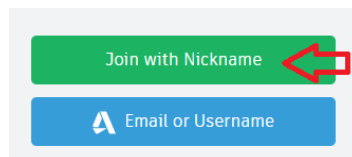


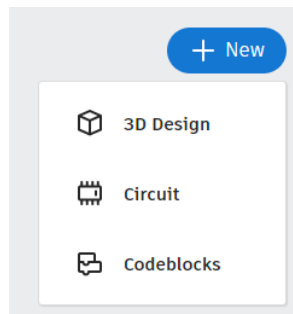
Student Solutions

Getting Started

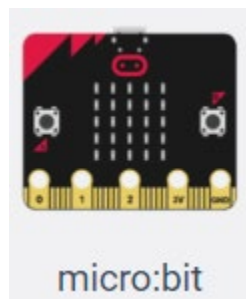
1. Sign-up on <https://www.tinkercad.com/>, choose “Students with Class Code”, and use the code given by the teacher to get started.
2. Choose “Join with Nickname”



3. Choose “NEW” → “Circuit” to create a new circuit on TinkerCad.

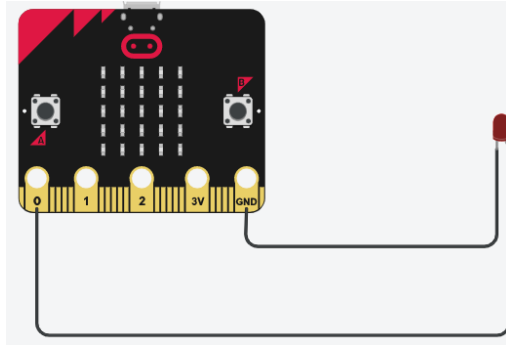


4. Add a micro:bit to your program to get started.

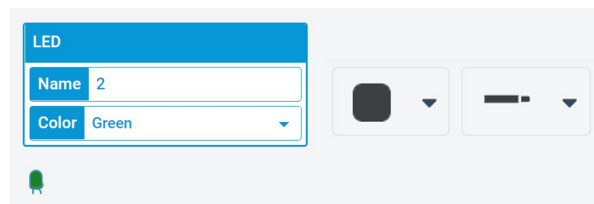


Circuits in Series

1. Start by creating a simple circuit like this one.



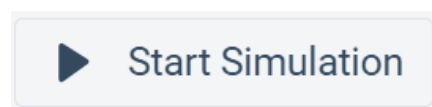
Note: You can change the colour of the wires and LEDs with the menus.



2. Select the Code section and create this program.



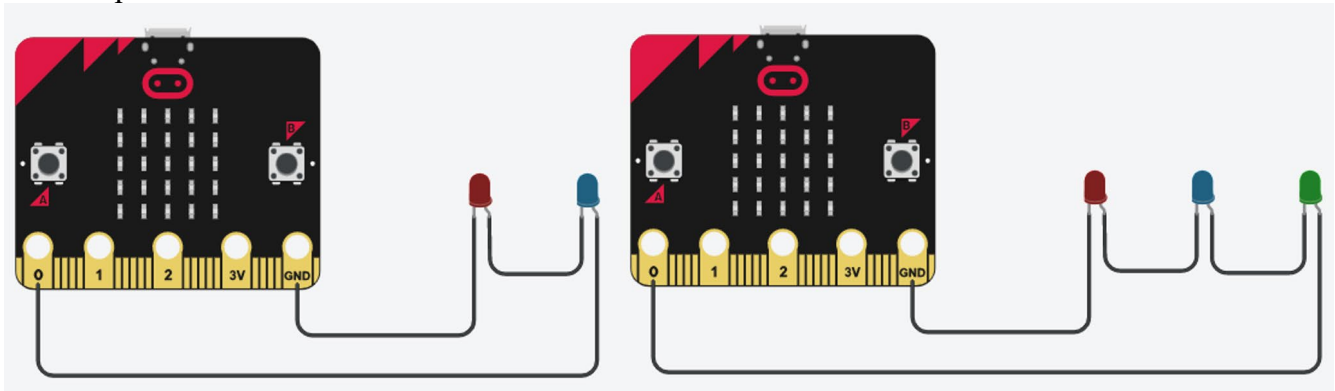
3. Click start simulation. What do you observe?



Observation:

The red LED blinks every second.

4. Add a second LED to your simple circuit. Start the simulation and record what you observe. Repeat this with a third LED.

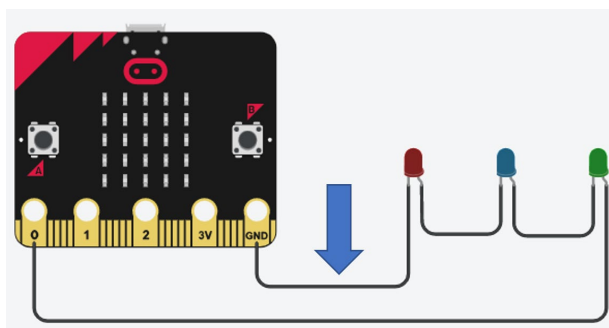


Observation:

The red and blue LED still blink, but less bright.

The red, blue and green LED don't have enough power to blink.

5. Delete the wire shown. Start the simulation and record what you observe.

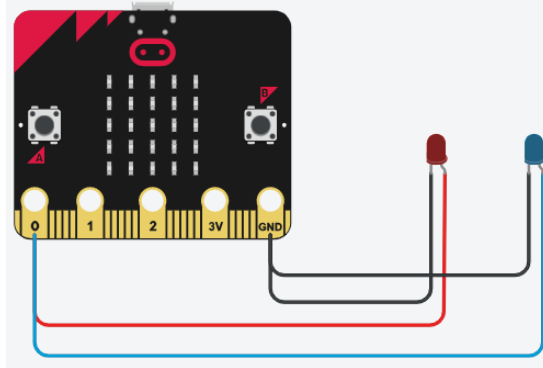


Observation:

None of the LEDs blink.

Circuits in Parallel

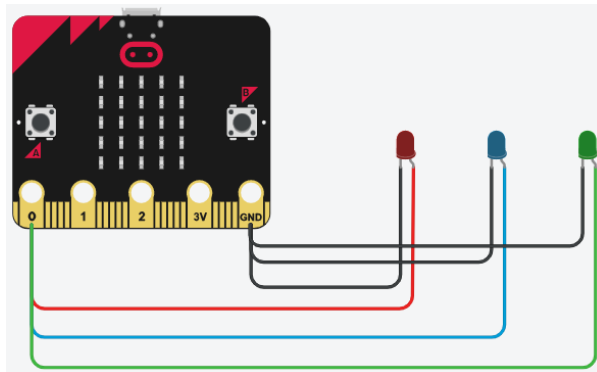
1. Start with your simple circuit and add a second LED in parallel. Run the simulation and record what you observe.



Observation:

Both the red and blue LED blink with the same level of brightness.

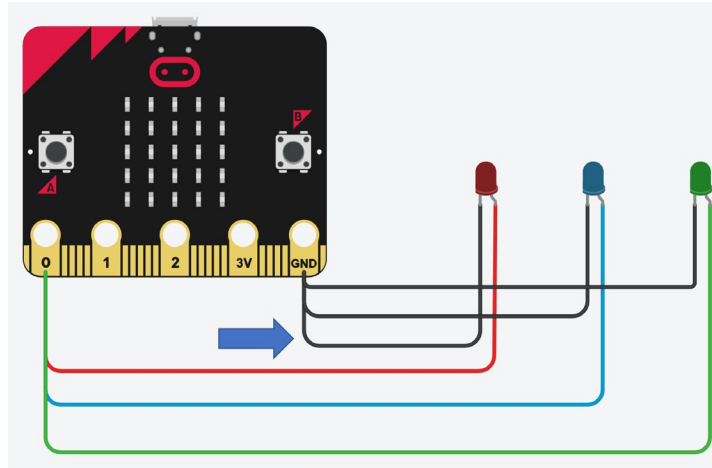
2. Add a third LED in parallel. Run the simulation and record what you observe.



Observation:

All three LEDs blink with the same level of brightness.

3. Delete the wire shown. Start the simulation and record what you observe.

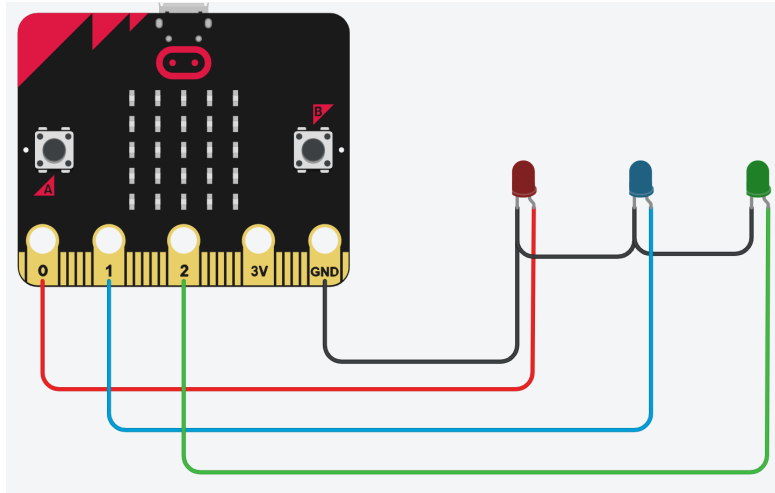


Observation:

The red LED stops blinking. The other two still blink.

Mystery Circuit

1. Create this circuit and run the simulation with the code that you already have. Record your observations.



Observation:

Only the red LED blinks.

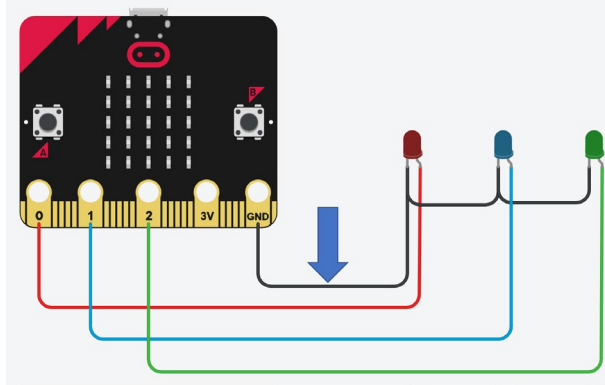
2. Try to choose another ‘pin’, for example “P1” or “P2”. What do you observe now when you run the code?

Observation:

The blue or green LED can be made to blink by changing the pin.

3. **Coding Challenge A.** Create a program so that the LEDs light up one after the other. Refer to the coding challenge handout.
4. **Coding Challenge B.** Create a program that will turn on all the LEDs at once. Refer to the coding challenge handout.

5. Using the code that turns on all the LEDs at once, delete this black wire, and run the simulation. What do you observe?



Observation:

None of the LEDs blink.

Conclusion

Based on your observations, is the mystery circuit a circuit wired in series or in parallel? Why do you think that is the case?

This circuit is done in series. This is evident when cutting one wire causes the rest to stop working.
