

2 Loops – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

while loop

Recall

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

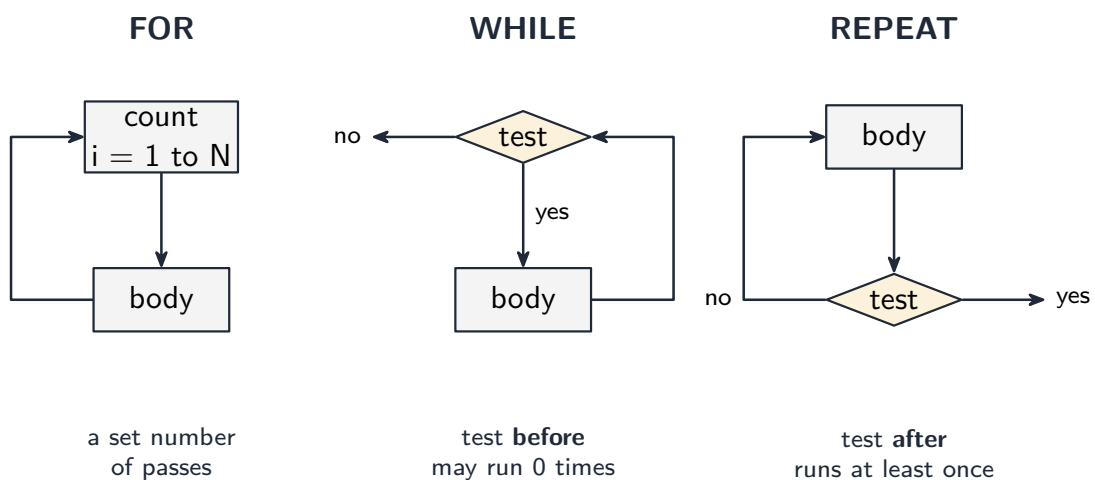
- Printing the numbers 1 to 100 by hand would be slow.
- A loop repeats the same steps many times, quickly.

Each idea has a worked example before the Practice.

New ideas

■ 1 The while loop

A **while loop** 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]