Q5: Both Paths

Let a path be some sequence of directions, starting with S for start, and followed by a sequence of U and Ds representing up and down directions along the path. For example, the path SUDDDUUU represents the path up, down, down, down, up, up, up.

Your task is to implement the function both\_paths, which prints out the path so far (at first just S), and then returns two functions, each of which keeps track of a branch down or up. This is probably easiest to understand with an example, which can be found in the doctest of both\_paths as seen below.

Note about default arguments: Python allows certain arguments to be given default values. For example, the function

**def** **root**(x, degree=2):

**return** x \*\* (1 / degree)

can be called either with or without the degree argument, since it has a default value of 2. For example

>>> root(64)

8

>>> root(64, 3)

4

In the given skeleton, we give the default argument sofar.

**def** **both\_paths**(sofar="S"):

"""

>>> up, down = both\_paths()

S

>>> upup, updown = up()

SU

>>> downup, downdown = down()

SD

>>> \_ = upup()

SUU

"""

print(sofar)

**def** **up**():

**return** both\_paths(sofar + "U")

**def** **down**():

**return** both\_paths(sofar + "D")

**return** up, down