



5.1 The loop

Name _____

Class _____

Date _____

What this lesson is about

Look, decide, act, wait, repeat. One action per tick. Counting ticks.

- Scripts block; behaviours tick
- One action per tick
- Why the wait matters
- Counting ticks

Questions

7 marks in all

1. What does every behaviour do, again and again? [1 mark]
☐ A Look, decide, act, wait, repeat
☐ B Drive, stop, turn, stop
☐ C Wait until the task is finished, then end
☐ D Read every sensor once, then act forever
2. Which call suits a behaviour loop, because it does not block? [1 mark]
☐ A `forward(60)`
☐ B `forward(60, distance=20)`
☐ C `turn_right(30, angle=90)`
☐ D `wait(5)`
3. A student leaves `wait(0.1)` out of a `while True` behaviour loop. What goes wrong? [1 mark]
☐ A The loop asks the sensors thousands of times with no time passing, and the simulator stops it
☐ B Nothing, it just runs faster
☐ C The robot only does the last tick
☐ D The robot drives backwards
4. What does this program print? [1 mark]

```
for tick in [0, 9, 10, 19, 20, 35]:  
    print(tick, "green" if tick % 20 < 10 else "off")
```

5. What does this program print?

[1 mark]

```
def choose(d):  
    if d < 15:  
        return "back"  
    elif d < 30:  
        return "turn"  
    else:  
        return "forward"  
  
for d in [10, 15, 29, 30, 80]:  
    print(d, choose(d))
```

6. In one tick a program calls `forward(60)` and then `turn_right(60)`. What does the robot do?

[1 mark]

- ☐ A Turns right: only the last command counts
- ☐ B Drives forward: only the first command counts
- ☐ C Drives forward and turns at once
- ☐ D Stops, because the commands clash

7. A behaviour loop waits 0.1 s each tick. How many ticks is five seconds?

[1 mark]

The task: wander

Keep moving for the whole twenty seconds, at least 120 cm in total, without touching a box or the edge of the mat.

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

# drive forward at 60 (keeps going until the next command)
forward(60)
# pause 5 s (the robot keeps doing what it was told)
wait(5)
# all motors off
stop()
```

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



Do it on the robot

www.bugbotlab.com/learn/5-1-the-loop/

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

Challenges

1. Wander for 20 seconds and print how many times you turned.
2. Turn left or right depending on which side of the depth grid has more room.
3. Slow down when something is between 30 and 50 cm away instead of waiting until 25.