

Exercise walk-through

while Loops ■ 2.7

eXercise

You must be able to

- write a **while loop** 当型循环 that repeats while its condition is true
- understand that the condition is tested **before** each pass
- update a **loop control variable** 循环控制变量 so the loop makes progress

Method — while loop

```

k+ktint+w ni+w o+=w l+m+mi0p,+w nsum+w o+=w l+m+mi0p;
kwhile+w p(ni+w o+w l+m+mi3p)+w p+w    c+c1// tested before each pass
+w    nsum+w o+o+=w nip;
+w    nio+o+p;+w                c+c1// update, or the loop never ends
p

```

Method — Progress toward stopping

The **loop control variable** must change so the condition eventually becomes false; otherwise the loop runs forever (an infinite loop).

Practice 2.1 ■ 1 mark

State when a while loop tests its condition.

Solution 2.1

Worked steps

before each pass through the loop **B1**.

Practice 2.2 ■ 1 mark

State what happens if the loop control variable is never updated.

Solution 2.2

Method: Progress toward stopping

Worked steps

the loop never stops (an infinite loop) **B1**.

Practice 2.3 ■ 2 marks

Trace: `int i = 0, sum = 0; while (i < 3) { sum += i; i++; }`. State the final sum.

Solution 2.3

Worked steps

$$0 + 1 + 2 = 3 \quad \text{M1} \quad \text{A1}.$$

Exam-style 3.1 ■ 1 mark

A while loop tests its condition

A after each pass

B before each pass

C never

D only once at the end

Solution 3.1

A after each pass

B before each pass 

C never

D only once at the end

Worked steps

B.

Exam-style 3.2 ■ 1 mark

A loop whose control variable never changes may become

A a for loop

B an infinite loop

C a method

D a cast

Solution 3.2

Method: Progress toward stopping

A a for loop

B an infinite loop 

C a method

D a cast

Worked steps

B.

Exam-style 3.3 ■ 1 mark

```
int n = 1; while (n <= 4) { System.out.print(n); n++; }.
```

- (a) State the output.
- (b) State the final value of `n`.
- (c) State when the condition is checked.

Solution 3.3

Worked steps

(a) 1234 **B1**. (b) 5 **B1**. (c) before each pass **B1**.