



## 1.6 Project: draw a letter

### What this lesson is about

Plan a path, drive it, leave a trail.

- Plan first
- Stroke one
- Stroke two, two ways
- Your own letters

### Questions

6 marks in all

1. The robot starts facing down the mat, at heading 180. What does `forward(60, distance=60)` draw? [1 mark]
- ☐ A A line down the mat
  - ☐ B A line up the mat
  - ☐ C A line to the right
  - ☐ D Nothing, because forward means up the mat

**Answer:** A. Forward is always the way the robot is facing. Facing down, forward draws the downstroke of the L.

2. The robot is facing down the mat. Which command slides it towards the right of the mat, without turning? [1 mark]
- ☐ A `left(60, distance=30)`
  - ☐ B `right(60, distance=30)`
  - ☐ C `turn_right(30, angle=90)`
  - ☐ D `backward(60, distance=30)`

**Answer:** A. Left and right are from the robot's point of view. When it faces down the mat, its left is the mat's right.

3. The robot faces down the mat at heading 180 and runs `turn_left(30, angle=90)`. What does `heading()` say? Give a whole number of degrees. [1 mark]

**Answer:** 90 (accept within 1). Turning left is anticlockwise, which takes degrees away: 180 minus 90 is 90, facing the right of the mat.

4. Put these lines in order to draw an L with a strafe, starting at the top left facing down.

[1 mark]

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

```
___ left(60, distance=30)
___ print("done at", position())
___ forward(60, distance=60)
___ connect()
___ from bugbot import *
```

**Answer:**

```
from bugbot import *
connect()
forward(60, distance=60)
left(60, distance=30)
print("done at", position())
```

The long downstroke comes first, then the short stroke. Facing down, left slides the robot to the right of the mat.

5. Which way of drawing the second stroke keeps the corner of the L sharpest?

[1 mark]

- ☐ A Strafing, because the robot does not turn
- ☐ B Turning, because the robot faces the way it goes
- ☐ C Both are exactly the same
- ☐ D Driving backwards

**Answer:** A. A turn adds a little error and a little wobble at the corner. A strafe goes straight from one stroke to the next.

6. Which of these letters need `drive` with rotation to draw well?

[1 mark]

Tick every answer that is true.

- ☐ A T
- ☐ B S
- ☐ C E
- ☐ D O
- ☐ E H

**Answer:** B, D, T, E and H are all straight strokes. S and O are curves, and a curve needs forward and rotation together.

## The task: draw an L

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Start at the top left facing down. Drive the long stroke into the corner zone, then the short stroke into the goal. The 60 by 30 L above finishes about 4 cm short of the goal, so measure the zones on the mat and plan your own lengths.

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

# stroke one, stroke two
```

**The hint students can ask for:** Start at the top left facing down. Drive down the long stroke into the corner zone, turn, and drive the short stroke into the goal. That draws an L.

### A solution

```
from bugbot import *
connect()
forward(60, distance=55)
left(60, distance=45)
```

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