

Name _____

Class _____

Date _____

By the end of this worksheet I can...

- ☐ draw flowcharts with start/stop, input, output, decision and loop symbols
- ☐ use fixed loops, continuous loops and conditional loops
- ☐ write programs using high, low, pause, if...then, for...next
- ☐ use subroutines, variables and analogue inputs in a program
- ☐ find faults in a program and correct them

I DO**Worked example**

Read how a full-mark answer is built

A program is meant to loop continuously but stops after one cycle.

1 Identify the fault and write the correction. (2 marks)**Full-mark answer** each ✓ is one mark

The program never returns to the start, so it stops after one cycle ✓. Add the line "goto main" at the end ✓.

Why marks are not awarded

"The loop is missing."

0 marks: no corrected line written.

WE DO**Guided practice**

Use the starters and word bank to help you

A traffic light sequence must repeat 20 times then stop.

2 Describe how a fixed loop is used in the program. (2 marks)**Sentence starters**

First, ...

Next, ... using a ...

Word bank

repeats · surrounds · program · sequence

Tip: 2 marks = 2 separate, developed points.

YOU DO**On your own** No notes. Check your answers afterwards.**3 Quick check: tick one box for each.**

- a) Which symbol tests whether a switch is pressed?
☐ Parallelogram ☐ Diamond ☐ Rectangle ☐ Oval
- b) Increasing the mark (on time) in a PWM signal makes a motor...
☐ Slower ☐ Faster ☐ Reverse ☐ Stop
- c) "for b0 = 1 to 15 ... next b0" is a...
☐ Continuous loop ☐ Decision ☐ Fixed loop ☐ Delay
- d) Which is an advantage of a microcontroller over a hard-wired circuit?
☐ It needs no software to be written ☐ Fewer components, so more reliable ☐ It is always cheaper than any chip ☐ It never needs a driver for outputs

4 Key terms: write the letter of the matching description next to each term.

1. Sub-procedure	_____	A Parallelogram, e.g. "pin 7 on".
2. ADC reading	_____	B Diamond with Y/N exits, used to test an input or a count.
3. Decision symbol	_____	C Rectangle with a time and unit, e.g. "wait 2 s".
4. Output symbol	_____	D Code called with gosub and ended with return.
5. Delay symbol	_____	E Repeats a set number of times.
6. Fixed loop	_____	F $V_{in} \div V_{ref} \times 255$

*A flowchart uses different symbols.***5 Draw the flowchart symbol for a decision and for an output.** (2 marks)

*A program reads an LDR on an analogue input into a variable.***6 Describe how the program could switch on a lamp when the reading is below 80.** (2 marks)

A flowchart switches on an LED on output 2 when a switch on input 0 is pressed, waits 3 seconds, then switches it off, and repeats.

7 Write a program for the flowchart. (4 marks)

Check and reflect

Mark your answers with the answer sheet. Go back to the checklist on the site and re-rate each “I can” statement above. Which one still needs work?
