ANSWERS

F4.1 Writing functions

Functions and structured code · GCSE · OCR J277 2.2.3, AQA 8525 3.2.10, Edexcel 1CP2 1.1.2 · about 12 min

What this lesson is about

def, calling, and why subprograms help.

- Defining a function
- Define first, then call
- What happens when a function is called
- A function can call other functions
- Why write functions?

Questions

6 marks in all

1. What happens when Python reaches `def report():` and its indented body? [1 mark]

- ☐ **A** It defines the function, but nothing in the body runs yet
- ☐ **B** It runs the body once
- ☐ **C** It runs the body forever
- ☐ **D** It prints report

> **Answer:** A. Defining is like writing a recipe. The body runs when the function is called: report().

2. Which are good reasons to write a function? [1 mark]

Tick every answer that is true.

- ☐ **A** Write a piece of behaviour once and reuse it
- ☐ **B** A name like is_clear(40) explains what the code does
- ☐ **C** Small pieces are easier to test
- ☐ **D** It makes the robot faster

> **Answer:** A, B, C. Functions stop repetition, name ideas and split a program into testable pieces. Speed is not the reason.

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

```
def signal():
    print("  beep")

print("before")
signal()
print("between")
signal()
```

Answer:

```
before
  beep
between
  beep
```

At each call the program jumps into the function, runs its body, and comes back to the next line.

4. A program calls `signal()` on line 3 and defines `def signal():` on line 5. What happens? [1 mark]

- ☐ **A** NameError: the function is not defined yet when line 3 runs
- ☐ **B** It works, Python looks ahead
- ☐ **C** SyntaxError
- ☐ **D** Nothing is printed and there is no error

Answer: A. Python runs top to bottom, so a function must be defined before the line that calls it.

5. What is a subprogram? [1 mark]

- ☐ **A** A named block of code that does a task and can be called from elsewhere in the program
- ☐ **B** A program that runs on another computer
- ☐ **C** A comment above some code
- ☐ **D** The first line of a program

Answer: A. Procedures and functions are both subprograms.

6. In OCR's Exam Reference Language, which word ends a procedure? (one word) [1 mark]

Answer: endprocedure. procedure name() ... endprocedure. A function ends with endfunction.

The task: signal at the corners

Write a function `signal()` that turns the LED red, plays a short note, and turns the LED off. Then drive a square of 25 cm sides, calling `signal()` at every corner. Call your function; do not repeat its lines.

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

def signal():
    led("red")

forward(60, distance=25)
turn_right(30, angle=90)
```

The hint students can ask for: Write the signal once as a function, then call it at each corner from a loop that drives and turns.

A solution

```
from bugbot import *
connect()
def signal():
    led("red")
    tone(880, 0.2)
    led("off")

for i in range(4):
    forward(60, distance=25)
    signal()
    turn_right(30, angle=90)
```

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