Exercise walk-through

for Loops ▪ 2.8

eXercise

You must be able to

- write a **for loop 计数循环** with an initialization, a condition, and an update
- understand how a for loop packs the setup, test, and change into one line
- rewrite a while loop as an equivalent for loop

Method — for loop

```
kfor+w p(k+ktint+w ni+w o=+w l+m+mi0p;+w ni+w o+w l+m+mi5p;+w nio+o+p)+w p
+w    nSystemp.n+naoutp.n+naprintp(nip)p;+w   c+c1// prints 01234
p
```

The header has three parts: **initialization** (`int i = 0`), **condition** (`i < 5`), and **update** (`i++`).

Method — Equivalent while

The same logic could be written as a while loop; the for loop just gathers the setup, test, and change in one place.

Practice 2.1 ▪ 2 marks

Name the three parts of a for loop header.

Solution 2.1

Method: for loop

Worked steps

initialization, condition, update B1 B1 *for any two; for all three.*

Practice 2.2 ▪ 1 mark

State how many times `for (int i = 0; i < 5; i++)` runs its body.

Solution 2.2

Worked steps

5 times B1.

Practice 2.3 ▪ 1 mark

State one advantage of a for loop over a while loop.

Solution 2.3

Method: Equivalent while

Worked steps

it keeps the setup, test, and change together in one line B1.

Exam-style 3.1 ▪ 1 mark

The three parts of a for loop header are initialization, condition, and

A body

B update

C return

D cast

Solution 3.1

Method: for loop

A body

B update ✓

C return

D cast

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

`for (int i = 1; i <= 3; i++)` runs its body
times.

A 2

B 3

C 4

D infinitely many

Solution 3.2

A 2

B 3 ✓

C 4

D infinitely many

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

```
for (int k = 0; k < 4; k++) System.out.print(k);.
```

(a) State the output.
(b) State how many times the body runs.
(c) State the value of `k` that first stops the loop.

Solution 3.3

Method: for loop

Worked steps

(a) 0123 B1. (b) 4 times B1. (c) `k = 4` B1.