

2 Loops – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
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while loop

循环

Recall

In Part A you met decisions. Now make the computer **repeat** work:

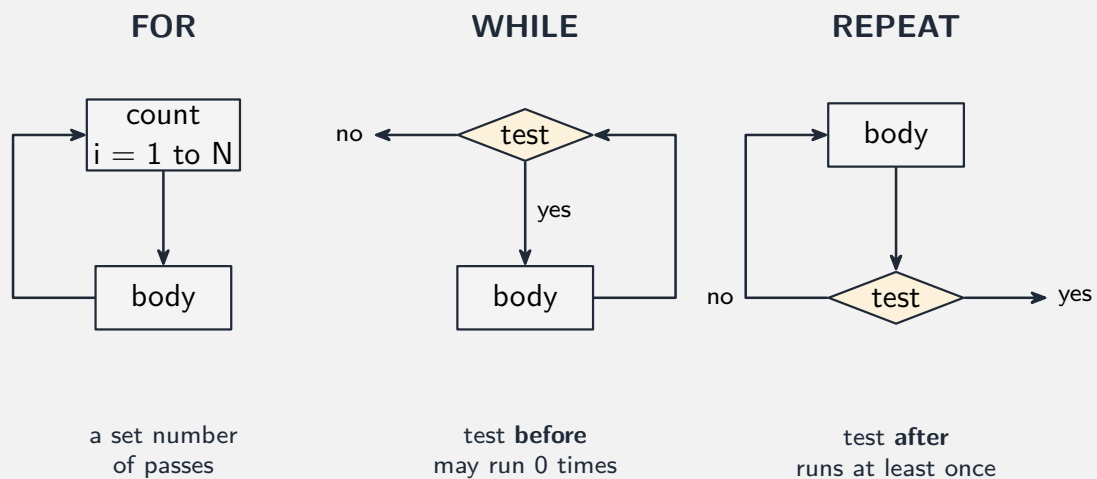
- Printing the numbers 1 to 100 by hand would be slow.
- A loop repeats the same steps many times, quickly.

Each idea has a worked example before the Practice.

New ideas

■ 1 The while loop

A **while loop** 循环 repeats **while** its condition is true:



```
int i = 0;
while (i < 3) {
    System.out.println(i);
    i++;
}
```

This prints 0, 1, 2.

■ 2 The for loop

A for loop packs the setup, condition, and update into one line –best when you know the count:

```
for (int i = 0; i < 5; i++) {
    // runs 5 times: i = 0,1,2,3,4
}
```

■ 3 Counting the repeats

A loop for (int i = 0; i < n; i++) runs exactly n times.

Worked example. for (int i = 1; i <= 4; i++) runs 4 times (for i = 1, 2, 3, 4).

■ 4 Nested loops

A loop **inside** another loop runs the inner one fully for each pass of the outer. If the outer runs 3 times and the inner 4, the inside runs $3 \times 4 = 12$ times.

Watch out: a loop must **change** something each time (like i++) so the condition eventually becomes false. If it never does, the loop runs forever –an infinite loop.

Practice

Try these in order. The methods are all above.

2.1 State how many times `for (int i = 0; i < 6; i++)` runs. [1]

2.2 State the values printed by the while loop above (`i` from 0 while `i < 3`). [2]

2.3 State how many times `for (int i = 1; i <= 10; i++)` runs. [2]

2.4 A nested loop has an outer running 5 times and an inner running 3 times. State how many times the inner body runs in total. [2]

2.5 Explain what makes a loop "infinite". [2]
