WORKSHEET

2.4 Getting round things

BugBotLab

Sensing · Robot club · about 20 min

Name _____ Class _____ Date _____

What this lesson is about

Detect, sidestep, continue: the first obstacle avoidance.

- The plan
- Step 1: approach
- Step 2: sidestep until clear
- Step 3: past and on
- Which way to step?

Questions

6 marks in all

1. Put the steps for getting round a box in order. [1 mark]

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

___ `Stop`
___ `Slide right until distance() is over 60 cm`
___ `Drive forward 35 cm to get past`
___ `Slide right 6 cm more`
___ `Drive forward until distance() is under 20 cm`

2. Why does the program slide another 6 cm after the sensor says the way is clear? [1 mark]

- ☐ **A** The body is wider than the sensor's beam
- ☐ **B** The sensor is always 6 cm wrong
- ☐ **C** To make up for coasting forward
- ☐ **D** To turn the robot back to heading 0

3. Why does sliding sideways, rather than turning, keep this program simple? [1 mark]

- ☐ **A** The robot never turns, so "ahead" still means the same direction
- ☐ **B** Sliding is faster than turning
- ☐ **C** The sensor does not work after a turn
- ☐ **D** Turning would reset position()

4. What does this loop do? [1 mark]

```
while distance() < 60:
    right(50)
    wait(0.1)
stop()
```

- ☐ **A** Slides right for as long as something is closer than 60 cm ahead
- ☐ **B** Slides right exactly 60 cm
- ☐ **C** Slides right until something is closer than 60 cm
- ☐ **D** Drives forward for 60 cm

5. What does this program print? [1 mark]

```
left_side = 25
right_side = 25
if right_side >= left_side:
    print("stepping right")
else:
    print("stepping left")
```

6. What could go wrong if the robot always steps right? [1 mark]

- ☐ **A** There might be no room on the right
- ☐ **B** It would turn round
- ☐ **C** The distance sensor would stop working
- ☐ **D** Nothing, stepping right always works

The task: dodge the box

Drive until the box is close, print `box ahead`, step sideways until the way is clear, go past, and finish in the green zone without touching the box.

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

# as long as the thing ahead is further than 20 cm
while distance() > 20:
    # drive forward at 50 (keeps going until the next command)
    forward(50)
    # pause 0.1 s (the robot keeps doing what it was told)
    wait(0.1)
# all motors off
stop()
print("box ahead")
```

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

Do it on the robot

www.bugbotlab.com/learn/2-4-getting-round-things/

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

Challenges

1. After passing the box, step back to the original line so the robot ends where it would have without the box.
2. Choose the side with more room using the grid.
3. Handle two boxes in a row with a loop around the whole behaviour.