

Exercise walk-through

Iteration ■ 3.8

eXercise

You must be able to

- explain how **iteration** 迭代 repeats a block of code using a loop
- use a **repeat** loop to run a block a fixed number of times
- use a condition-controlled loop that continues **until** a condition is true
- identify and avoid an **infinite loop** 无限循环

Method — Iteration

A **loop** repeats a block of code. A **repeat** loop runs a fixed number of times; an **until** loop runs until a Boolean condition becomes true.

Method — Infinite loops

A loop that never meets its stopping condition is an **infinite loop** — it never ends, so avoid it.

Method — Tracing

Follow the variables across iterations: start `total` at 0, repeat “add 2” three times, and `total` becomes 6.

Practice 2.1 ■ 1 mark

State what iteration does.

Solution 2.1

Worked steps

it repeats a block of code (using a loop) **B1**.

Practice 2.2 ■ 2 marks

A loop starts `total` at 0 and adds 5 each time, repeating 4 times. State the final total.

Solution 2.2

Worked steps

$$0 + 5 + 5 + 5 + 5 = 20 \quad \text{M1} \quad \text{A1}.$$

Practice 2.3 ■ 1 mark

State what an infinite loop is.

Solution 2.3

Method: Infinite loops

Worked steps

a loop that never meets its stopping condition, so it runs forever **B1**.

Exam-style 3.1 ■ 1 mark

A loop that repeats a block a fixed number of times is a

A conditional

B repeat loop

C variable

D list

Solution 3.1

Method: Iteration

A conditional

B repeat loop 

C variable

D list

Worked steps

B.

Exam-style 3.2 ■ 1 mark

A loop that never meets its stopping condition is

- A** efficient
- B** an infinite loop
- C** a filter
- D** a substring

Solution 3.2

Method: Infinite loops

- A efficient
- B an infinite loop 
- C a filter
- D a substring

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A counter starts at 1 and doubles each time, repeated 3 times ($1 \rightarrow 2 \rightarrow 4 \rightarrow 8$).

- (a) State the final value.
- (b) State how many times the block ran.
- (c) Name the general idea of repeating code.

Solution 3.3

Method: Iteration

Worked steps

(a) 8 **B1**. (b) 3 times **B1**. (c) iteration **B1**.