



## F2.7 Loop patterns

Decisions and loops · GCSE · OCR J277 2.2.1, AQA 8525 3.2.2, Edexcel  
1CP2 1.2.4 · about 20 min

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Name \_\_\_\_\_

Class \_\_\_\_\_

Date \_\_\_\_\_

### What this lesson is about

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Running totals, counting, finding the largest, nested loops and trace tables.

- Running total
- Counting
- Finding the largest
- Loops inside loops
- Tracing a loop

### Questions

7 marks in all

1. What does this program print?

[1 mark]

```
total = 0
for d in [40, 35, 30]:
    total = total + d
print(total, total / 3)
```

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2. What does this program print?

[1 mark]

```
count = 0
for d in [50, 20, 35, 10]:
    if d < 30:
        count = count + 1
print(count)
```

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3. What does this program print?

[1 mark]

```
most = 0
for d in [12, 51, 30]:
    if d > most:
        most = d
print(most)
```

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4. An outer loop runs 3 times and the loop inside it runs 4 times each time. How many times does the inner block run?

[1 mark]

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5. A program puts `total = 0` inside the loop instead of before it. What goes wrong? [1 mark]
- ☐ A The total is reset every time round, so it ends as just the last value
  - ☐ B Nothing
  - ☐ C A syntax error
  - ☐ D The loop never ends

6. What is a trace table for? [1 mark]
- ☐ A Following the values of variables step by step as an algorithm runs
  - ☐ B Drawing the robot's path
  - ☐ C Listing a program's errors
  - ☐ D Storing data in a program

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

```
for row in range(1, 3):  
    for col in range(1, 4):  
        print(row, col)
```

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## The task: times grid

Print a multiplication grid of five rows and five columns with two nested `for` loops. Each row is the numbers separated by single spaces, so the first row is `1 2 3 4 5` and the last is `5 10 15 20 25`. Work the numbers out; do not type them. The robot must not drive.

```
# the two lines every program starts with: the commands, then the robot  
from bugbot import *  
connect()  
  
for row in range(1, 6):  
    print(row)
```

Plan your program here, then type it in and press Run.

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Do it on the robot

[www.bugbotlab.com/learn/f2-7-loop-patterns/](http://www.bugbotlab.com/learn/f2-7-loop-patterns/)

The simulator checks it and tells you when it passes. Nothing to install, no account.

## Challenges

1. Find the **smallest** distance in eight directions, and which way it is.
2. Print a triangle of stars with nested loops: one star on the first row, two on the second, up to five.
3. Take ten distance readings while driving and print how many were under 30, and their average.