driving Base moving in a straight line.
3. **Curved Move** – Use the Move Steering block to steer the Driving Base.
4. **Tank Move** – Use the Tank block to steer the Driving Base.
5. **Move Object** – Program the Driving base to move and release the Cuboid.
6. **Stop at the Line** – Use the Color Sensor to stop the Driving Base when a line is detected.
7. **Stop at Angle** – Use the Gyro Sensor to navigate the Driving Base through a 45-degree turn.
8. **Stop at Object** – Use the Ultrasonic Sensor’s Wait for the Change mode to detect proximity to an object.
9. **Brick Programming** – Use the Brick Program App on the EV3 Brick to program the Driving Base.

**Beyond Basics (Advanced Programming)**
1. **Multitasking** – Use multitasking to move the Driving Base and play a sound at the same time.
2. **Loop** – Use the Loop block to repeat a series of actions.
3. **Switch** – Use the Switch block to make dynamic sensor-based decisions.
4. **Multiple Switch** – Program the Driving Base to move and turn when it detects different colors.
5. **Data Wires** – Experiment with three different types of data wires and how they can be used.
6. **Random** – Use the Random block to move the Driving Base at random speed and direction.
7. **Sensor Blocks** – Use sensor blocks to dynamically control the power of Driving Base motors.
8. **Text** – Display real-time sensor values and merge with text.
9. **Range** – Use the Ultrasonic Sensor to move the Driving Base forward when within a specified range of the Cuboid.
10. **Basic Math** – Use the Math block to calculate the speed of the Driving Base.
11. **Gyro Rate** – Experiment with rate of turn using the Gyro Sensor.
12. **Compare** – Use the Color Sensor to activate the Driving Base motors when it detects specific colors.
13. **Variables** – Use a variable to store the number of times the Driving Base motors will rotate.
14. **Calibrate Color Sensors** – Calibrate the Color Sensor in Light mode to increase sensitivity.
15. **Messaging** – Send messages from one EV3 Brick to another.
16. **Logic** – Experiment with And/Or conditions to control the Driving Base.
17. **Advanced Math** – Use trigonometry to navigate the Driving Base.
18. **Arrays** – Use multiple values stored in the EV3 Brick’s memory to navigate the Driving Base.

**Hardware (Engineering)**
1. **Brick Sound** – Play sound via the EV3 Brick’s built-in speaker.
2. **Brick Status Light** – Use the EV3 Brick Status Light to indicate program status.
3. **Brick Display** – Use the EV3 Brick Display to show images and text.
4. **Brick Buttons** – Operate the EV3 Brick using the built-in buttons.
5. **Large Motor** – Experiment with different ways of controlling the Large Motor.
6. **Medium Motor** – Experiment with different ways of controlling the Medium Motor.
7. **Touch Sensor** – Use the Touch Sensor to trigger program events.
8. **Gyro Sensor** – Use the Gyro Sensor to measure rotational movement.
9. **Color Sensor** – Use the Color Sensor to find different ways of detecting colors.
10. **Color Sensor (Light)** – Use the Color Sensor to detect changes in the light reflection intensity and ambient light.
11. **Ultrasonic Sensor** – Use the Ultrasonic Sensor to detect objects at various distances.

**DATA LOGGING (Statistics and Analysis)**
1. **Oscilloscope** – Experiment with the data logging software Oscilloscope mode.
2. **Live Data Logging** – Log real-time temperature data directly in the EV3 software application.
3. **Remote Data Logging** – Use the EV3 Brick to store collected data and then transfer it to a computer for analysis.
4. **Brick Data Logging** – Collect data using the EV3 Brick Datalog App.
5. **Autonomous Data Logging** – Collect data using a Driving Base operating autonomously.
6. **Dataset Calculation** – Create a calculated dataset based on data collected by the Color Sensor.
7. **Graph Programming** – Use the Graph Programming environment to program the Driving Base to perform actions while collecting data.

**TOOLS (Additional Tools)**
1. **Sound Editor** – Create a sound file for playback on the EV3 Brick.
2. **My Blocks** – Group multiple programming blocks into a single block.
3. **Image Editor** – Create images and display them on the EV3 Brick.

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