



What this lesson is about

Plan, build and test one program that asks, drives a square, plays notes and reports.

- The brief
- Plan before you type
- Step 1: ask and convert
- Step 2: one side and one corner
- Step 3: the whole square
- Step 4: the report
- Testing

Questions

4 marks in all

1. In the project, which of these is an output?

[1 mark]

- ☐ A The perimeter printed at the end
- ☐ B The side length the user types
- ☐ C The note the user types
- ☐ D The constant SPEED

Answer: A. The user's answers are inputs. What the program prints, and the drive and notes, are outputs.

2. What does this program print?

[1 mark]

```
side = float("12.5")
print("perimeter:", 4 * side)
print("area:", side * side)
```

Answer:

```
perimeter: 50.0
area: 156.25
```

side is 12.5, so the perimeter is 50.0 and the area is 156.25.

3. Why does the project convert the note with `int` but the side with `float`?

[1 mark]

- ☐ A A side can be a fraction of a centimetre; a note is a whole number of hertz
- ☐ B `int` is faster
- ☐ C `tone()` only accepts text
- ☐ D `float` cannot be used twice

Answer: A. Choose the data type that fits the values that make sense.

4. You test with a side of 10. What should the area be?

[1 mark]

- ☐ A 100
- ☐ B 40
- ☐ C 20
- ☐ D 10

Answer: A. Area is side times side. Working the answer out by hand first is what makes a test useful.

The task: ask and drive

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

SPEED = 50

# ask the two questions and convert the answers

# drive the square, a note at each corner

# print the perimeter and the area
```

The hint students can ask for: Ask for both answers and convert each to the kind of number it should be: a side can have a decimal, a note cannot. Drive the four sides in order, sounding the note after each one, then work the perimeter and area out from the side you were given.

A solution

```
from bugbot import *
connect()
SPEED = 50

# ask the two questions and convert the answers
side = float(input("How long is each side, in cm? "))
note = int(input("Which note, in hertz? "))

# drive the square, a note at each corner
forward(SPEED, distance=side)
tone(note, 0.2)
right(SPEED, distance=side)
tone(note, 0.2)
backward(SPEED, distance=side)
tone(note, 0.2)
left(SPEED, distance=side)
tone(note, 0.2)

# print the perimeter and the area
print("perimeter:", 4 * side)
print("area:", side * side)
```

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

