

S3: Add a PIN Code

Student Worksheet · Advanced Challenge

🎯 YOUR MISSION

Right now, anyone can arm or disarm your system just by pressing a button. Add a PIN code, so the system only arms or disarms when the right sequence of button presses is entered. It's the last piece of a real access-control system.

🏠 REAL-WORLD SCENARIO

Think of a keypad by a door, or the PIN on a bank card. It doesn't matter who presses the buttons. What matters is whether the sequence they enter matches the one on file. Get it right, and you're in; get it wrong, and it resets and makes you start again. Buttons A and B are your keypad; a short sequence like "AABA" is your PIN.

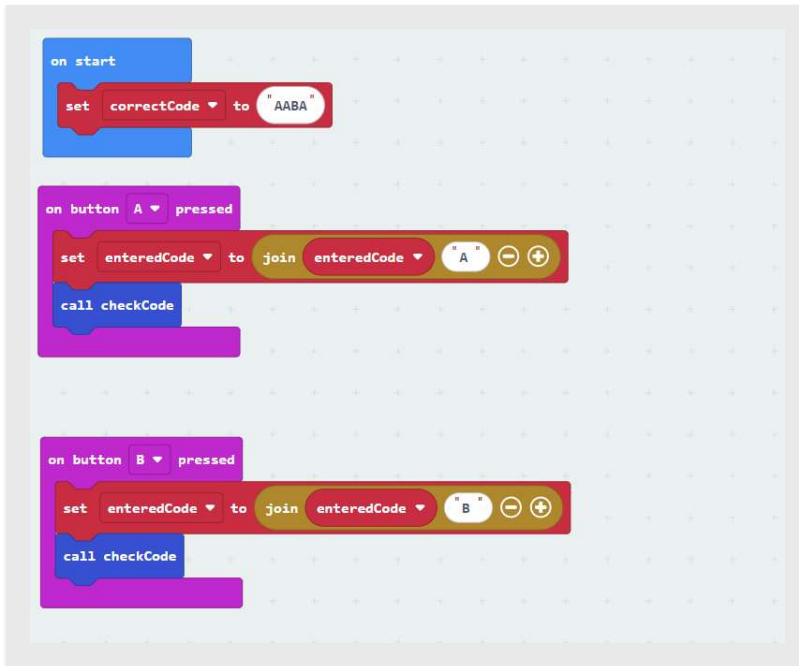
What you need to do

- Store a correct code (e.g. "AABA") and build up an entered code one button press at a time.
- After every press, check the entered code against the correct one, and react as soon as they're the same length.
- Show a happy face if it matches, show an "open lock symbol" and reset if it doesn't.

Concepts introduced

[Strings](#)[Functions](#)[Comparison operators](#)

Starter code



Equipment needed: just the micro:bit, nothing else.

YOUR TASK

Every button press calls a function named "checkCode" that doesn't exist yet. Write it: compare enteredCode to correctCode once they're the same length, show the right icon, and reset enteredCode if it's wrong.

My correct code was: _____

<> 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.

```

SET correctCode to "AABA"
SET enteredCode to "" (empty)

WHEN button A is pressed:
  ADD "A" to the end of enteredCode
  RUN checkCode

WHEN button B is pressed:
  ADD "B" to the end of enteredCode
  RUN checkCode

FUNCTION checkCode:
  IF length of enteredCode EQUALS length of correctCode:
    IF enteredCode EQUALS ____:      // FILL IN THE BLANK
      SHOW ____                      // FILL IN THE BLANK
    ELSE:
      SHOW ____                      // FILL IN THE BLANK
  RESET enteredCode to "" (empty)
  
```

WHAT DO YOU NEED TO THINK ABOUT?

Why check the length before checking the letters? What would go wrong if you compared `enteredCode` to `correctCode` on every single button press, from the very first one?

Extension

Finished early? Try one of these:

- ☐ Lock out after three wrong attempts: count failed tries, and once it hits three, disable Button A and B for a few seconds.
- ☐ Show the entered code's length on the display as the student types it, like a keypad showing how many digits you've entered so far.
- ☐ Only let the code arm/disarm the S2 system, instead of just showing an icon: combine S2 and S3 into one build.

Build it: checklist

- ☐ Entering the correct sequence shows the happy face.
- ☐ Entering the wrong sequence (same length) shows "X" and resets.
- ☐ Nothing happens until enough presses have built up a code the same length as `correctCode`.

→ NEXT STEPS

This is the final piece of the Building a Smart City security track. You've now built sensing, responding, state, and access control.