



## 10.2 Racing the bots

Competing · Robot club · about 14 min

Name \_\_\_\_\_

Class \_\_\_\_\_

Date \_\_\_\_\_

### What this lesson is about

Practice, replay and the results board: why you lost, and the fast-then-careful pattern that wins.

- Practice is free
- Reading why you lost
- Fast, then careful

### Questions

6 marks in all

1. What does this program print?

[1 mark]

```
for gap in [100, 30, 10]:  
    speed = max(20, min(90, gap * 1.2))  
    print("gap", gap, "-> speed", round(speed))
```

2. After losing a race, put the three things to look at in order.

[1 mark]

Number the lines 1 to 3 to put them in the right order.

- \_\_\_ Where did the time go?
- \_\_\_ Did the robot do what you meant?
- \_\_\_ What did the bots do differently?

3. What are the built-in bots for?

[1 mark]

- ☐ A A measuring stick you can race again and again
- ☐ B Opponents you only need to beat once
- ☐ C Robots that copy your program
- ☐ D Helpers that push you to the finish

4. Which pattern wins nearly every game with a target?

[1 mark]

- ☐ A Fast while the target is far, slow as you arrive, stop before you overshoot
- ☐ B Slow and steady the whole way
- ☐ C Full speed until you touch the target
- ☐ D Fast at the end to catch up

5. Your robot stops inside the bay but facing 14 degrees off. What should you add?

[1 mark]

- ☐ A A correction at the end that turns back to the starting heading
- ☐ B A faster approach
- ☐ C A longer wait before stopping
- ☐ D Nothing, being in the bay is enough

6. With `speed = max(20, min(90, gap * 1.2))`, below what gap does the speed stop falling and sit at 20? Give your answer to one decimal place. [1 mark]

## The task: park square

Drive into the bay and stop inside it, facing the way you started, within 10 degrees. Being in the bay is not enough: finish straight.

```
from bugbot import *
connect()

forward(60, distance=35)
stop()
print("heading", heading())
```

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



**Do it on the robot**

[www.bugbotlab.com/learn/10-2-racing-the-bots/](http://www.bugbotlab.com/learn/10-2-racing-the-bots/)

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

## Challenges

1. Run the same program five times. How much do the finishing positions differ?
2. Add a correction at the end: if the heading is out by more than 5 degrees, turn back.
3. Try the speed rule above instead of two fixed speeds, and see which parks closer.