



SCRATCH PEN

Teacher: Lucy



INFORMATIKA
UNPAR



Hello!

Hope everyone's doing great.

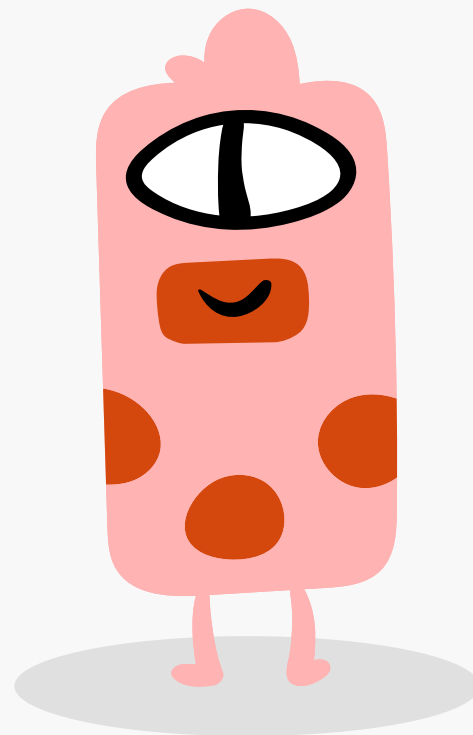


Invisible Pen

Each sprite has an invisible pen which can be either up or down. If the pen is down, the sprite will draw as it moves. Otherwise, the sprite moves without leaving any trace.



Sprite 1



Sprite 2



Sprite 3

Try This Out

```
go to x: 0 y: 0
clear
set pen color to magenta
set pen size to 160
pen down
set pen color to green
set pen size to 120
pen down
```

```
go to x: -200 y: 0
clear
set pen color to 0
set pen size to 20
repeat 200
  move 2 steps
  change pen color by 1
```

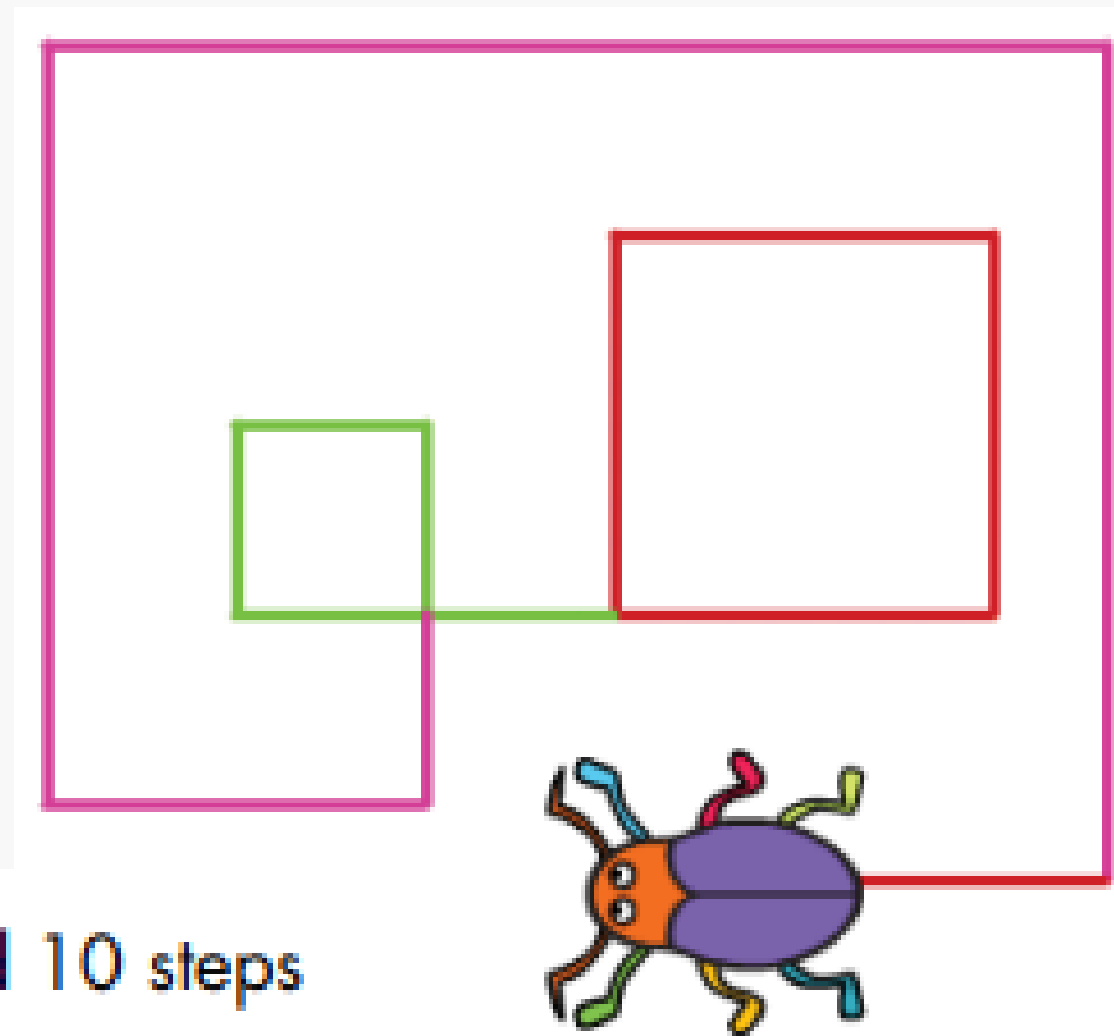
```
go to x: -200 y: 0
clear
set pen color to 70
set pen size to 20
set pen shade to 0
repeat 100
  move 4 steps
  change pen shade by 1
```

Re-create these scripts, run them, and describe the output for each! Don't forget to set the sprite's pen down before running these scripts.

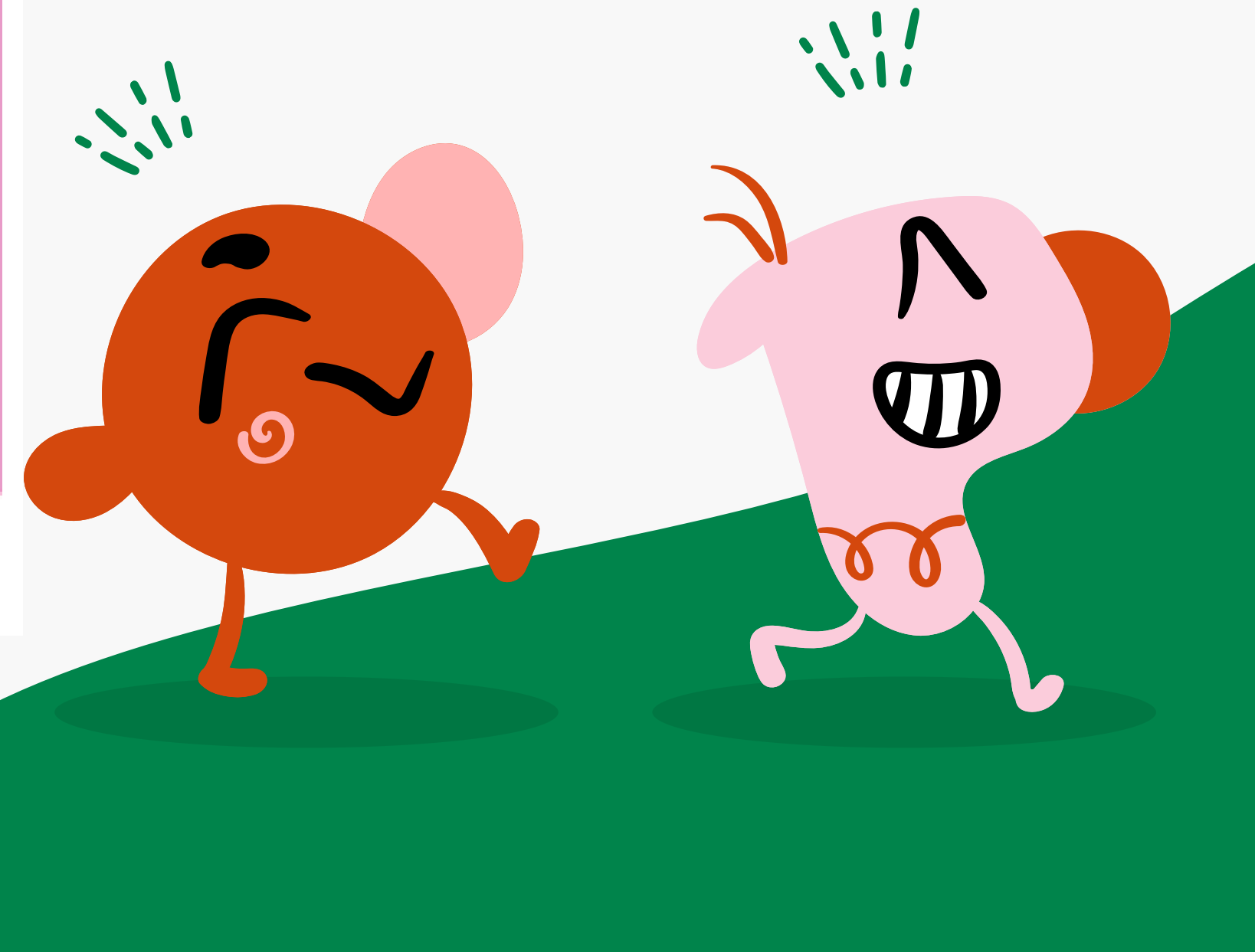


Activity Time

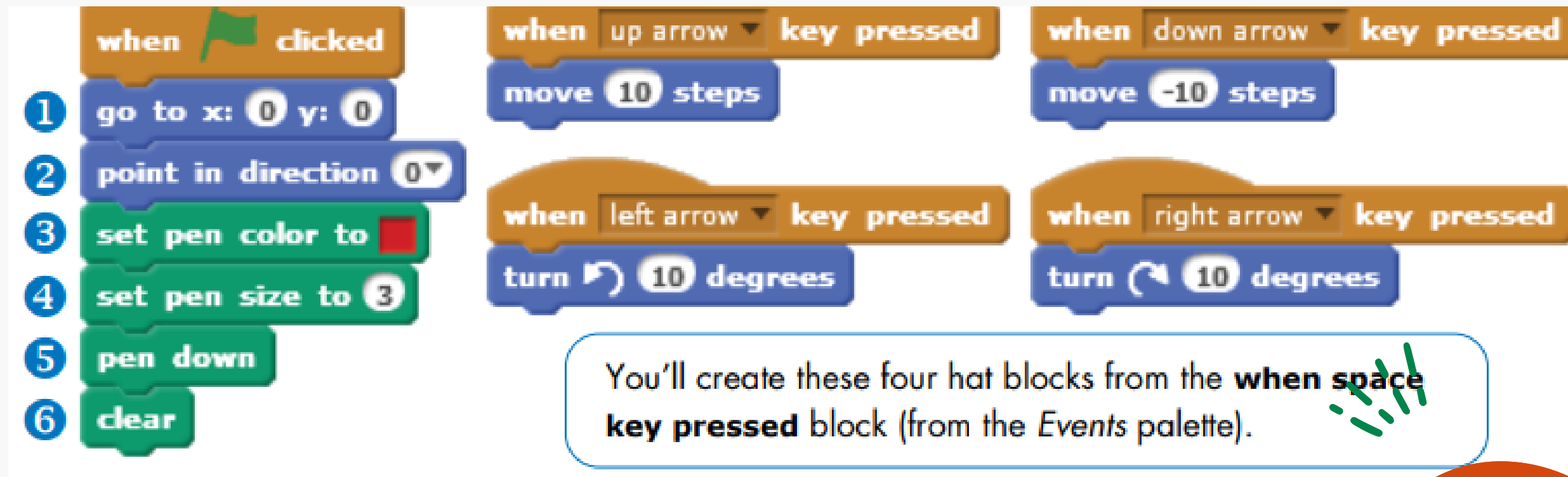
Start a new Scratch project, choose a sprite that clearly shows if the sprite is pointing left, right, up, or down.



- ↑ Move the sprite forward 10 steps
- ↓ Move the sprite backward 10 steps.
- Turn the sprite to the right 10°.
- ← Turn the sprite to the left 10°.



Activity Time (cont.)



The image displays a Scratch script and four key press blocks. The script on the left is a sequence of six blocks: a 'when clicked' block, followed by 'go to x: 0 y: 0', 'point in direction 0', 'set pen color to red', 'set pen size to 3', 'pen down', and 'clear'. To the right are four 'when key pressed' blocks: 'up arrow' (move 10 steps), 'down arrow' (move -10 steps), 'left arrow' (turn 10 degrees), and 'right arrow' (turn 10 degrees). A text box below these blocks explains that these four 'when key pressed' blocks are created from the 'when space key pressed' block in the Events palette.

1 when clicked

2 go to x: 0 y: 0

3 point in direction 0

4 set pen color to red

5 set pen size to 3

6 pen down

7 clear

when up arrow key pressed

move 10 steps

when down arrow key pressed

move -10 steps

when left arrow key pressed

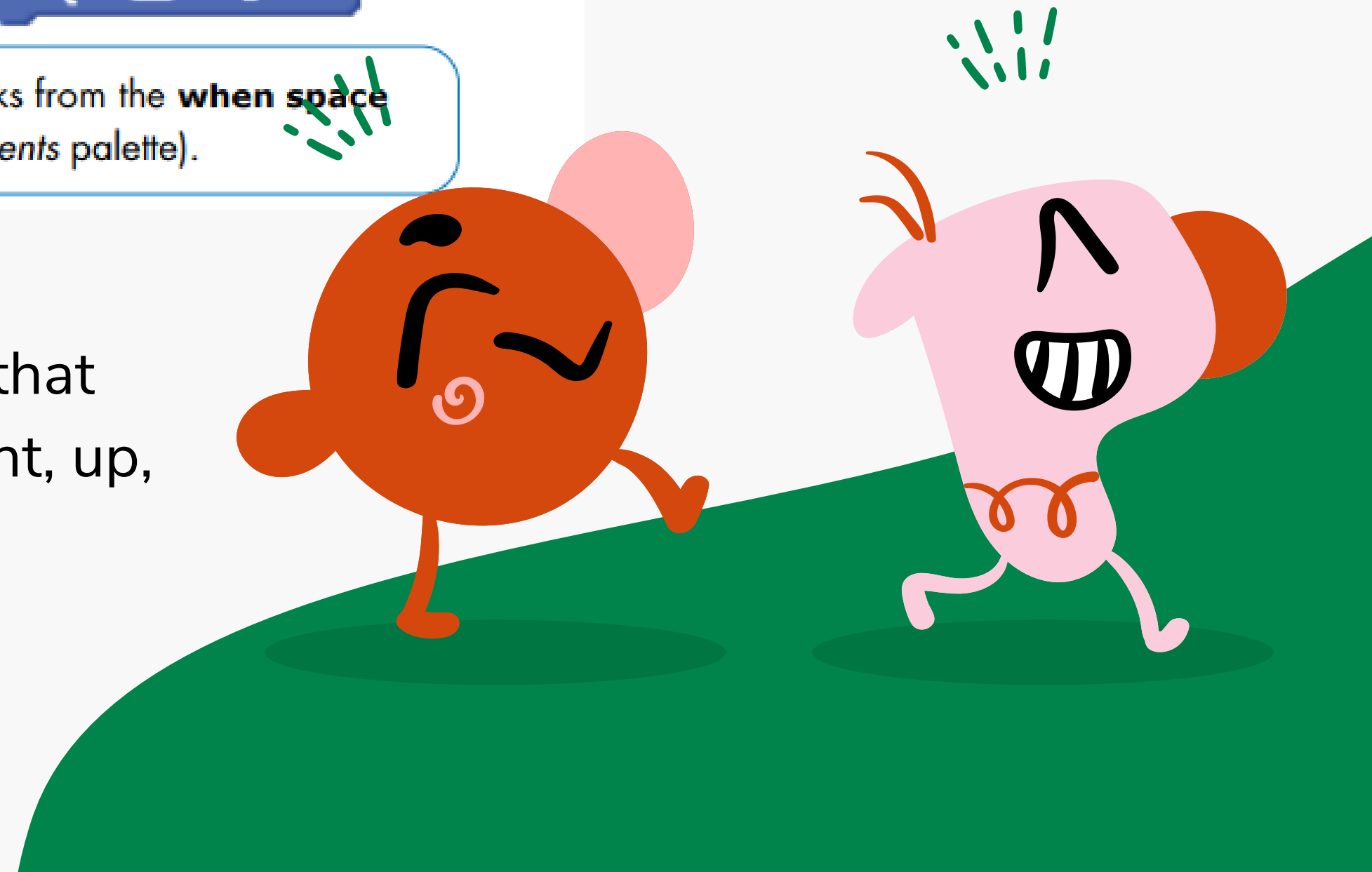
turn 10 degrees

when right arrow key pressed

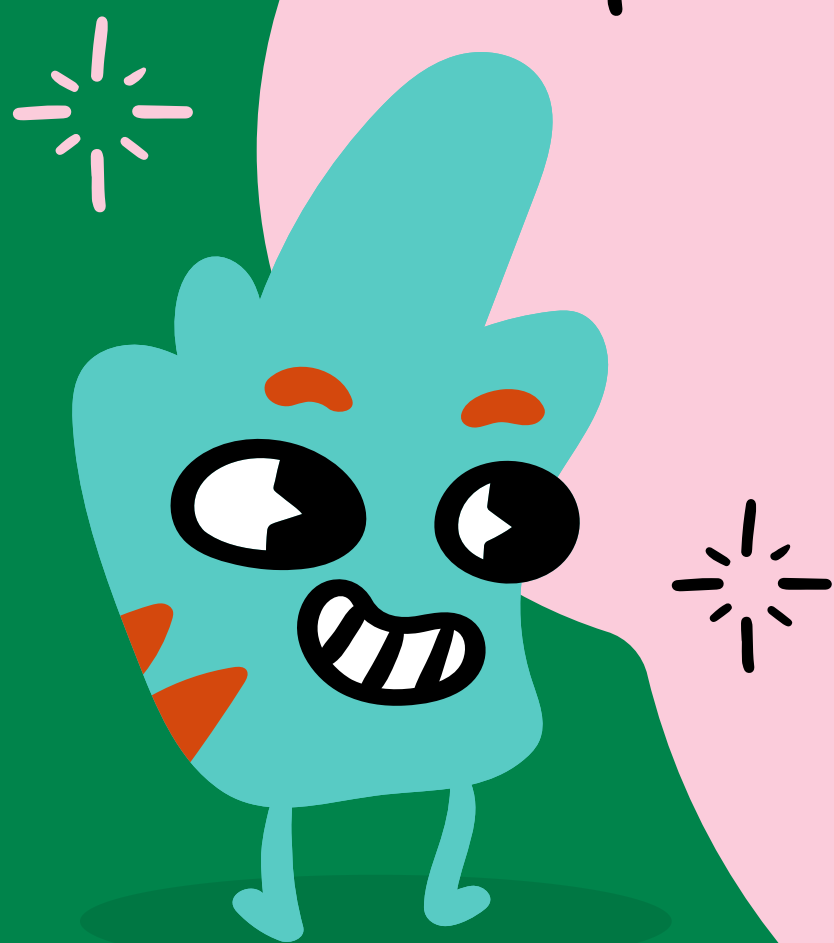
turn 10 degrees

You'll create these four hat blocks from the **when space key pressed** block (from the Events palette).

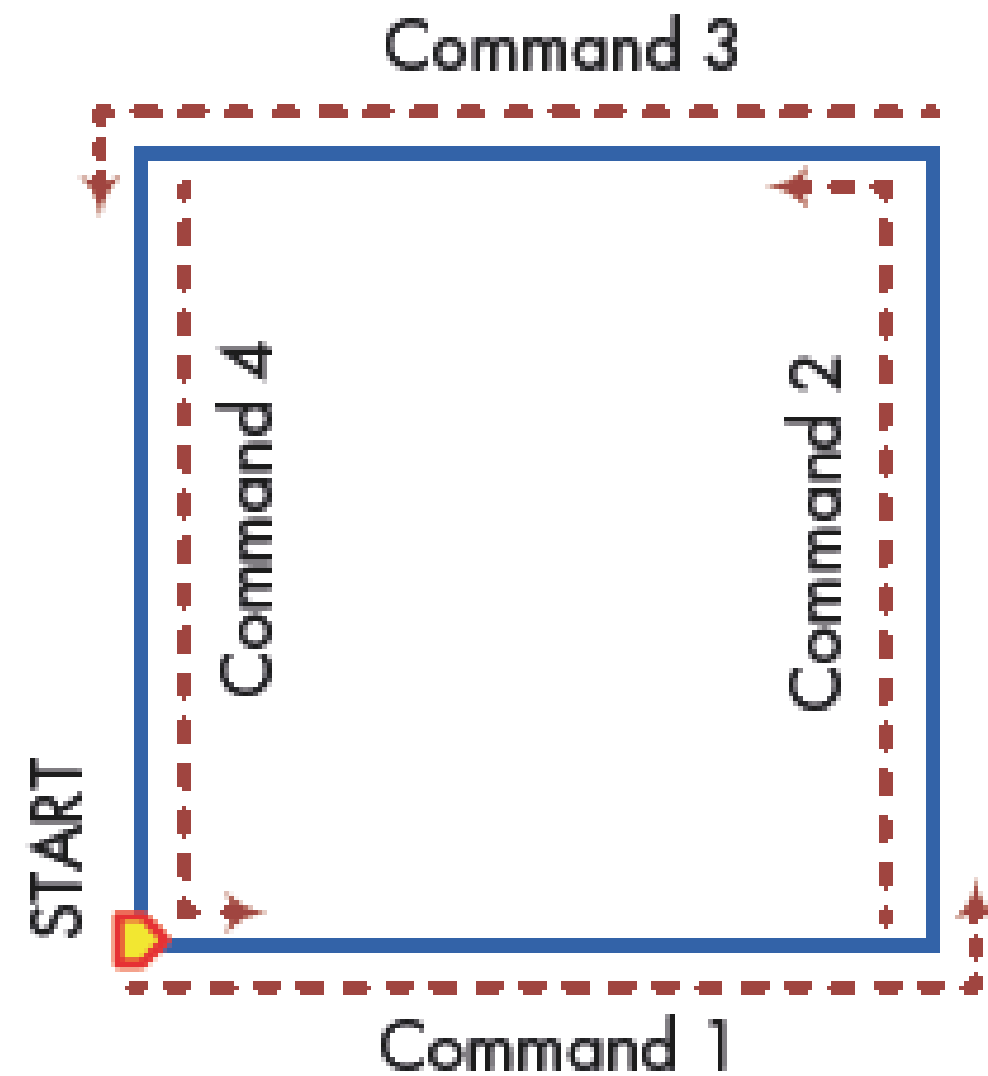
Start a new Scratch project, choose a sprite that clearly shows if the sprite is pointing left, right, up, or down. Add the above script to your sprite



The Power of... **REPEAT**

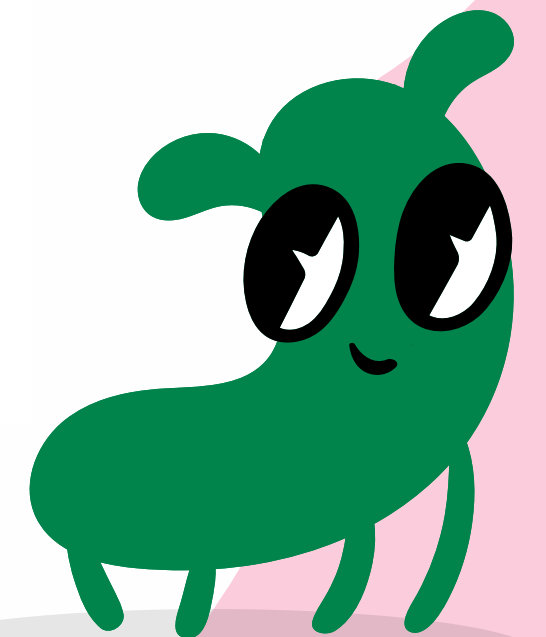


Make a Square

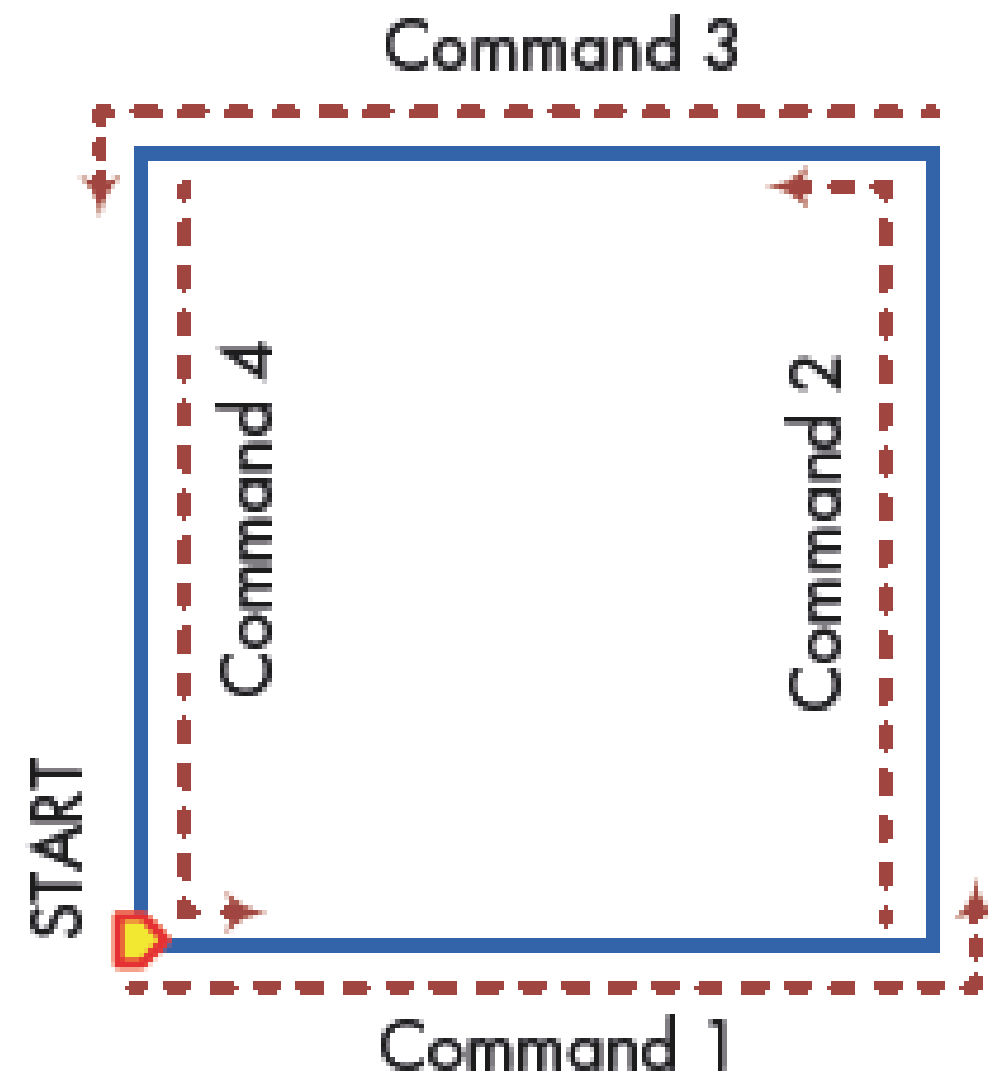


```
when green flag clicked
go to x: 0 y: 0
point in direction 90
set pen color to blue
set pen size to 3
pen down
clear
```

```
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
```

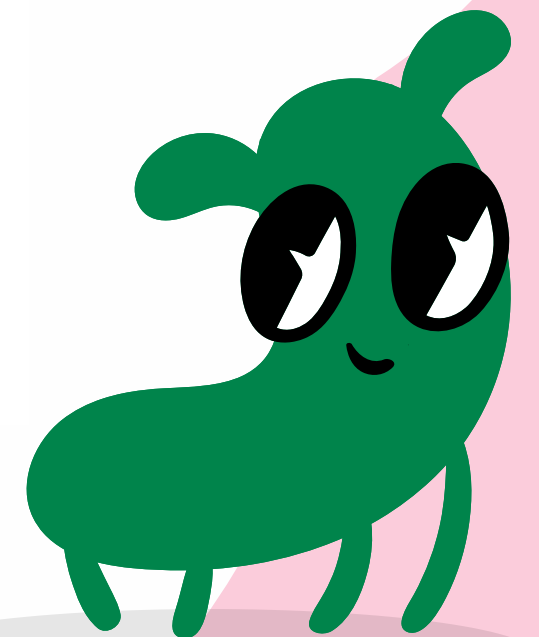


Make a Square

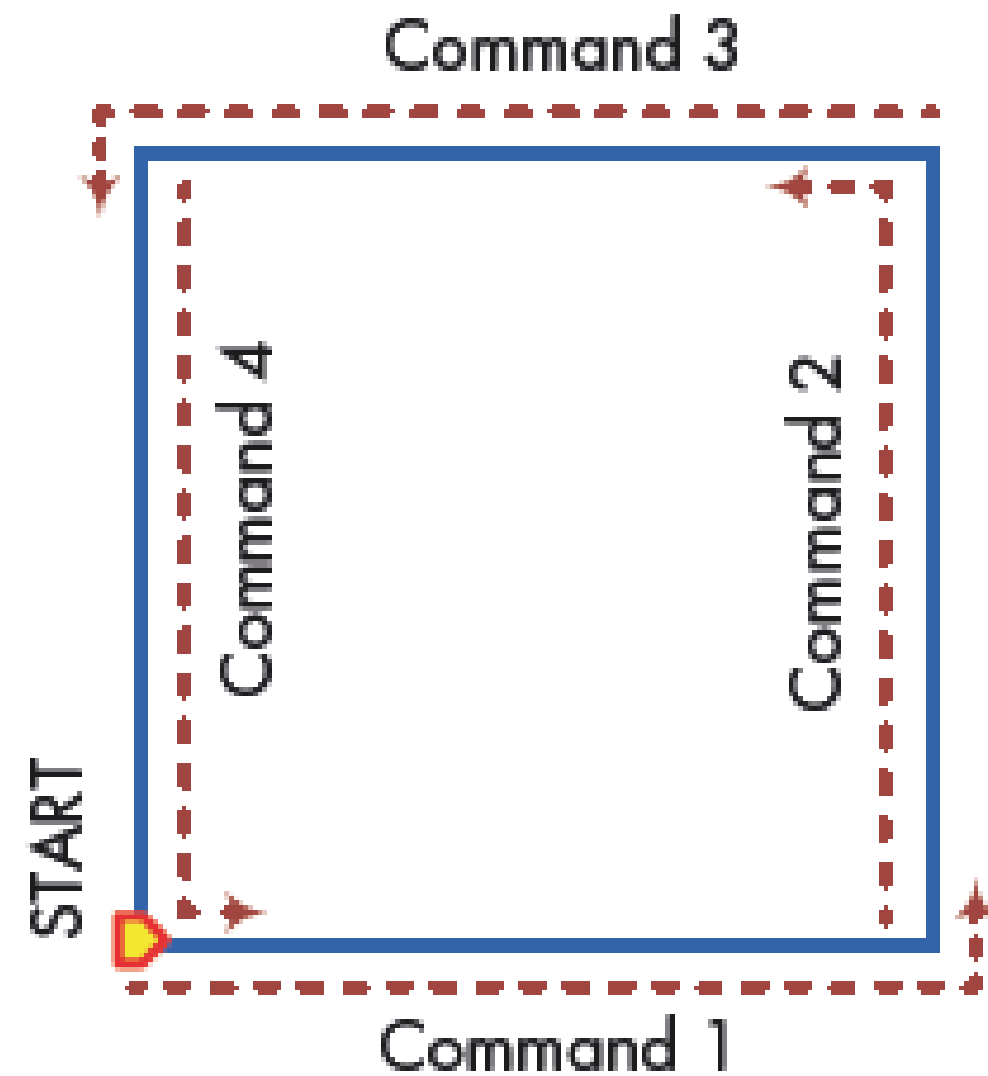


```
when green flag clicked
go to x: 0 y: 0
point in direction 90
set pen color to blue
set pen size to 3
pen down
clear
```

```
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
```

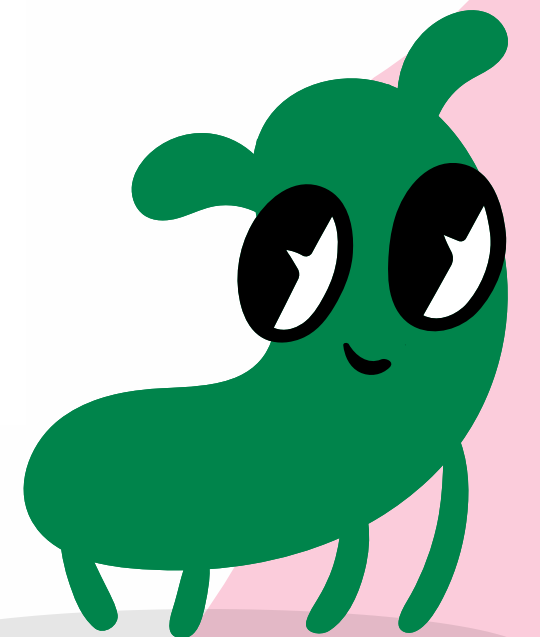
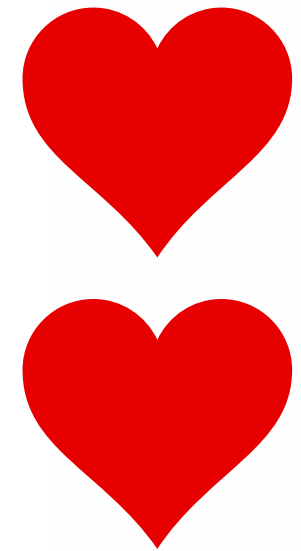


Make a Square

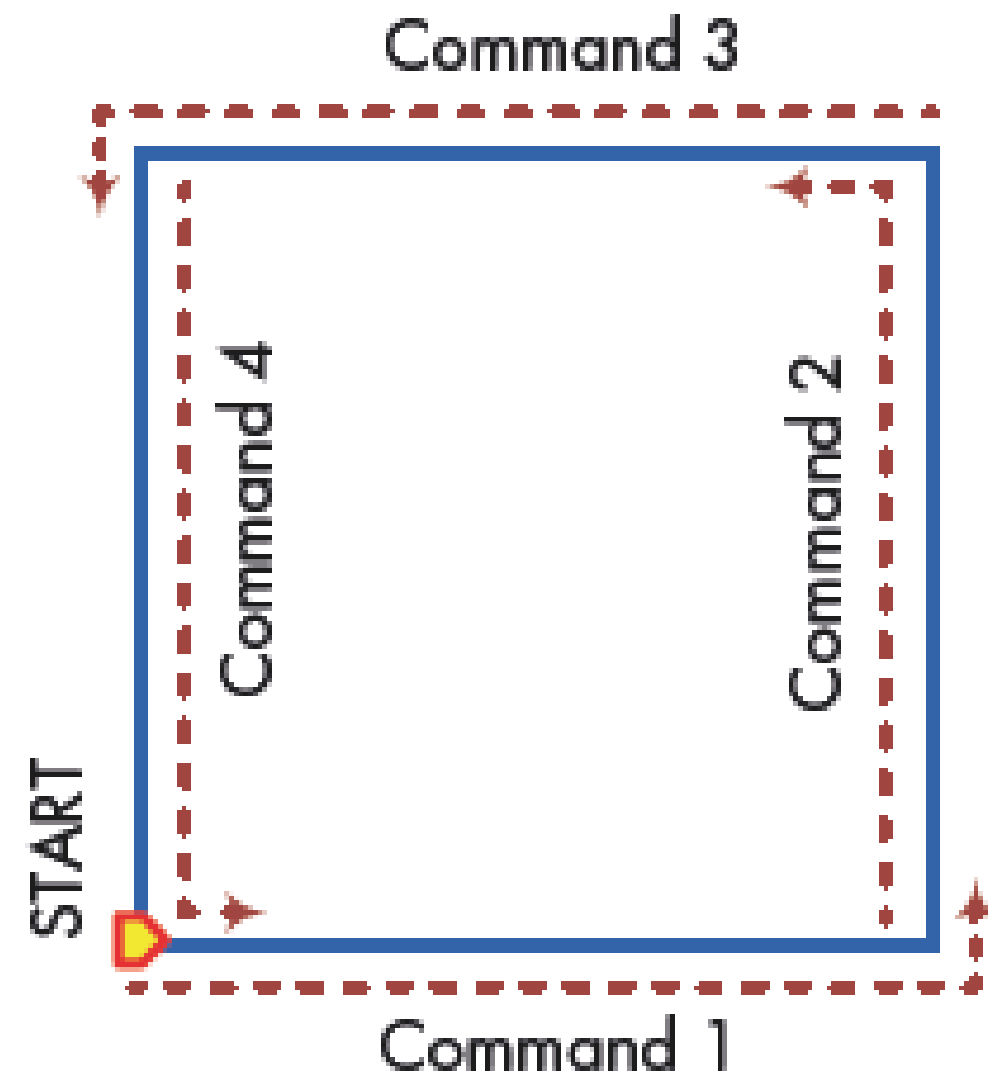


```
when green flag clicked
go to x: 0 y: 0
point in direction 90
set pen color to blue
set pen size to 3
pen down
clear
```

```
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
```

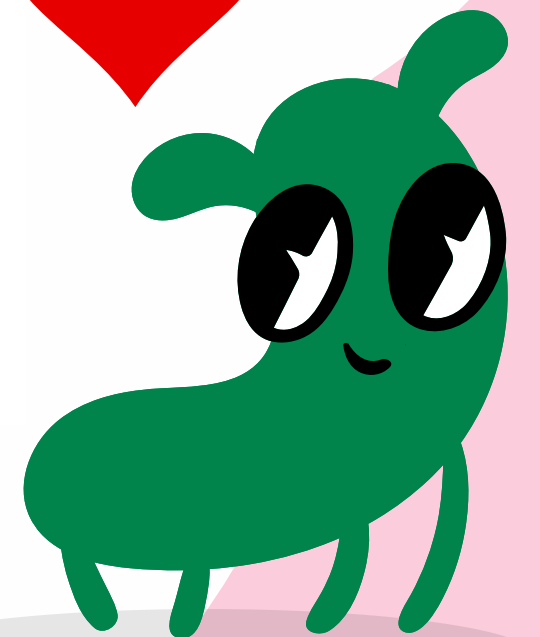


Make a Square

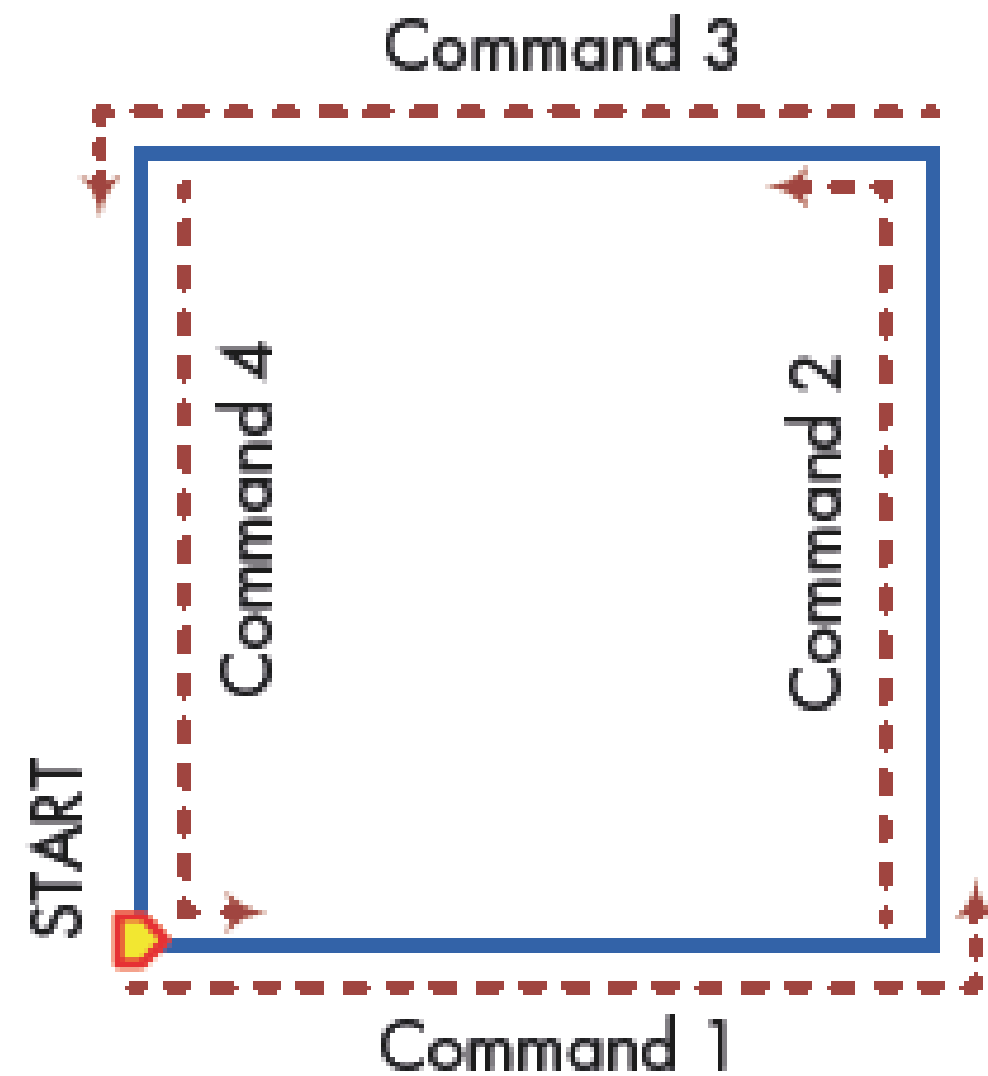


```
when green flag clicked
go to x: 0 y: 0
point in direction 90
set pen color to blue
set pen size to 3
pen down
clear
```

```
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
```

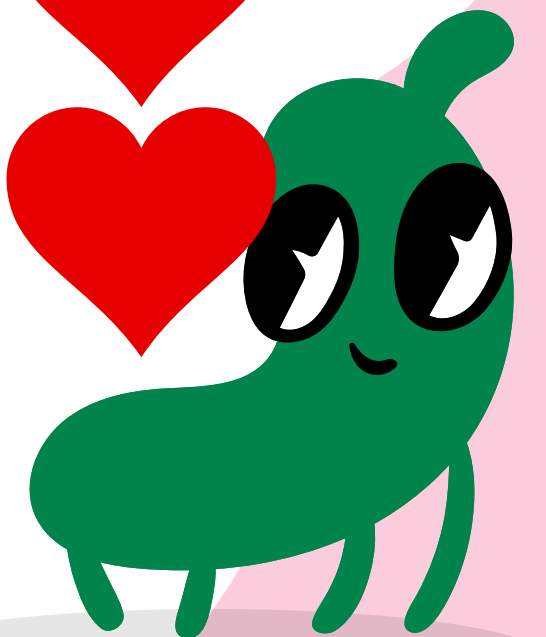
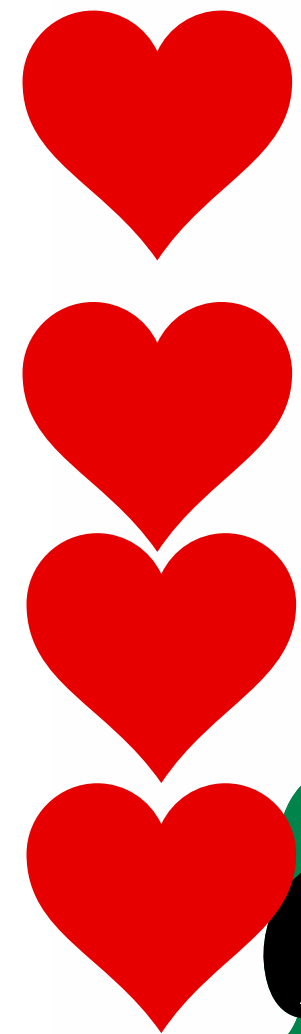


Make a Square

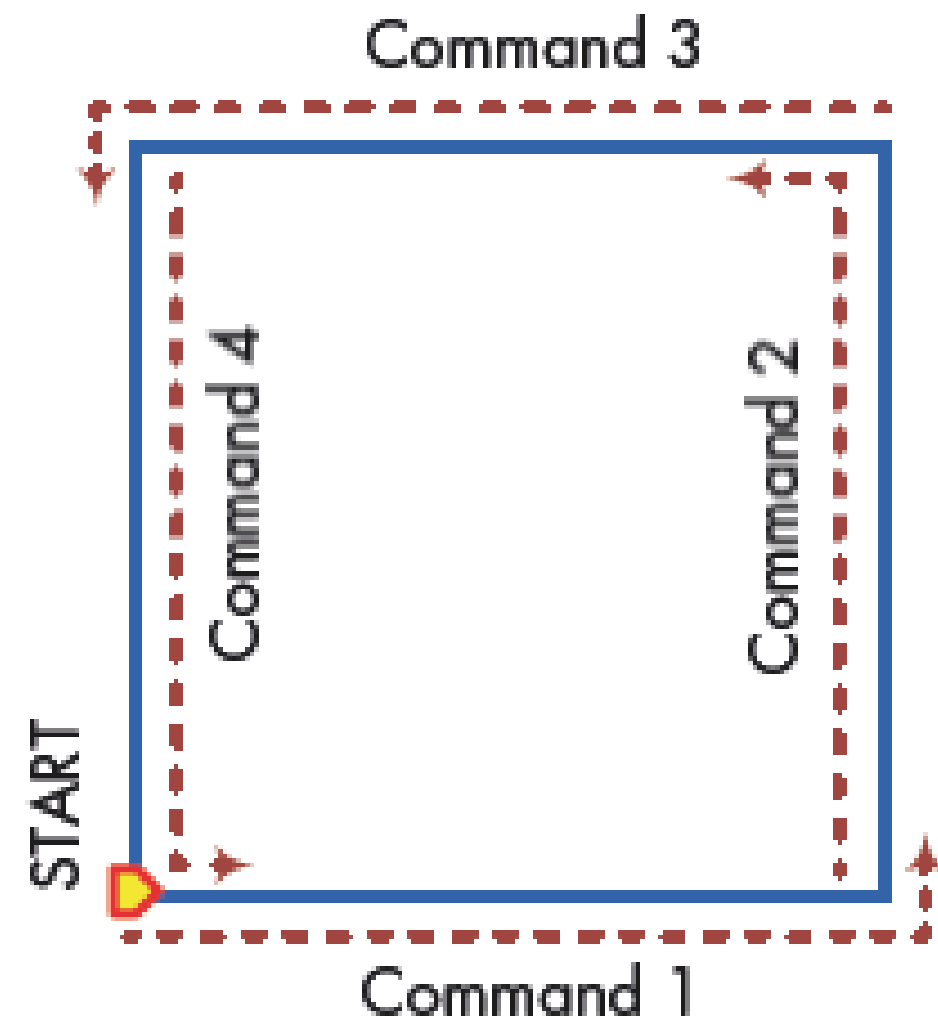


```
when green flag clicked
go to x: 0 y: 0
point in direction 90
set pen color to blue
set pen size to 3
pen down
clear
```

```
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
move 100 steps
turn 90 degrees
```



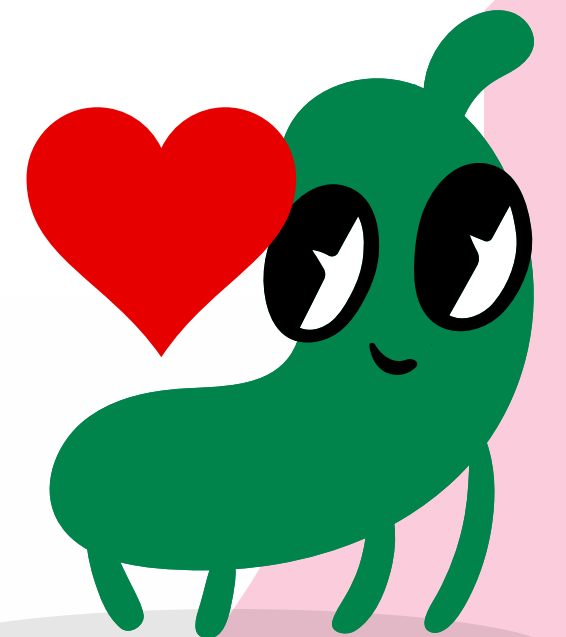
Make a Square



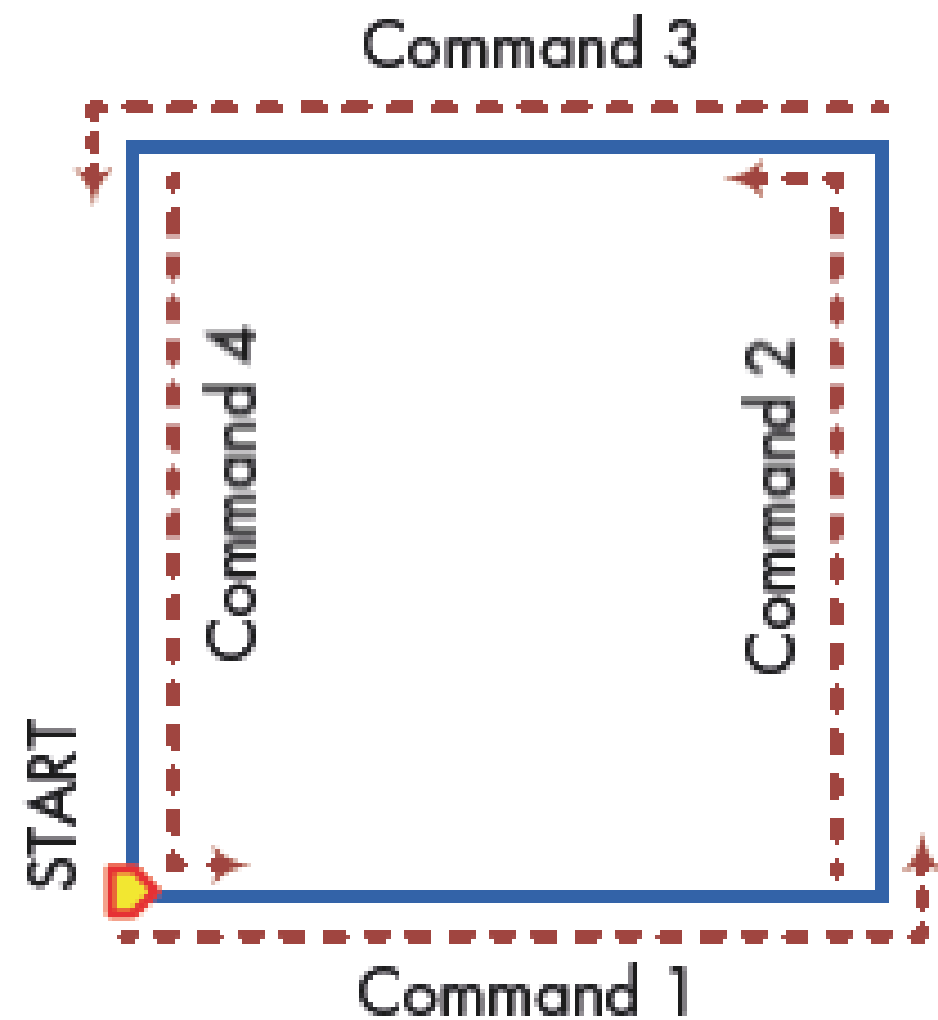
```
when clicked
  go to x: 0 y: 0
  point in direction 90
  set pen color to blue
  set pen size to 3
  pen down
  clear
```

```
repeat 4
  move 100 steps
  turn 90 degrees
```

Run the commands inside the repeat block four times.



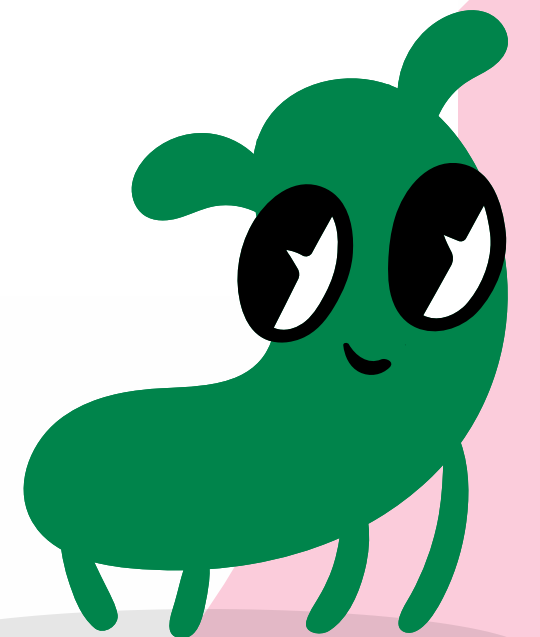
Make a Square



```
when clicked
go to x: 0 y: 0
point in direction 90
set pen color to blue
set pen size to 3
pen down
clear
```

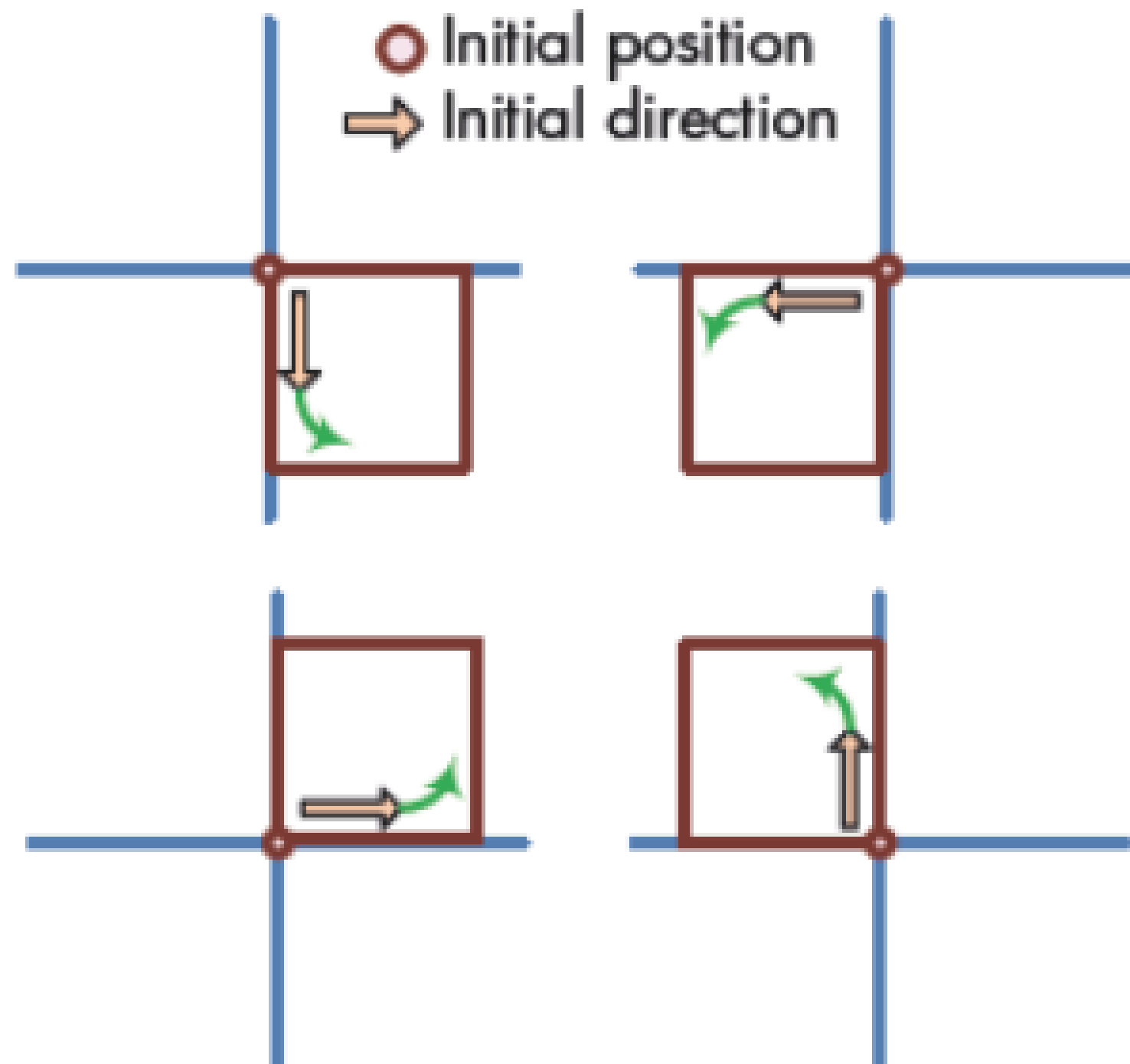
```
repeat 4
  move 100 steps
  turn 90 degrees
```

Run the commands inside the repeat block four times.



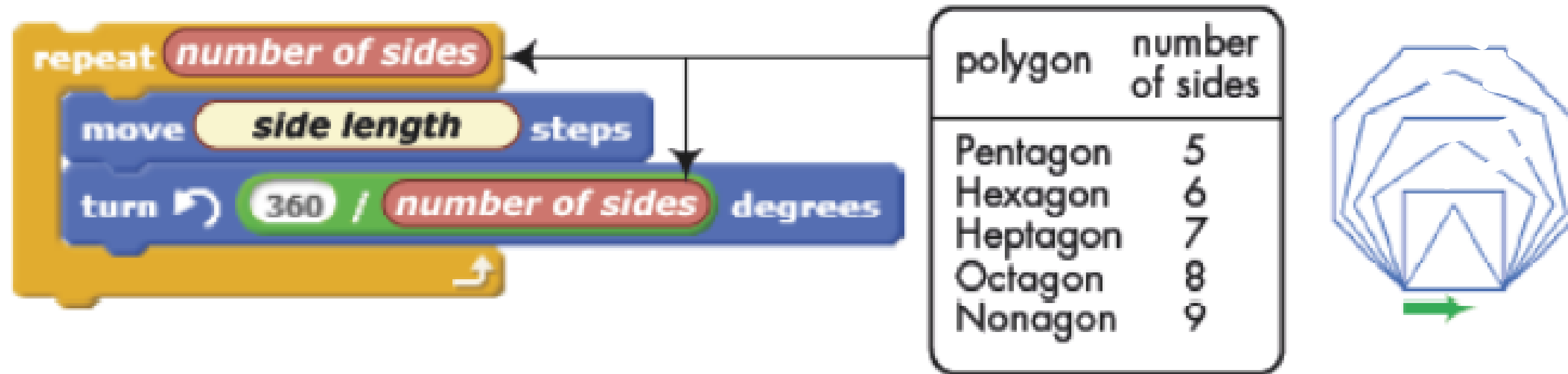
INITIAL DIRECTION

The sprite's initial direction changes the square's location!



Try This Out!

Modify the square-drawing script to draw other regular polygons!



The image shows a Scratch script and a table for drawing regular polygons. The script is a 'repeat' loop with 'number of sides' iterations. Inside the loop, there is a 'move' block with 'side length' steps and a 'turn' block with '360 / number of sides' degrees. The 'number of sides' variable is connected to the 'repeat' block and the 'turn' block. To the right of the script is a table with two columns: 'polygon' and 'number of sides'. The table lists five polygons: Pentagon (5 sides), Hexagon (6 sides), Heptagon (7 sides), Octagon (8 sides), and Nonagon (9 sides). To the right of the table is a diagram of a nonagon with a green arrow indicating the direction of movement.

polygon	number of sides
Pentagon	5
Hexagon	6
Heptagon	7
Octagon	8
Nonagon	9



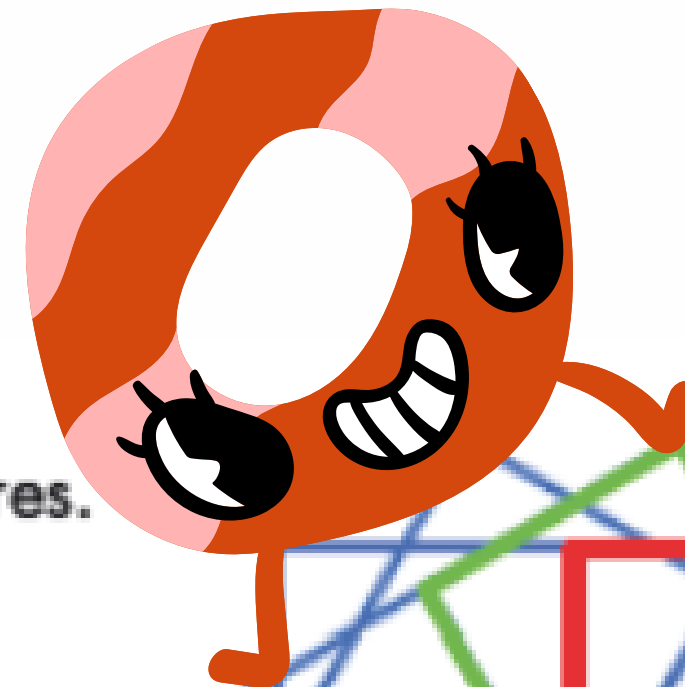
Rotated Squares



1 To draw 12 squares.

2 Draw a square.

3 Turn left 30°.



Second square

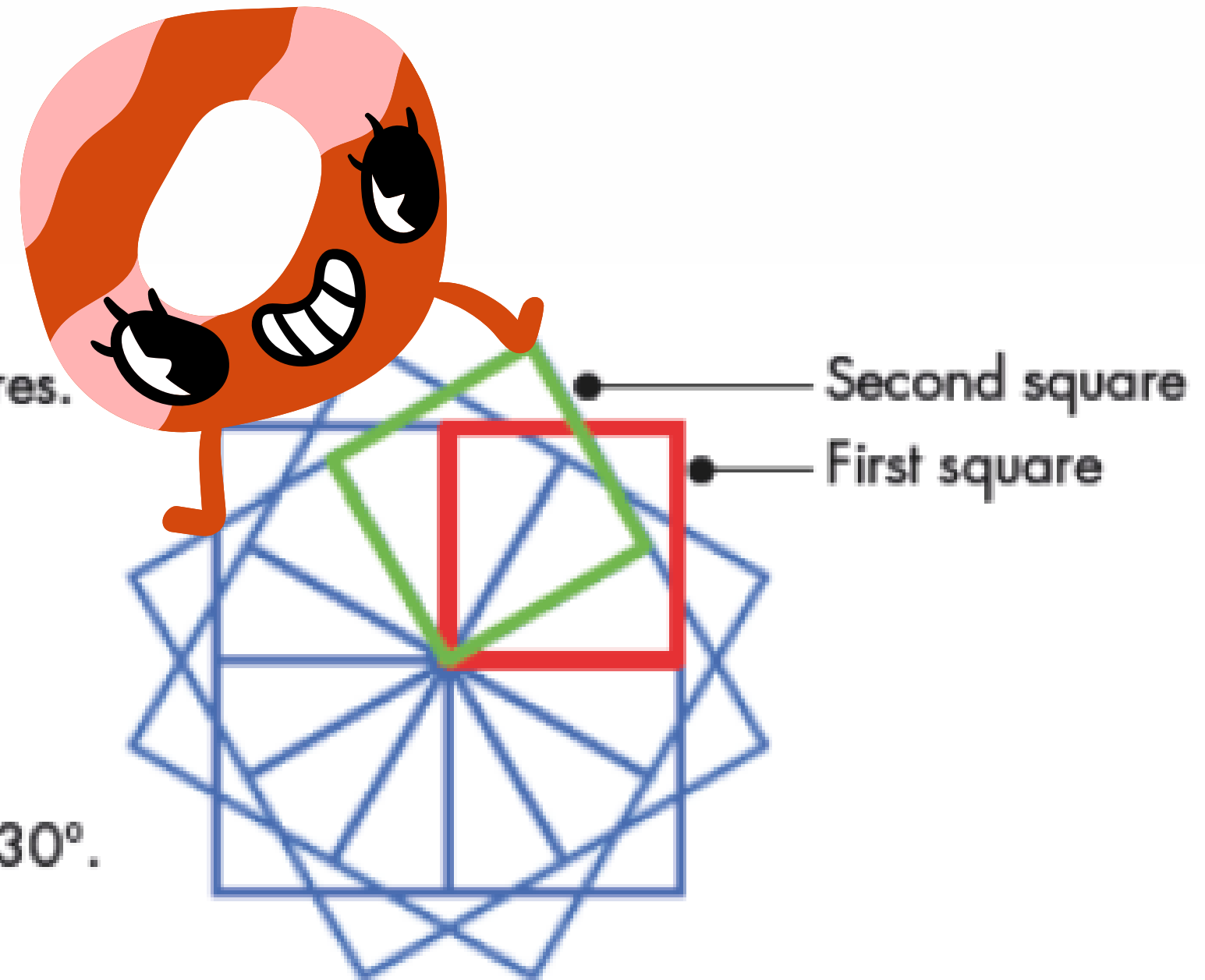
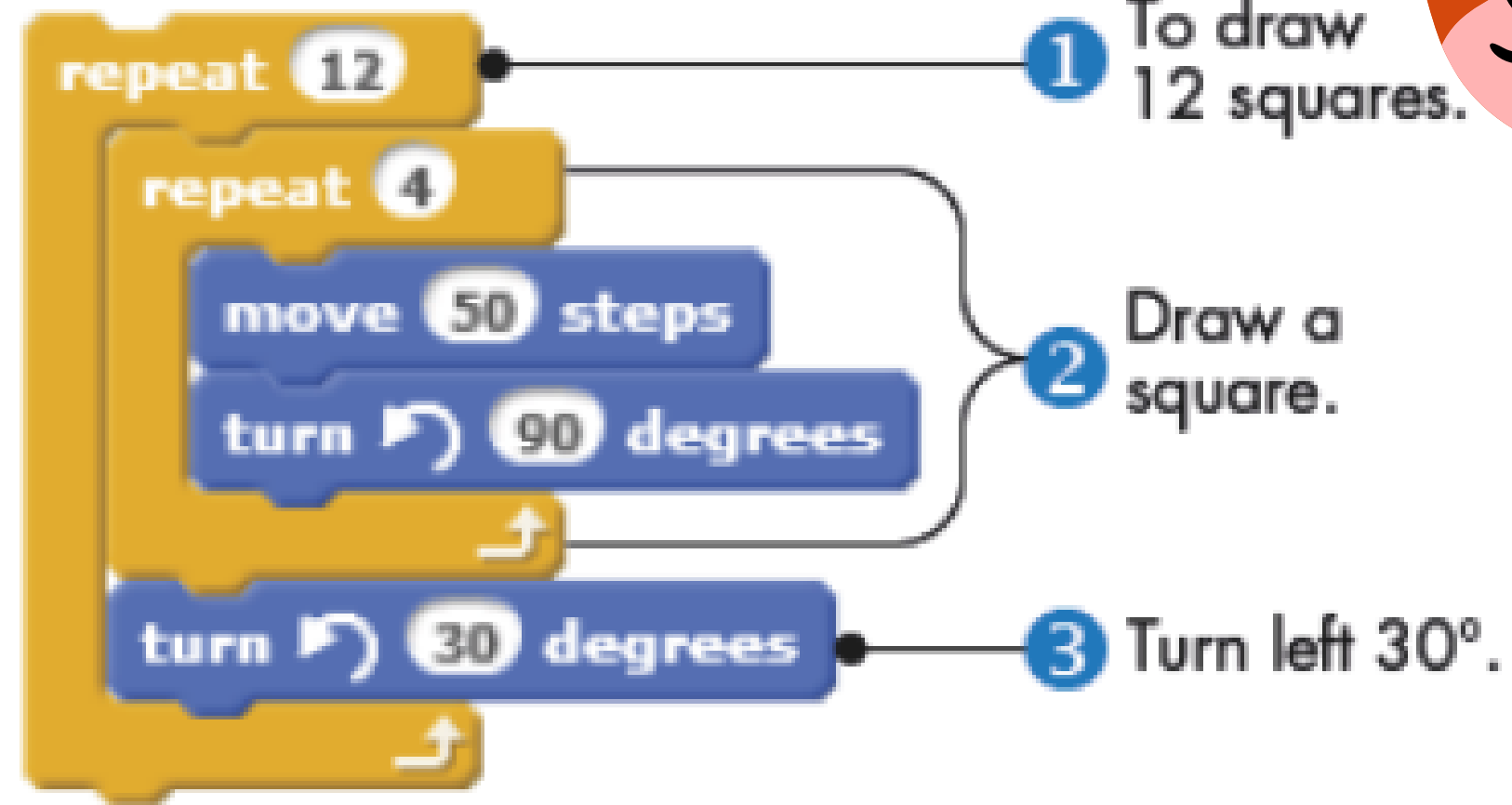
First square

Rotated Squares

Notice that $(12 \text{ repeats}) \times (30 \text{ degrees for each repeat}) = 360 \text{ degrees}$.

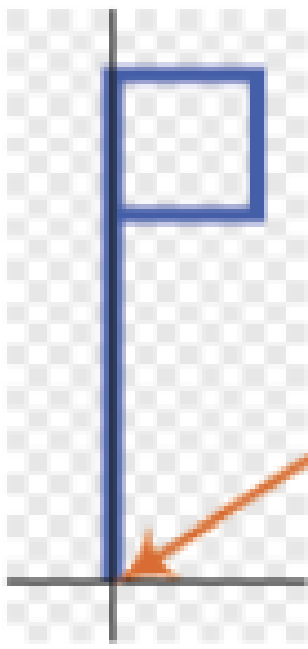
What would happen if you change to:

- 4 repeats and 90 degrees?
- 5 repeats and 72 degrees?



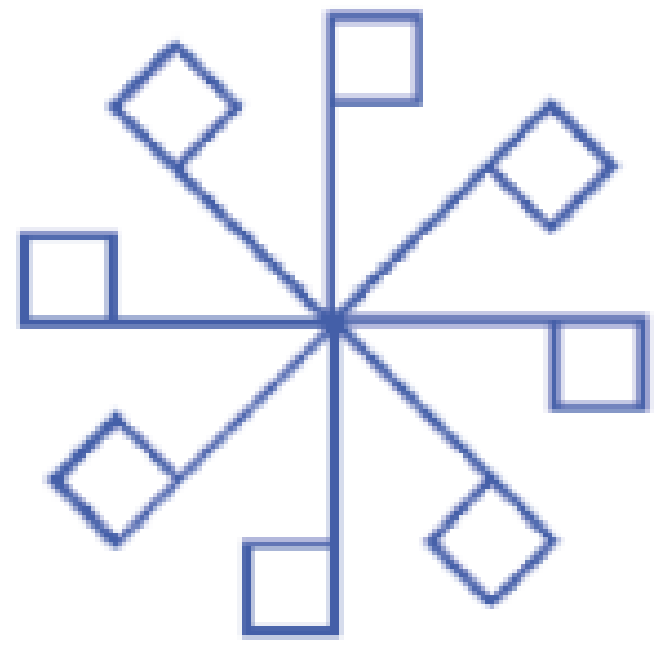
EXPLORING WITH STAMP

Let's write a program to draw the whindmill!



The flag shape as it appears in the Paint Editor. Note the location of the costume's center.

```
set rotation style all around
repeat 8
  stamp
  turn 45 degrees
```



Add change color effect by block inside the repeat block!

THANK YOU!

Don't forget to



and click the

