

Lightbot Functions

Goal: The purpose of this exercise is to learn how to express a function symbolically. You will write functions and a program to demonstrate your understanding of using these concepts.

This assignment is a continuation of the last assignment when you programmed the Lightbot symbolically, with text instructions instead of iconographic instructions.



Step (S)



Left (L)



Right (R)



Jump (J)



Power (P)



F.name

We also introduced iteration (repeating operations), as in 4: (S)

Symbolic Function Definitions

When we define functions symbolically we use a special form. For the function definition, we write the name, a pair of parentheses, the operation sequence, and end it with a period. For example, this is a function definition for a function that turns the bot around:

F.turnaround() R,R.
 name body

The name of the function is the part between the dot and the open parenthesis, in this case turnaround. The part after the closing parenthesis to the period, is called the body. It defines how the function works.

To make the function happen, we need to "call" it. To call the function you give the name, followed by the parentheses, as in turnaround() which instructs the bot to do the instructions in the body of the function.

For example, to program the bot to "turn around and jump", we would write the program turnaround(), J.

Notice that a single function like turnaround() has two roles: in one role it is defined; in the other role it is called. **A function has only one definition, but can be called many times.**

Name: _____

Example: The Moon Walk

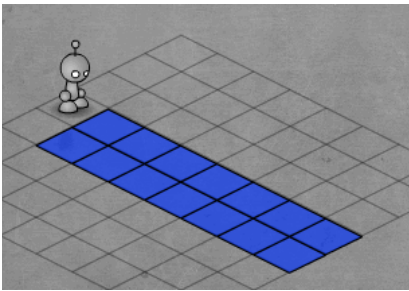
The bot version of the Moonwalk function is below.

```
F.moonwalk() 4:(S, R).
```

According to the function body, the bot's Moonwalk is four repeats of taking a step (and not going anywhere) and then turning right. To use the moonwalk() function after jumping up two steps, for example, we could write: J, J, moonwalk().

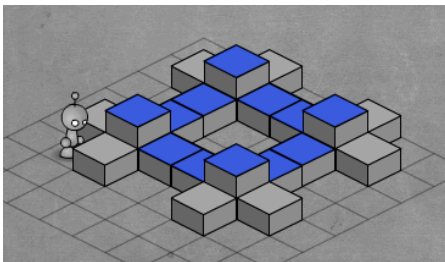
Exercises

A: Consider a different solution to problem (C) from last time. Suppose we have written the program 7:light_a_pair(). Write out the function definition for the F.light_a_pair function so that the command works for our program.



B: The program below ends with the instruction 4:light_a_side(). Write the F.light_a_side function definition so that the program works. Your function will probably take about seven instructions.

```
J, L, J, R, 4:light_a_side().
```



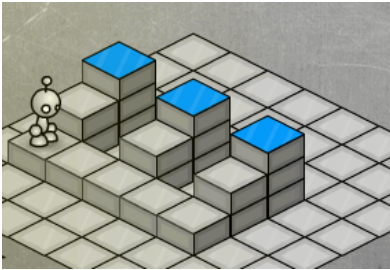
Name: _____

Moonwalk

The Lightbot wants a new solution to the Basic Level 6. The bot wants is to go up each riser and do its version of a Moonwalk on the top before powering the light. You will write a new version of the Moonwalk, the bot should go up the stairs and do the moonwalk.

C: Solve the problem below so that the bot does a Bot Moonwalk at the top of each riser before powering the light. Include a copy of your new `moonwalk()` definition with your solution.

<moonwalk function definition>



<program to solve the entire level>

To Turn In

Scan pages 2 and 3 of this document and upload them to Lightbot Functions assignment on Canvas.