Schematic diagram of the interactive educational robot's

🔧 1. Hardware Components

Component	Description
Microcontroller	ESP32 (for Bluetooth/WiFi)
Chassis	Custom 3D-printed structure
Motors	2 DC motors with a motor driver
Caster Wheel	Stabilises the robot
RGB LED	For visual feedback
Reset / Start Button	For manual control or test start
Buzzer	Simple sound feedback
Battery	7.4v Li-ion or 18650 cells with voltage regulator

📱 2. Mobile App Structure (Flutter)

Module	Role
User Interface (UI)	Child-friendly interface with buttons and progress
Visual Programming Block	Blockly/Scratch-style interface to program paths
Interpreter Engine	Translates visual blocks into commands (FWD, LEFT, etc.)
Connection Handler	Manages Bluetooth/WiFi communication
Progress System	Unlocks levels and tracks learning progress

🔄 3. Communication Mode

Element	Description
Type	Bluetooth (ESP32)
Command Format	Simple strings: F, L, R, S, etc.
Data Flow	App → Robot (real-time or batch execution)
Robot Response	Optional: ACK, error signals, mission complete
Safety	Delay between commands, lost connection detection

Hardware Components
- Microcontroller
- Chassis
- Motors
- RGB LED
- Reset / Start Button
- Buzzer

Mobile App (Flutter)
- User Interface (UI)
- Visual Programming Block
- Interpreter Engine
- Connection Handler

Communication Mode

Type	Bluetoch or WiFi
Command Format	F, L, R, S, etc.
Data Flow	App → Robot
Robot Response	optional
Safety	Delay between cornmands Lost connection detection