



1.2 Driving by distance

Driving · Robot club · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Tell the robot how far, not how long. Where it thinks it is.

- distance=
- How it knows
- The robot coasts
- Distance and time together

Questions

7 marks in all

1. What changes when you add `distance=20` to `forward(60)` ?

[1 mark]

Tick every answer that is true.

- ☐ A The robot stops itself when it has gone 20 cm
- ☐ B Your program waits until the move is done
- ☐ C The robot drives for 20 seconds
- ☐ D The robot drives at speed 20

2. How does the robot know how far it has gone?

[1 mark]

- ☐ A An optical-flow sensor underneath watches the mat slide past, like a computer mouse
- ☐ B It counts how many times its wheels turn
- ☐ C It times how long it has been driving
- ☐ D A camera on the front measures the mat

3. The robot starts at (0, 0) facing forward, drives forward 30 cm, then backward 10 cm. Roughly what does `position()` say?

[1 mark]

- ☐ A (0, 20)
- ☐ B (20, 0)
- ☐ C (0, 40)
- ☐ D (40, 0)

4. When is driving on, not waiting printed?

[1 mark]

```
print("starting")
forward(60, distance=25)
print("arrived")
forward(60)
print("driving on, not waiting")
wait(1)
stop()
```

- ☐ A As soon as the second drive starts, while the robot is still moving
- ☐ B After the robot has gone 25 cm more
- ☐ C After the one second wait
- ☐ D Before "arrived"

5. forward(100, distance=20) usually lands further from 20 than forward(30, distance=20). Why?

[1 mark]

- ☐ A A faster robot coasts further after the motors stop, and the robot cannot allow for it perfectly
- ☐ B The sensor cannot measure at high speed
- ☐ C Speed 100 is not allowed with a distance
- ☐ D The slow one drives for longer, so it is more tired

6. The robot drives forward(60, distance=20) then forward(60, distance=40). Roughly how many centimetres forward of the start does it end? Give a whole number.

[1 mark]

7. There is a line 30 cm ahead that the robot must stop before. Which is the safest plan?

[1 mark]

- ☐ A forward(40, distance=27)
- ☐ B forward(100, distance=30)
- ☐ C forward(100) then wait(3) then stop()
- ☐ D forward(40, distance=33)

The task: twenty, then forty

Drive 20 cm, print `after 20:` followed by `position()` , then drive 40 cm more and stop inside the green band 60 cm from the start.

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

# drive forward at 60 for 20 cm, then stop
forward(60, distance=20)
print("after 20:", position())
```

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



Do it on the robot

www.bugbotlab.com/learn/1-2-driving-by-distance/

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

Challenges

1. Drive 10 cm five times with a loop, printing `position()` each time. How much does the error grow?
2. Drive out 30 cm and back 30 cm. How far from (0, 0) do you end up?
3. Find the speed at which `forward(speed, distance=20)` lands closest to 20.