# Model 1 Flow of Execution

In addition to using Python's built-in functions (e.g., `print`, `abs`) and functions defined in other modules (e.g., `math.sqrt`), you can write your own functions.

```
1  def model_one():
2      word = input("Enter a word: ")
3      L = len(word)
4      ans = word * L
5      print(ans)
6
7  def main():
8      print("Starting main...")
9      model_one()
10     print("All done!")
11
12 main()
```

## Questions (20 min)

**Start time:** _____

**1.** Based on the program in Model 1:

a) What is the Python keyword for defining a function? _____

b) On what line is the `model_one` function... defined? _____ called? _____

c) On what line is the `main` function... defined? _____ called? _____

**2.** Open a web browser and go to PythonTutor.com. Click on "Visualize your code", and type (or paste) the program above. Make sure the line numbers match.

**3.** Click the "Visualize Execution" button. As you step through the program, pay attention to what is happening on the **left side** of the visualization.

a) What does the **red** arrow indicate? _____

b) What does the **green** arrow indicate? _____

**4.** Notice the order in which the program runs:

a) After line 12 of the program executes (Step 3), what is the next line that executes? _____

b) After line 9 of the program executes (Step 6), what is the next line that executes? _____

**5**. Go back to the beginning of the program execution. This time as you step through the program, pay attention to what changes on the **right side** of the visualization.

a) Describe what changes in the visualization after Step 1.

b) Describe what changes in the visualization after Step 2.

**6**. In general, what happens on the right side of the visualization when a function is called?

**7**. In terms of execution order, what is the effect of calling a function?

**8**. Draw the right side of the visualization for Step 11 in the space below.

**9**. Notice that the variable `ans` is printed from within the `model_one` function. What happens if you try to `print(ans)` inside the main function?

**10**. Explain what happened in the previous question in terms of frames in the visualization.

**11**. In the space below, write a definition for a function called `str_to_list` that prompts the user to enter a word. The function should convert the string to a list and print the list.

**12**. Edit the program in Python Tutor so that, instead of defining and calling the function `model_one`, it defines and calls the function `str_to_list`. Verify your changes by visualizing the execution, and draw a picture of the right side immediately after the list is printed.