



F2.5 Count-controlled loops: for

Decisions and loops · GCSE · OCR J277 2.2.1, AQA 8525 3.2.2, Edexcel
1CP2 6.2.2 · about 15 min

What this lesson is about

range, the loop variable, and repeating a known number of times.

- for and range
- Counting from zero
- The loop variable is useful
- Loops and decisions together

Questions

9 marks in all

1. What does this program print?

[1 mark]

```
for i in range(4):  
    print(i)
```

Answer:

```
0  
1  
2  
3
```

range(4) is 0, 1, 2, 3: four numbers, starting at 0 and never reaching 4.

2. What does this program print?

[1 mark]

```
for n in range(1, 4):  
    print(n, n * n)
```

Answer:

```
1 1  
2 4  
3 9
```

range(1, 4) starts at 1 and stops before 4.

3. What does this print? `total = 0` then `for i in range(5): total = total + i`, then `print(total)`

[1 mark]

Answer: 10. $0 + 1 + 2 + 3 + 4$ is 10.

4. A square has four sides. Which loop drives it?

[1 mark]

- ☐ A `for i in range(4):` with `forward` and `turn_right(30, angle=90)` inside
- ☐ B `for i in range(3):` with `forward` and `turn_right(30, angle=90)` inside
- ☐ C `for i in range(90):` with `forward` inside
- ☐ D `for i in 4:` with `forward` and `turn_right(30, angle=90)` inside

Answer: A. range(4) runs the block four times. for i in 4 is an error: a number is not something to loop over.

5. How many times does the block under `for i in range(10):` run? [1 mark]

Answer: 10. `range(10)` is 0 to 9: ten numbers.

6. Put the lines in order to print corner 1, corner 2, corner 3. [1 mark]

Number the lines 1 to 3 to put them in the right order.

```
___ for i in range(3):
___ print("corner", corner)
___ corner = i + 1
```

Answer:

```
for i in range(3):
    corner = i + 1
    print("corner", corner)
```

The `for` line comes first, and the lines of the block are indented under it.

7. What does this program print? [1 mark]

```
for n in range(0, 20, 5):
    print(n)
```

Answer:

```
0
5
10
15
```

The third number is the step: 0, 5, 10, 15, stopping before 20.

8. In OCR's Reference Language, `for i = 1 to 5 ... next i`. How many times does the loop run? [1 mark]

Answer: 5. The Reference Language includes the end number: 1, 2, 3, 4, 5. Python's `range(1, 5)` would stop at 4.

9. What does AQA call a count-controlled loop? [1 mark]

- ☐ A Definite iteration
- ☐ B Indefinite iteration
- ☐ C Selection
- ☐ D Recursion

Answer: A. Definite: the number of times is known before it starts.

The task: count the corners

Drive a square of 30 cm sides with a `for` loop, printing `corner 1`, `corner 2`, `corner 3`, `corner 4` as you go, and finish facing the way you started.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

for i in range(4):
    forward(60, distance=30)
```

The hint students can ask for: One trip round a square is the same two steps repeated four times, so put them in a loop and use the loop's counter in what you print.

A solution

```
from bugbot import *
connect()
for i in range(4):
    forward(60, distance=30)
    turn_right(30, angle=90)
    print('corner', i + 1)
```

Any program that meets the task's checks is marked correct in the simulator; this is one way, not the only way.