



# SAKAR ENGLISH SCHOOL

## SUBJECT:- ROBOTICS AND CODING

### ROBOTIC NOTES



**A BO motor** is a DC gear motor used in robotics because it can turn things with good *twisting strength* and works on low voltage (3V-12V). These motors are used in smart cars, robots, and small projects. The one shown has a dual shaft, meaning it has output on both sides.

**Power Blox:** The Power Blox is always the first component in any robot's electronics.



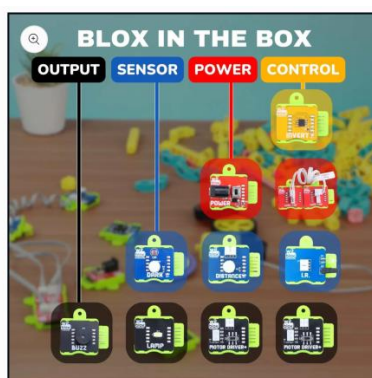
It supplies electrical power to all other blox. It takes input from a 9V battery and uses a voltage regulator to convert it to 5V for sensors, motors, and motor drivers. It also includes a sliding ON/OFF switch and an LED indicator to show power status.



**The Motor Driver+** block is used to control motors. Control forward and backward direction



**The Lamp block** is used to takes in electrical energy as input and gives out light



### **Distance & IR Blox**



The Distance Blox measures how close objects are, and the IR Blox detects nearby objects or surfaces. They are used for obstacle and edge detection. The IR Blox sends infrared light, and the Distance Blox measures the reflected light to find the distance.



**The Dark Sensor Blox** changes light intensity into electrical signals. It has an LDR (Light Dependent Resistor), the small brown part with a white snake-like pattern. The LDR's resistance changes depending on how much light falls on it.



**The Invert block** The Invert Blox works like a NOT gate, flipping the input signal and giving the opposite output. It is used in logic-based projects like Line Follower Robots to invert signals when needed.



**The Wire-Tap Blox** is an extension piece used to connect blocks and build circuit logic in different projects.



### Full forms

LDR:- Light Dependent Resistor

LED:- Light Emitting Diode

### *An Edge Avoiding Algorithm*

An edge-avoiding robot uses sensors to detect drops and prevent falling off surfaces. IR or ultrasonic sensors face downward to check if the ground is present. If the sensor sees a surface, the robot moves forward. If a sensor detects no reflection or a large distance, it means an edge. The microcontroller then stops the robot and turns it away from the edge. If both sensors detect an edge, the robot reverses and turns to a safe direction.

### *Black Line Following Algorithm :*

A line-following robot uses IR sensors to detect a black line on a white surface. IR light reflects strongly from white but is absorbed by black. So, the IR receiver gives a different signal for white (HIGH) and black (LOW). The microcontroller reads these signals to know where the line is and guides the robot to follow it

**Chandrayaan-3 :-** This mission was launched on **14 July 2023** and successfully soft-landed on the Moon's **south pole** on **23 August 2023**, making India the first country to do so. It had three main parts: **Propulsion Module, Vikram Lander**, and

**PragyanRover.Propulsion Module:** Took the lander and rover to lunar orbit and carried the SHAPE instrument to study Earth.

- **Vikram Lander (1471 kg):** Soft-landed on the Moon, took pictures, and studied the surface using instruments like ChaSTE and ILSA.
- **Pragyan Rover (27 kg):** A 6-wheeled rover that moved on the Moon's surface, detected sulfur and other elements, and could travel up to 500 m.

**Satellite:**-A satellite is an object that moves around a planet.

- **Natural Satellite:** Example – Moon (Earth's natural satellite).
- **Artificial Satellite:** Man-made and launched into space.
- **Orbiter:** A satellite that circles a planet, takes pictures, and sends data to Earth

**Aditya-L1 (Suryayaan):**-Aditya-L1, launched on **2 September 2023**, is India's first mission to study the **Sun**. It orbits the **L1 point**, 1.5 million km from Earth, giving it a nonstop view of the Sun.

**MangalyaanMars Orbiter Mission:**-Mangalyaan was India's first mission to **Mars**, launched on **5 November 2013**. It entered Mars orbit on **24 September 2014**, making India the first country to succeed on its first attempt.

- **Purpose:** Develop interplanetary mission technology and study Mars' atmosphere and surface.
- **End of Mission:** Contact lost in **2022** due to lack of fuel.

**LED (Light Emitting Diode)**-An LED is a small electronic light that glows when electricity passes through it. It uses very little power and comes in many colours.

**Capacitor**-A capacitor stores small amounts of electrical energy and releases it when needed. It works like a tiny rechargeable battery used in circuits.

**Resistor**- A resistor controls or reduces the flow of electric current in a circuit. It protects components by preventing too much electricity from passing through.

**Open Circuit**- An open circuit has a break or gap, so electricity **cannot** flow.  
Example: a switch turned **OFF**.

**Closed Circuit**- A closed circuit has no breaks, so electricity **can** flow.  
Example: a switch turned **ON**

**Conductors**-Conductors allow electricity to pass through them easily.  
Examples: copper, aluminium, iron.

**Insulators**-Insulators do **not** allow electricity to pass through them.  
Examples: rubber, plastic, wood.

**Resistance** is the property of a material that **slows down or opposes** the flow of electric current. It is like a blockage in the path of electricity.

It is measured in **ohms ( $\Omega$ )**.

High resistance → less current flows.

Low resistance → more current flows.

Resistors are components used to create resistance in a circuit.

### **Series Connection**

In a **series connection**, components are connected **one after another** in a single path.

- Same current flows through all components.
- If one component breaks, the whole circuit stops working.

Example: Old-style decorative lights.

### **Parallel Connection**

In a **parallel connection**, components are connected **side by side**, creating multiple paths for current.

- Each component gets the same voltage.
- If one path breaks, the others still work.

Example: Lights in homes.