

Karel Can't Turn Right! (Teacher Version)

Corresponding Material

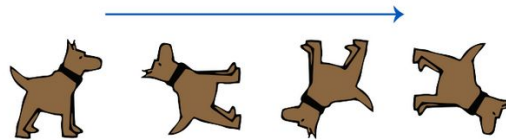
Programming with Karel, Lesson 3: Karel Can't Turn Right

Discussion

You may have noticed that Karel does not know how to turn right! That is a problem... how will Karel travel around the world only by moving and turning left?

The Anatomy of a Right Turn

As it turns out, there is a way for Karel to make right turns. Karel can "turn right" by turning left three times. Three lefts make a right!



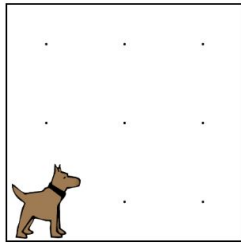
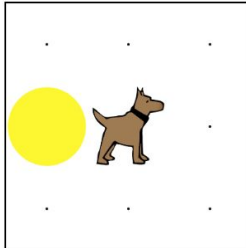
We can teach Karel what it means to turn right by creating a **function**.

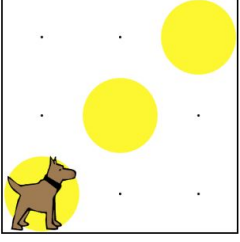
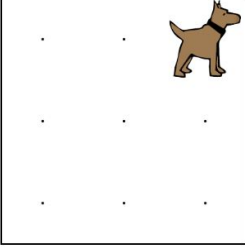
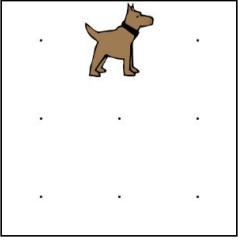
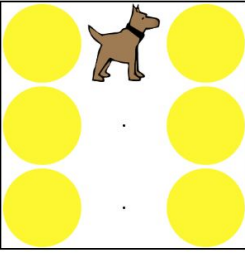
Exercise

- Fill in the commands that Karel needs to do whenever the `turnRight()` function is called:

```
function turnRight() {
    _____
    _____
    _____
}
```

- For each initial program written below, draw in the result world. Then alter the program to use the `turnRight()` function where applicable to complete the same task. You can assume that the `turnRight()` function was previously defined.

Starting World	Initial Program	Result World	Program Using <code>turnRight()</code>
	<pre>turnLeft(); move(); turnLeft(); turnLeft(); turnLeft(); putBall(); move();</pre>		<pre>turnLeft(); move(); turnRight(); putBall(); move();</pre>

	<pre>takeBall(); move(); turnLeft(); move(); takeBall(); move(); turnLeft(); turnLeft(); turnLeft(); move(); takeBall();</pre>		<pre>takeBall(); move(); turnLeft(); move(); takeBall(); move(); turnRight(); move(); takeBall();</pre>
	<pre>move(); putBall(); turnLeft(); turnLeft(); turnLeft(); move(); putBall(); move(); putBall(); turnLeft(); turnLeft(); turnLeft(); move(); move(); putBall(); turnLeft(); turnLeft(); turnLeft(); move(); putBall(); move(); putBall(); turnLeft(); turnLeft(); turnLeft(); move();</pre>		<pre>move(); putBall(); turnRight(); move(); putBall(); move(); putBall(); turnRight(); move(); move(); putBall(); turnRight(); move(); putBall(); turnRight(); move(); putBall(); turnRight(); move();</pre>

Conclusion Questions

1. What do you notice about each program that used the `turnRight()` function in terms of length?

Each program that utilized the `turnRight()` function was shorter than the initial program written.

2. Name two reasons functions are useful in code.

1- Functions shorten code.

2- Functions allow us to repeat commands easier.