



7.3 Fetching a ball

Hands and feet · Robot club · about 20 min

Name _____

Class _____

Date _____

What this lesson is about

See it, approach it, grip it, bring it home.

- Find it
- Approach and grip
- Bring it home

Questions

7 marks in all

1. Put the stages of a fetch in order.

[1 mark]

Number the lines 1 to 5 to put them in the right order.

- ___ Stop and close the jaws once the ball is in reach
- ___ Steer towards the blob, slowing as distance() falls
- ___ Open the jaws
- ___ Spin until a red blob is in view
- ___ Drive home with go_to, holding the ball

2. What does this program print?

[1 mark]

```
def bearing_of(cx):  
    return (cx - 160) * 120 / 320  
  
print(bearing_of(240))  
print(bearing_of(100))
```

3. What does this program print?

[1 mark]

```
for d, error in [(30, 4), (30, 25), (8, 2)]:  
    speed = 15 if d < 10 else (45 if abs(error) < 10 else 20)  
    print(d, error, speed)
```

4. Why does fetch slow to 15 for the last few centimetres?

[1 mark]

- ☐ A The slow finish is what makes the grip reliable
- ☐ B The distance sensor only works at low speed
- ☐ C The jaws cannot close while the robot is moving
- ☐ D To save the battery for the drive home

5. Inside `fetch`, the jaws close but `holding()` is `None`. What happens next? [1 mark]
- ☐ A It creeps forward at 15 and tries again on a later tick
 - ☐ B It returns `False` straight away
 - ☐ C It opens the jaws and spins to search again
 - ☐ D It returns `True` anyway
6. `fetch` has used all 250 ticks without holding the ball. What does it do? [1 mark]
- ☐ A Stops the motors and returns `False`
 - ☐ B Returns `True`
 - ☐ C Starts the 250 ticks again
 - ☐ D Keeps driving forward at 15
7. `fetch` waits 0.1 s each tick for up to 250 ticks. Ignoring the time spent gripping, what is the longest it can take, in whole seconds? [1 mark]
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The task: fetch the ball

Find the red ball, fetch it, and leave it in the home zone.

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



Do it on the robot

www.bugbotlab.com/learn/7-3-fetching-a-ball/

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

Challenges

1. Print how long the fetch took.
2. Fetch a blue ball instead. (Add one in the free-play editor first.)
3. `fetch` gives up after 250 ticks, but `find_ball` spins forever if no ball is in view. Make both give up after 10 seconds, with `fetch` returning `False`.