



7.2 The gripper

Hands and feet · Robot club · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

grip, release, holding: knowing when you have something.

- Open and close
- It comes with you
- Get close enough
- Knowing what you hold

Questions

7 marks in all

1. The jaws close on nothing. What does `holding()` return? [1 mark]

- ☐ A None
- ☐ B False
- ☐ C 0
- ☐ D "red"

2. Put the lines in order to drive up to a ball, stop and grab it. (The loop body is shown on one line.) [1 mark]

Number the lines 1 to 4 to put them in the right order.

```
___ while distance() > 6: forward(40); wait(0.1)
___ stop()
___ print("holding:", holding())
___ gripper("close")
```

3. A ball is 20 cm ahead. A student writes `gripper("close")` and then `forward(40, distance=20)`. [1 mark]
What goes wrong?

- ☐ A The jaws shut on nothing before the robot arrives, so the ball is never held
- ☐ B Nothing: the gripper waits until the robot reaches the ball
- ☐ C The robot cannot drive while the jaws are closed
- ☐ D `holding()` says red as soon as the jaws close

4. `distance()` reads 7.5 cm, measured from the robot's centre, and the front of the robot is 3.5 cm from [1 mark]
its centre. How many cm is the ball in front of the robot's front edge? Give a whole number.

5. What does `gripper("open")` do underneath? [1 mark]

- ☐ A `servo(0, 0)` then `wait(0.4)`
- ☐ B `servo(0, 90)` then `wait(0.4)`
- ☐ C `servo(1, 0)` then `wait(0.4)`
- ☐ D `servo(0, 0)` with no wait

6. The robot grips the red ball, slides left 15 cm, turns 90 degrees and reverses 10 cm. What does `holding()` say now? [1 mark]
- ☐ A red, because the ball rides in the jaws until they open
 - ☐ B None, because turning shakes the ball loose
 - ☐ C None, because reversing leaves the ball behind
 - ☐ D It depends which way the robot is facing
7. On the real robot, where does `holding()` get its answer from? [1 mark]
- ☐ A The camera, seeing a ball filling the bottom of the picture in front of the jaws
 - ☐ B A touch sensor inside the jaws
 - ☐ C The servo feeling how hard it is pushing
 - ☐ D The radio

The task: grab the ball

Drive up to the ball, grip it, and print `holding: red`.

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

# drive forward at 50 for 20 cm, then stop
forward(50, distance=20)
print("holding:", holding())
```

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



Do it on the robot

www.bugbotlab.com/learn/7-2-the-gripper/

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

Challenges

1. Try gripping from 8 cm and from 4 cm. Where does it stop working?
2. Grip the ball, carry it 20 cm, release it, back away 10 cm, and grip it again.
3. Print `distance()` before and after the grip.
4. Close the jaws slowly with `servo(0, angle)`, in steps of 10 degrees with a short wait between, and print `holding()` at each step: at what angle does the ball get caught?