



0.4 Deciding

What this lesson is about

if, else, comparisons, and a robot that looks with distance() before it moves.

- The distance sensor
- if and else
- Stopping at the right moment

Questions

7 marks in all

1. What does this program print?

[1 mark]

```
gap = 25
if gap > 30:
    print("plenty of room")
else:
    print("too close")
```

Answer:

too close

25 is not more than 30, so the test is false and the else lines run instead.

2. What does this program print?

[1 mark]

```
gap = 30
if gap > 30:
    print("go")
else:
    print("stop")
```

Answer:

stop

30 is not more than 30, it is equal. > is false when the two are the same, so this prints stop. Use >= to include 30.

3. Which line asks whether gap is 15?

[1 mark]

- ☐ A if gap == 15:
- ☐ B if gap = 15:
- ☐ C if gap is equal 15:
- ☐ D if 15:

Answer: A. Two equals signs ask a question. One equals sign gives a name a value, and Python will not accept it in an if.

4. What does this program make the robot do?

[1 mark]

```
while distance() > 15:
    forward(40)
    wait(0.1)
stop()
```

- ☐ A Drive forward, looking as it goes, and stop once the gap is 15 cm or less
- ☐ B Drive exactly 15 cm and stop
- ☐ C Drive backwards away from the wall
- ☐ D Drive until it touches the wall

Answer: A. The while looks at `distance()` before every repeat. As soon as the gap is not more than 15, the loop ends and `stop()` runs.

5. The same program runs with the robot already 10 cm from the wall. What happens?

[1 mark]

```
while distance() > 15:
    forward(40)
    wait(0.1)
stop()
```

- ☐ A The loop never runs, so the robot stops straight away without moving
- ☐ B It drives into the wall
- ☐ C It backs up to 15 cm
- ☐ D Python gives an error

Answer: A. The test `distance() > 15` is false the very first time, so the indented lines are skipped and the program goes straight to `stop()`.

6. `gap` is 20. Which of these tests are true?

[1 mark]

Tick every answer that is true.

- ☐ A `gap > 15`
- ☐ B `gap >= 20`
- ☐ C `gap != 20`
- ☐ D `gap < 20`
- ☐ E `gap == 20`

Answer: A, B, E. 20 is more than 15, and it is equal to 20, so `>=` and `==` are true. It is not less than 20, and `!=` asks whether it is different, which it is not.

7. Which two symbols together mean "is not" in Python?

[1 mark]

Answer: `!=`. `!=` is true when the two sides are different, so `gap != 0` means the gap is anything except 0.

The task: stop at the wall

Drive up to the wall and stop between 10 cm and 20 cm from it, without touching it. Look as you go, rather than guessing a distance.

```
from bugbot import *
connect()

while distance() > 40:
    forward(40)
    wait(0.1)

stop()
print("gap", distance())
```

The hint students can ask for: Drive while distance() is more than the gap you want, with a short wait each time round, then stop.

A solution

```
from bugbot import *
connect()
while distance() > 15:
    forward(40)
    wait(0.1)
stop()
print('gap', distance())
```

Any program that meets the task's checks is marked correct in the simulator; this is one way, not the only way.