

Debugging Functions (Teacher Version)

Corresponding Material

Introduction to Programming, Lesson 4: Functions in Karel

Discussion

We have to teach Karel the dog new tricks by creating new functions. But Karel is a little picky... everything has to be spelled just right or Karel won't be able to read the function. Computers are also like this: they have a hard time understanding the code if there are mistakes in spelling or structure. A **logic error** is a mistake in the algorithm or program that causes it to behave incorrectly or unexpectedly. A **syntax error** is a mistake in the program where the rules of the programming language are not followed.

Class Exercise

1. Circle the mistakes in the following function definitions and then describe the mistake in the box given. Lastly, decide if this was a logic or syntax error

- a. Teaching Karel to turn right

Code	Describe Mistake	Type of Error
<pre>function turnRight() { turnLeft(); turnLeft(); turnLeft(); }</pre>	- Missing open bracket { on the first line.	Syntax Error

- b. Teaching Karel to put down three tennis balls

Code	Describe Mistake	Type of Error
<pre><u>function</u> putThreeBalls() { putBall<u>()</u>; putBall(); putBall(); }</pre>	- Missing "function" keyword. - Missing parentheses and semicolon after the first putBall command.	Syntax Error

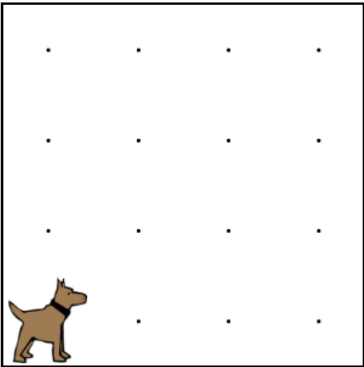
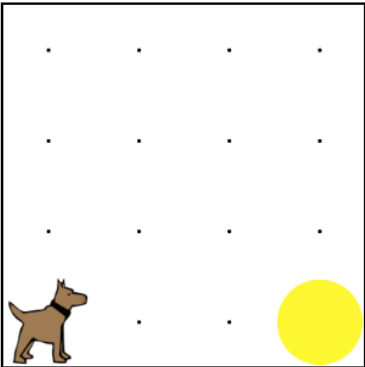
c. Teaching Karel to turn around

Code	Describe Mistake	Type of Error
<pre>function turnAround() turnLeft() turnLeft() }</pre>	- Missing parentheses in function declaration. - Missing semicolons after the commands. - Lowercase l instead of L in turnLeft. - Missing closing bracket } at the end.	Syntax Error

d. Teaching Karel to turn right

Code	Describe Mistake	Type of Error
<pre>function turnRight() { turnRight(); turnRight(); turnRight(); turnLeft(); turnLeft(); turnLeft(); }</pre>	- The turnRight function is made up of turnRights! This won't work because turnRight isn't defined yet. We need to use turnLeft commands instead.	Logic Error

2. The following program has been written.

Program	Starting World	Desired Result World
<pre>function turnAround() { turnLeft(); turnLeft(); } moveThreeSpaces(); turnAround(); putBall(); moveThreeSpaces(); turnAround();</pre>		



- a. This program will result in a logic error because the `moveThreeSpaces()` function has not been defined! Write the function definition for this function below:

```
function moveThreeSpaces () {  
    move () ;  
    move () ;  
    move () ;  
}
```

- b. Could we write a function to include more commands that are being repeated? Write a third function that will have Karel move three spaces and then turn around. (Hint: Functions can be used inside other functions!)

```
function moveThenTurn () {  
    moveThreeSpaces () ;  
    turnAround () ;  
}
```