WORKSHEET

F4.6 Project: the patrol

Functions and structured code · GCSE · about 25 min

Name _____ Class _____ Date _____

What this lesson is about

A complete program built a function at a time: patrol to the wall and come home.

- The brief
- Decompose it
- Piece 1: one step
- Piece 2: the patrol
- Piece 3: coming home
- Check the whole program
- Where next

Questions

5 marks in all

1. Why test `step(n)` on its own before writing the loop? [1 mark]

- ☐ **A** Mistakes are easiest to find while the program is small
- ☐ **B** Python needs functions to be run once first
- ☐ **C** It charges the battery
- ☐ **D** The loop will not work otherwise

2. What does a name written in capitals, like `STOP_AT = 30`, tell someone reading the program? [1 mark]

- ☐ **A** It is set once and not changed while the program runs
- ☐ **B** Python will not let it change
- ☐ **C** It is a function
- ☐ **D** It is printed automatically

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

```
n = 1
while n <= 3:
    print(f"step {n}")
    n = n + 1
print("stopped after", n - 1, "steps")
```

4. In the patrol, why does `patrol(stop_at)` return the number of steps rather than print it? [1 mark]

- ☐ **A** go_home needs the value to drive back the same distance
- ☐ **B** Printing is not allowed in functions
- ☐ **C** return is faster
- ☐ **D** So nothing appears on screen

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

```
def patrol(readings):
    n = 0
    for d in readings:
        if d <= 30:
            break
        n = n + 1
    return n

print(patrol([60, 50, 40, 30, 20]))
```

The task: patrol

Build the patrol against the wall: drive in 10 cm steps while the wall is more than 30 cm away, printing `step <n>: <distance> cm` each time; then print `arrived`, turn the LED green, and be inside the green zone.

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

def step(n):
    forward(50, distance=10)
    print(f"step {n}: {distance()} cm")

# the loop, then the ending
```

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

Do it on the robot

www.bugbotlab.com/learn/f4-6-project-the-patrol/

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

Challenges

1. Make the step size a parameter of `step`, and a constant at the top.
2. Store every distance reading in a list inside `patrol`, and return the list as well as the count.
3. Add a `beep_count` to `go_home` that beeps once per step, without any global variables.