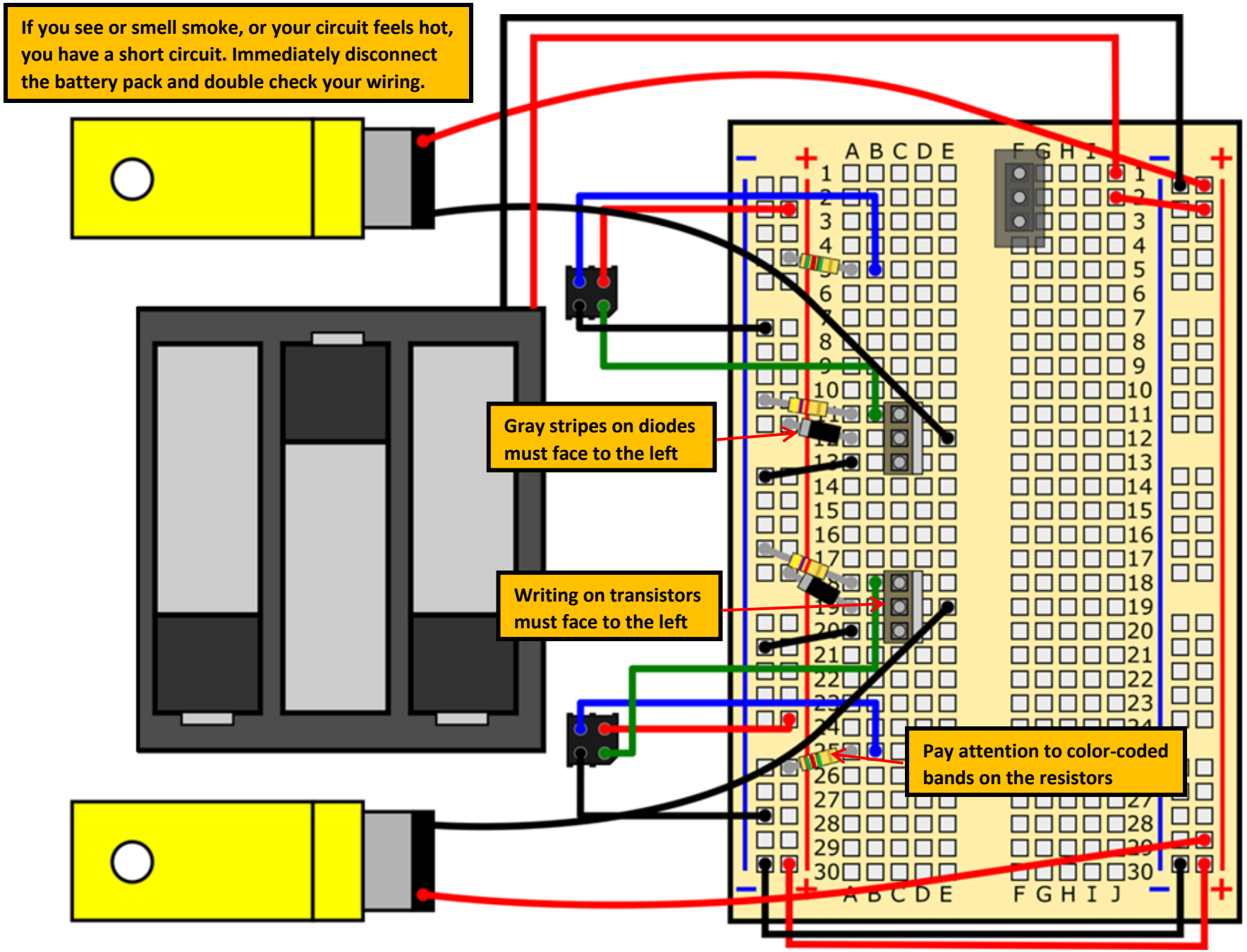
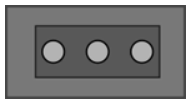
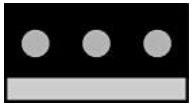
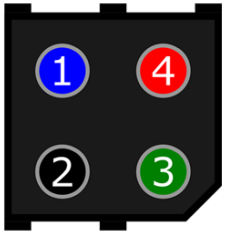
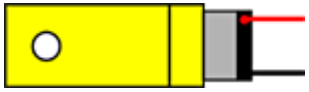
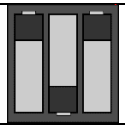
Line-Following BlueBot: Wiring diagram and parts list

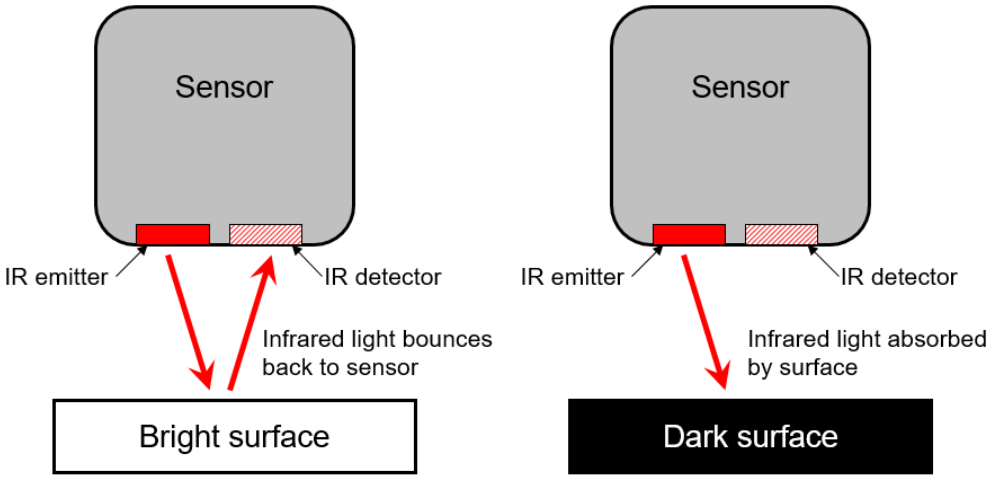
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Component	Picture	Symbol	Connections	Description
Power switch			F1, F2, F3 Direction does not matter	Used to turn the entire circuit on and off.
Jumper wires (x5)			1: J2 to (+) bus 2: A13 to (-) bus 3: A20 to (-) bus 4: Left (+) bus to right (+) bus 5: Left (-) bus to right (-) bus	Used to make electrical connections between different points on the breadboard. They come in many different colors. Color does not matter, pick a wire with an appropriate length.
Transistor (x2)			1: C11, C12, C13 2: C18, C19, C20 Writing must face to left (see diagram)	Like a “valve” that controls that flow of electricity to the motors to turn them on and off.
Diode (x2)			1: A12 to (+) bus 2: A19 to (+) bus Gray stripe must face to the left	Used to protect the transistors from electrical damage when the motors stop abruptly.
4.7 kΩ resistor (x2)			1: A11 to (-) bus 2: A18 to (-) bus Yellow, purple, red, gold stripes Direction does not matter	Connected to the transistors to make sure they are “off” by default when no IR light is reflected to the sensor.
150 Ω resistor (x2)			1: A5 to (+) bus 2: A25 to (+) bus Brown, green, brown, gold stripes Direction does not matter	Used to limit the amount of electrical current that flows through the IR sensors, preventing them from burning out
IR sensors (x2)			View sensors from the bottom (pins facing you) with the notch in the lower right. 1: pin 1 to B5, pin 2 (-) bus, pin 3 to B11, pin 4 to (+) bus 2: pin 1 to B25, pin 2 to (-) bus, pin 3 to B18, pin 4 to (+) bus	Note: use male-female jumper wires to connect the pins to the breadboard. The notch in one corner is small and can be hard to see. The sensors emit infrared (IR) light and detect whether it is reflected back from a nearby surface. They allow the robot to follow a line.
Motors (x2)			1: Red wire to (+) bus Black wire to E12 2: Red wire to (+) bus Black wire to E19	Each motor drives one of the robot’s wheels.
Battery pack			Red wire to J1 Black wire to (-) bus	The batteries provide power to the entire circuit.

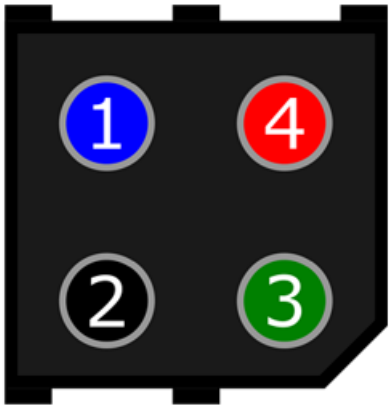
Using the Infrared (IR) sensors

The sensors work by sending out infrared light and detecting whether it is reflected back from a nearby surface.



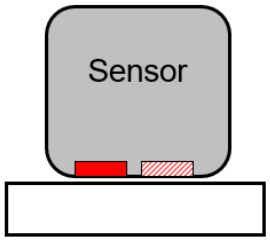
Hold the sensor with the pins facing you, and the small diagonal notch in the bottom right. Use color-coded male-female jumper wires to connect the pins to the breadboard.



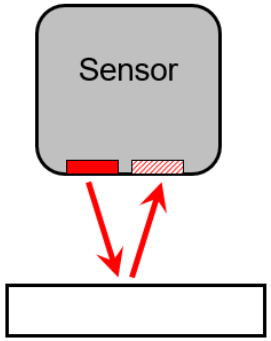


You need to mount the sensors to the front of your robot. Their faces should be a few millimeters off the ground. They will not work properly if they are too close or too far away from the surface. Use tape so you can adjust the height.

Sensor too close to surface, the detector is blocked and will not work properly even if the surface reflects IR light



Sensor an appropriate distance from surface



Sensor too far away – not enough light is reflected back for the detector to measure it

