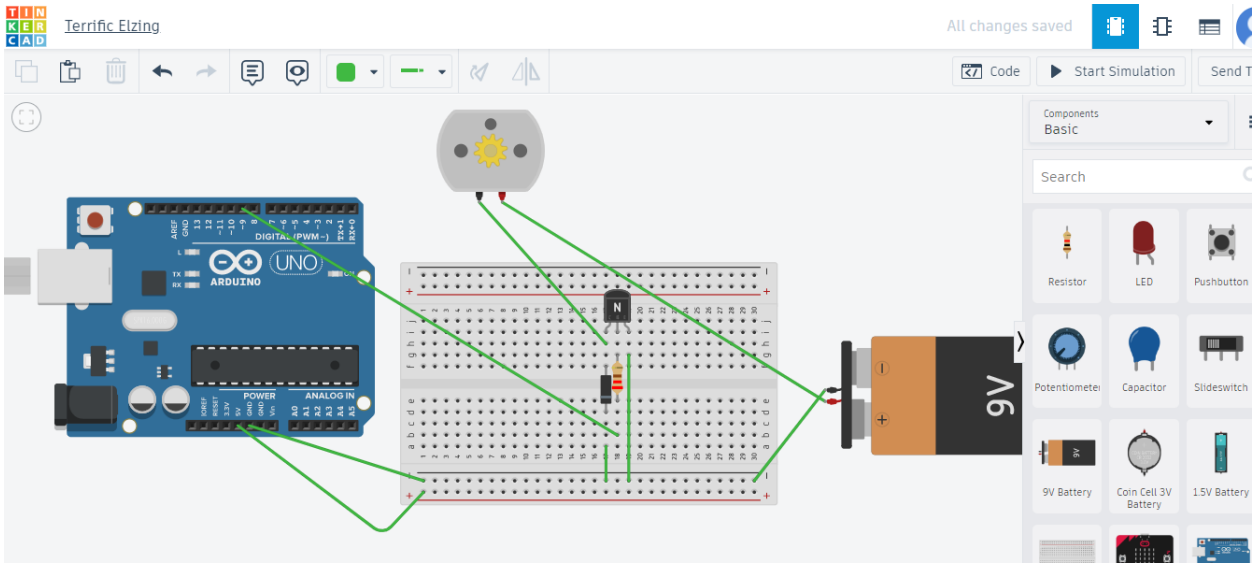
Program to demonstrate DC motor using Arduino uno in tinkercad step by step in a simple and easy way



Step 1: Set Up Tinkercad

1. **Log in** to Tinkercad.
2. Click on **“Circuits”** and then **“Create new Circuit.”**

Step 2: Add Components

1. **Arduino Uno**: Drag it onto the workspace.
2. **DC Motor**: Add it to the workspace.

3. **9V Battery**: Drag it into the circuit.
4. **NPN Transistor** (e.g., 2N2222): Add it.
5. **Diode** (e.g., 1N4007): Add it.
6. **Resistor** (220Ω): Place it in the workspace.
7. (Optional) **Breadboard**: Add it for organization.

Step 3: Wire the Components

1. **Motor**:
    - Connect one terminal to the **collector** of the NPN transistor.
    - Connect the other terminal to the **positive** terminal of the battery.
2. **Diode**:
    - Connect the **anode** (no stripe) to the collector.
    - Connect the **cathode** (stripe) to the **negative** terminal of the battery.
3. **Transistor**:
    - Connect the **emitter** to the **ground (GND)** rail.
    - Connect the **base** to one end of the resistor; connect the other end to **digital pin 9** on the Arduino.
4. **Power Connections**:
    - Connect the **negative terminal** of the battery to the GND rail.
    - Connect the **GND** pin of the Arduino to the GND rail.

Step 4: Write the Arduino Code

1. Click the **"Code"** button.
2. Replace the default code with:

```
int motorPin = 9; // Motor control pin

void setup() {
  pinMode(motorPin, OUTPUT); // Set pin as output
}

void loop() {
  digitalWrite(motorPin, HIGH); // Turn motor ON
  delay(2000);                  // Wait for 2 seconds
  digitalWrite(motorPin, LOW);  // Turn motor OFF
  delay(2000);                  // Wait for 2 seconds
}
```

Step 5: Simulate the Circuit

1. Click **"Start Simulation."**
2. Observe the motor: it should turn on for 2 seconds and then off for 2 seconds, repeating this cycle.

Step 6: Debugging (if needed)

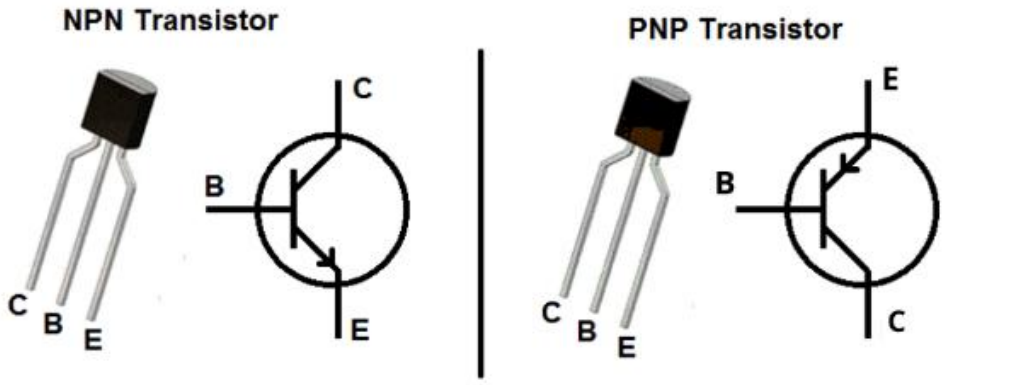
- **Check connections**: Ensure they are correct.
- **Verify code**: Ensure there are no syntax errors.

Conclusion

You've successfully set up a DC motor controlled by an Arduino Uno! The motor will turn on and off in a loop as programmed. Enjoy experimenting!

An **NPN transistor** is a device that can control a larger electrical current using a smaller one.

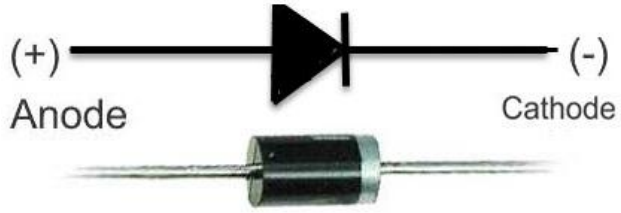
You can think of an NPN transistor like a water faucet. When you turn the handle (the base), it allows a larger flow of water (current) to come out from the pipe (collector) to the drain (emitter). A little twist controls a much bigger flow! a small turn (input current) controls a larger flow of water (output current) from the pipe.

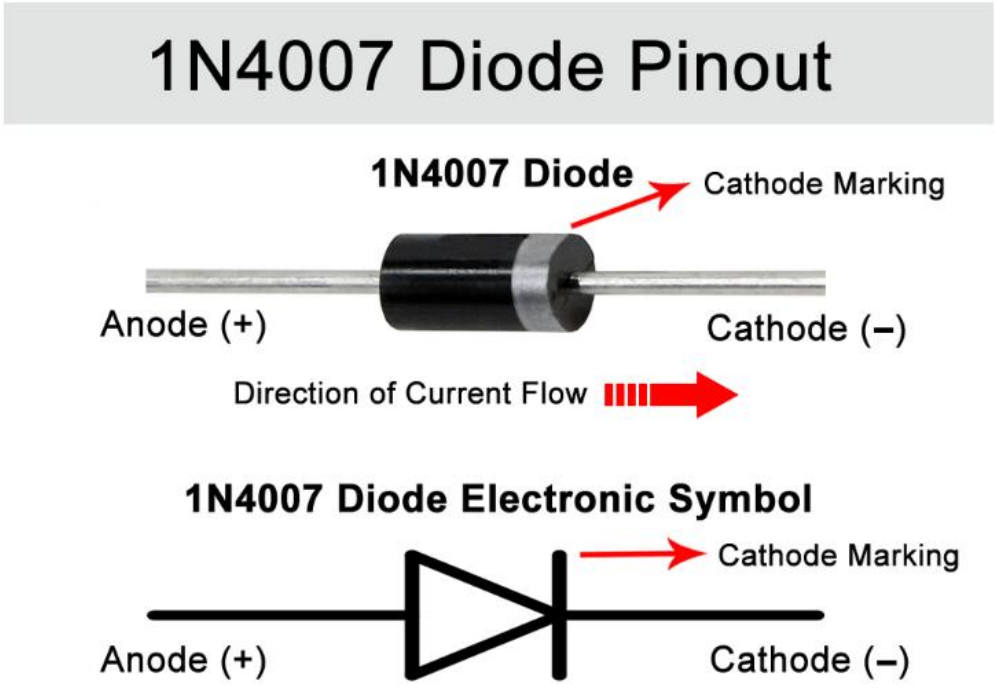


– base terminal; E – emitter terminal; C – collector terminal

- A **diode** is a semiconductor device that allows current to flow in one direction only, acting as a one-way valve for electrical current. It consists of a p-n junction and is used in various

applications like rectification, voltage regulation, and signal demodulation. In circuits, diodes protect components from reverse polarity and voltage spikes.



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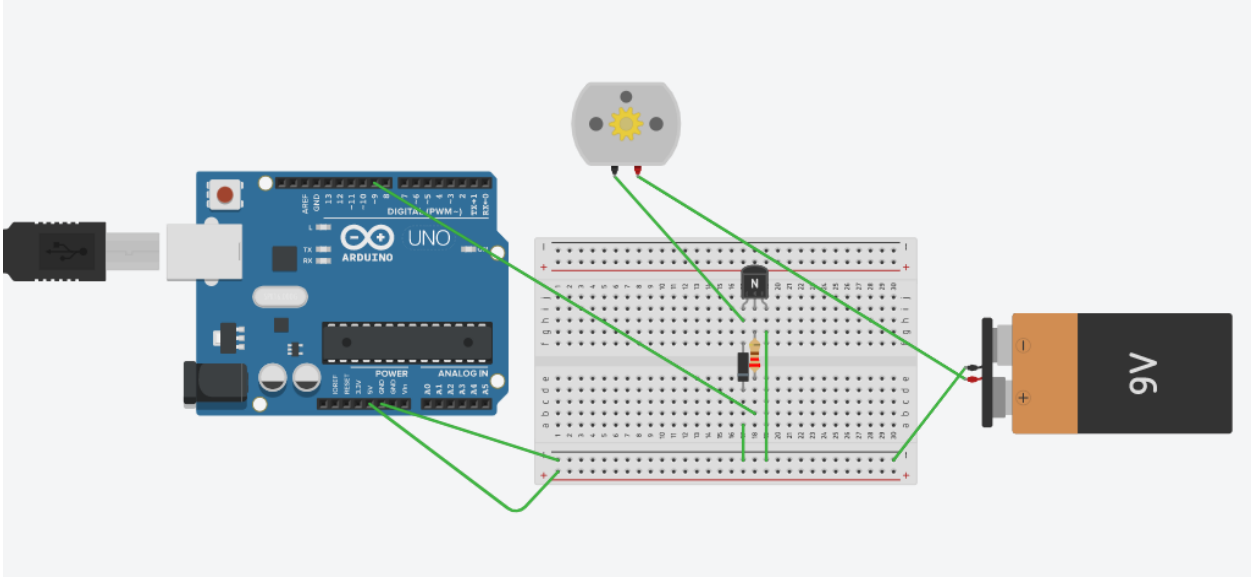


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