Flowchart symbols and rules

LEARNING INTENTION

We are learning to use the Data Booklet flowchart symbols and rules correctly.

SUCCESS CRITERIA — I CAN

- ☐ name each flowchart symbol and what it is used for
- ☐ use the right symbol for each step
- ☐ follow the arrow rules for flow lines
- ☐ start and end a flowchart correctly

Data Booklet symbols (page 6)

Symbol	Name and use
	**Terminator** Start and end of a program or sub-procedure.
	**Input/Output** Switch outputs on or off, or read an input.
	**Process** Something inside the microcontroller, e.g. a delay.
	**Decision** A yes/no question. Two routes out.
	**Sub-procedure** Calls a sub-procedure (a mini program).

Flow line rules

Down or right
No arrow needed (you may add one).

Up or left
Arrow needed.

One way in
Lines join a flow line; they never cross a symbol.

SHORT CIRCUIT

× WHAT EXAMINERS SAW

Some candidates drew the first decision as an output parallelogram, so the symbol mark was lost.

✓ THE FIX

A question with a yes/no answer always goes in a diamond (decision). Outputs go in a parallelogram.

Course report 2025, Question 9(a).

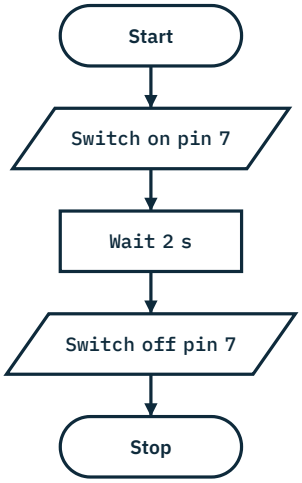
Flowchart symbols and rules

A first flowchart

WORKED EXAMPLE Choosing symbols for a sequence

1 GIVEN	2 FIND	3 FORMULA	4 SUBSTITUTE	5 ANSWER + UNIT
1. A green LED on pin 4 turns on. 2. After 3 s it turns off.	flowchart	output → Input/Output delay → Process start/end → Terminator	Start Switch on pin 4 (I/O) Wait 3 s (process) Switch off pin 4 (I/O) Stop	**5 symbols, top to bottom**

Every flowchart begins with Start and (unless it loops forever) ends with Stop.

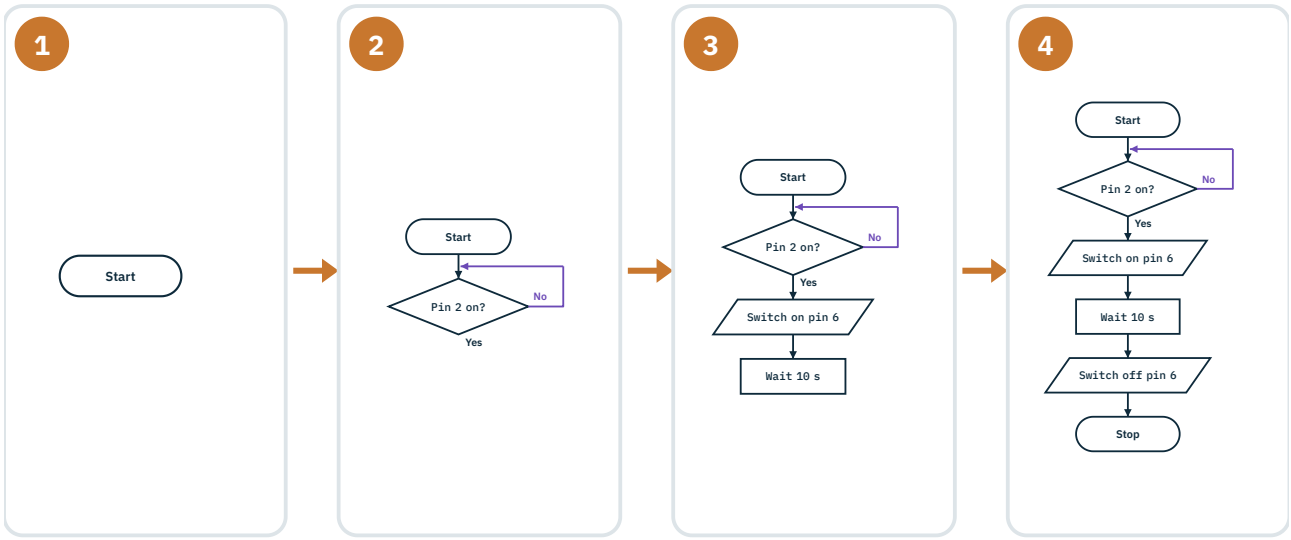


Lamp on pin 7 for 2 s

Flowchart symbols and rules

Building a flowchart

BUILDING A FLOWCHART ONE SYMBOL AT A TIME



Start | Add the decision | Outputs and delays | Finish with Stop

WORKED EXAMPLE Symbol for each step

1 GIVEN	2 FIND	3 FORMULA	4 SUBSTITUTE	5 ANSWER + UNIT
1. Wait for the start switch (pin 2) 2. Switch on the fan (pin 6) 3. Wait 10 s 4. Switch off the fan	symbols	question → decision output → I/O delay → process	Pin 2 on? → decision Switch on pin 6 → I/O Wait 10 s → process Switch off pin 6 → I/O	**Decision, I/O, process, I/O**

WORKED EXAMPLE Where do arrows go?

1 GIVEN	2 FIND	3 FORMULA	4 SUBSTITUTE	5 ANSWER + UNIT
a loop goes back up to the decision	arrow needed?	up or left → arrow	the loop goes upwards	**Yes: arrow on the loop line**

Flowchart symbols and rules

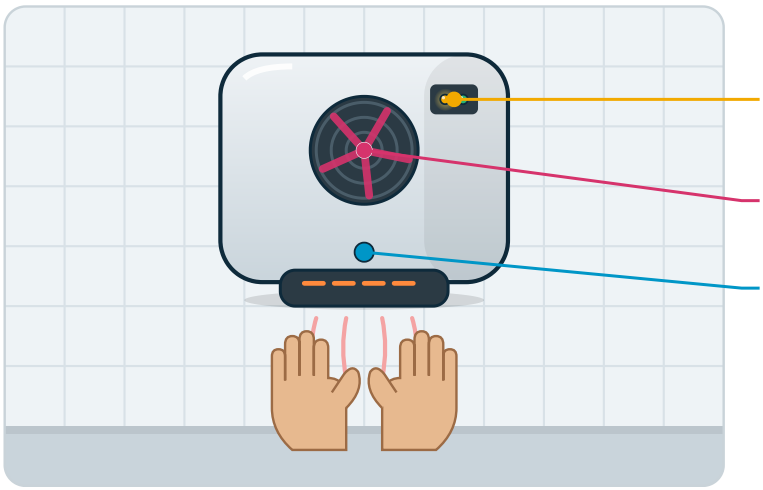
WRONG Course report 2025: a decision drawn as a parallelogram loses the mark.



RIGHT A question goes in a diamond.



A hand dryer runs a flowchart



Flowchart symbols and rules

REAL ENGINEERING · KINBRAE LIGHTHOUSE

Lighthouse engineers at Kinbrae (fictional) plan every new light sequence as a flowchart first.

Checking the symbols and arrows on paper finds mistakes before the microcontroller is programmed.

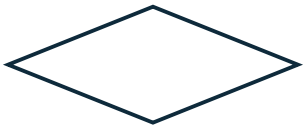
PROBE · QUICK CHECKS

1. Symbol for a delay? _____
2. Symbol for a yes/no question? _____
3. When must a flow line have an arrow? _____

EXAM READY · 6 MARKS

1 **State** the name of the flowchart symbol used to switch an output on. **[1]**

2 **State** the name of this symbol. **[1]**



3 A buzzer on pin 6 sounds for 4 s and then stops. **Complete** the flowchart. **[4]**