

S2: Arm and Disarm the System

Student Worksheet • Intermediate Challenge

DIFFICULTY



🎯 YOUR MISSION

In S1 anyone could set off your alarm at any time. Real security systems aren't switched on all the time. They're armed when you leave, and disarmed when you get back. Add that missing piece: a system that remembers whether it's on guard.

🏠 REAL-WORLD SCENARIO

Think of a house with a burglar alarm. When the family leaves, someone taps a code into a keypad by the door to arm the system. From then on, opening a door or window sets off the siren. When they get home, the same keypad disarms it before anyone walks in and trips it by accident. Your Button A and Button B are standing in for that keypad: one arms, one disarms.

What you need to do

- Use Button A to arm the system (show a locked icon) and Button B to disarm it (show an unlocked icon).
- Add a separate trigger (e.g. shaking the micro:bit, or a third input) that only sets off the alarm if the system is currently armed.

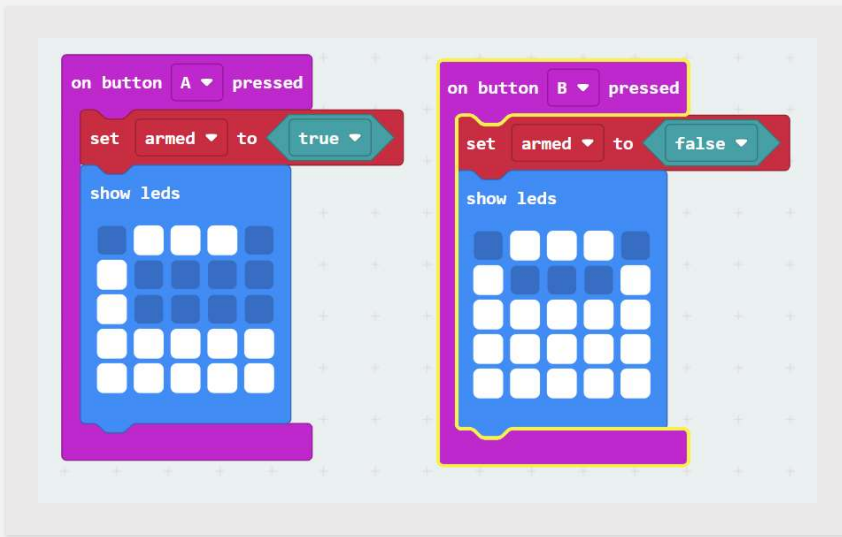
Concepts introduced

Variables

State management

Conditional logic (if armed)

Starter code



Equipment needed: just the micro:bit, nothing else. It uses the shake sensor built in.

YOUR TASK

This only arms and disarms. Add your own "on shake" block: inside it, use an "if armed" check, and only then show "INTRUDER" and play a tone.

Tone I used: _____

< > PSEUDOCODE

This is plain-English pseudocode, not real code to copy into MakeCode. Your blocks will need to do the following; you'll build it yourself with the actual blocks.

```
on button A pressed:
  set armed to true
  show leds (lock icon)

on button B pressed:
  set armed to false
  show leds (unlock icon)

on shake:
  if armed:
    show string ____ // FILL IN THE BLANK
    play tone ____ for ____ // FILL IN THE BLANK
```

Build it: checklist

- ☐ Pressing A shows the locked icon and arms the system; pressing B shows the unlocked icon and disarms it.
- ☐ Shaking while armed shows "INTRUDER" and plays the alarm tone.
- ☐ Shaking while disarmed does nothing at all.



WHAT DO YOU NEED TO THINK ABOUT?

What should happen if the system is shaken while it's disarmed. Should anything happen at all?

Extension

Finished early? Try one of these:

- ☐ Exit delay: real systems give you a few seconds to leave before they actually arm. Add a "pause" after pressing A, and show a countdown ("3, 2, 1") before switching armed to true.
- ☐ Add a counter that tracks how many times the alarm has gone off, and show it on the display when Button B disarms the system.
- ☐ Swap the shake trigger for the light sensor: if it's armed and the room goes dark (or a torch shines on it), sound the alarm instead.

→ NEXT STEPS

This feeds into Challenge S3.