[220 / 319] Using Functions

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Learning Objectives Today

How to call functions

- terminology
- input/output

Function usage demos

Please read Ch 3 of Think Python

make a battleship game!

Main Code:

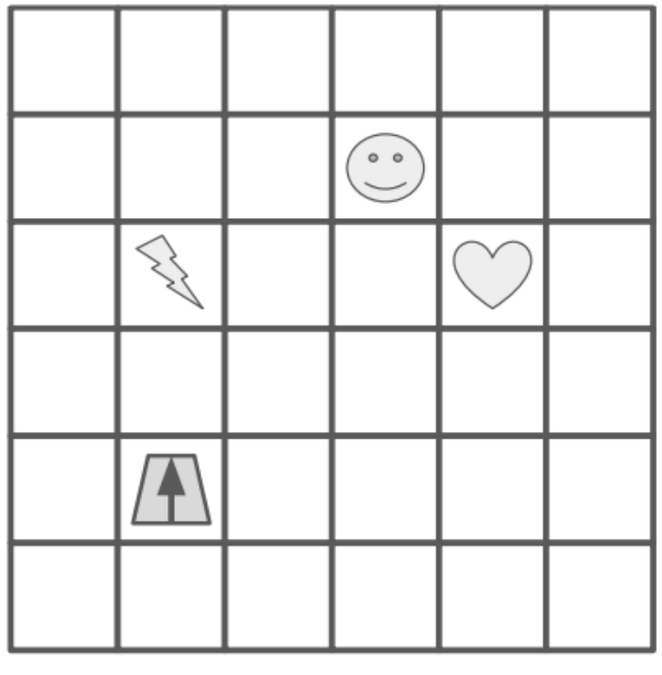
1. Put 2 in the “moves” box
2. Perform the steps under “Move Code”, then continue to step 3
3. Rotate the robot 90 degrees to the right (so arrow points to right)
4. Put 3 in the “moves” box
5. Perform the steps under “Move Code”, then continue to step 6
6. Whatever symbol the robot is sitting on, write that symbol in the “resut” box

Move Code:

A. If “moves” is 0, stop performing these steps in “Move Code”, and go back to where you last were in “Main Code” to complete more steps
B. Move the robot forward one square, in the direction the arrow is pointing
C. Decrease the value in “moves” by one
D. Go back to step A

“Move Code” is a function

Functions are like “mini programs”, as in our robot worksheet problem



we'll learn about how to give functions input by passing arguments (e.g., 2) to parameters (e.g., moves)

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today we'll learn how to use functions in Python

we'll also learn how to ask functions questions and get answers called return values

Move Code:

A. If "moves" is 0, stop performing these steps in "Move Code", and go back to where you last were in "Main Code" to complete more steps
B. Move the robot forward one square, in the direction the arrow is pointing
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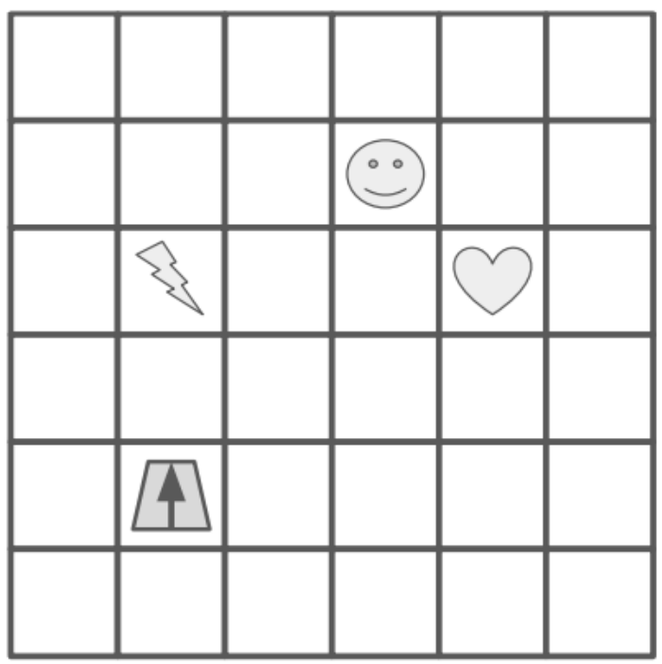
next lecture, we'll learn how to write our own new functions

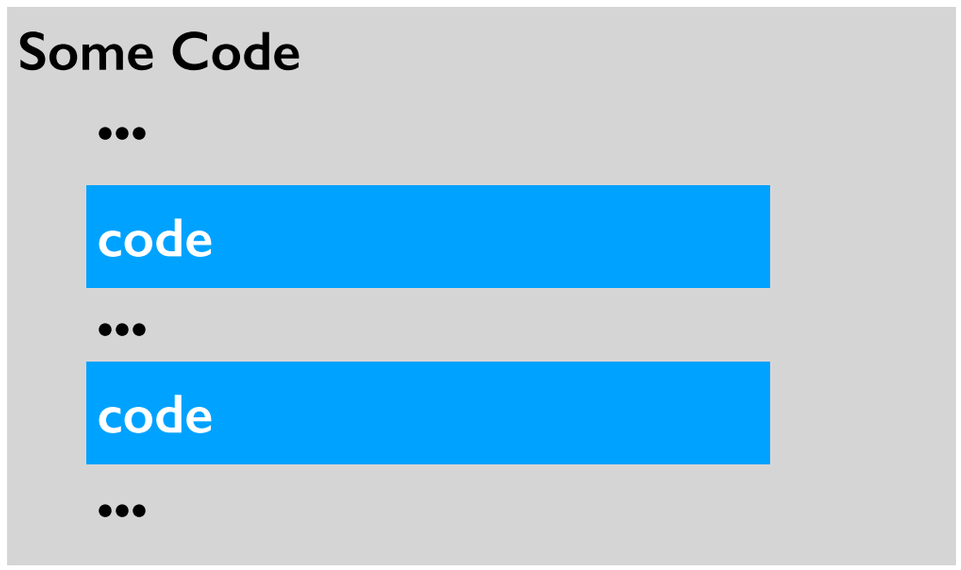
Functions are like "mini programs", as in our robot worksheet problem



Vocabulary

- ...

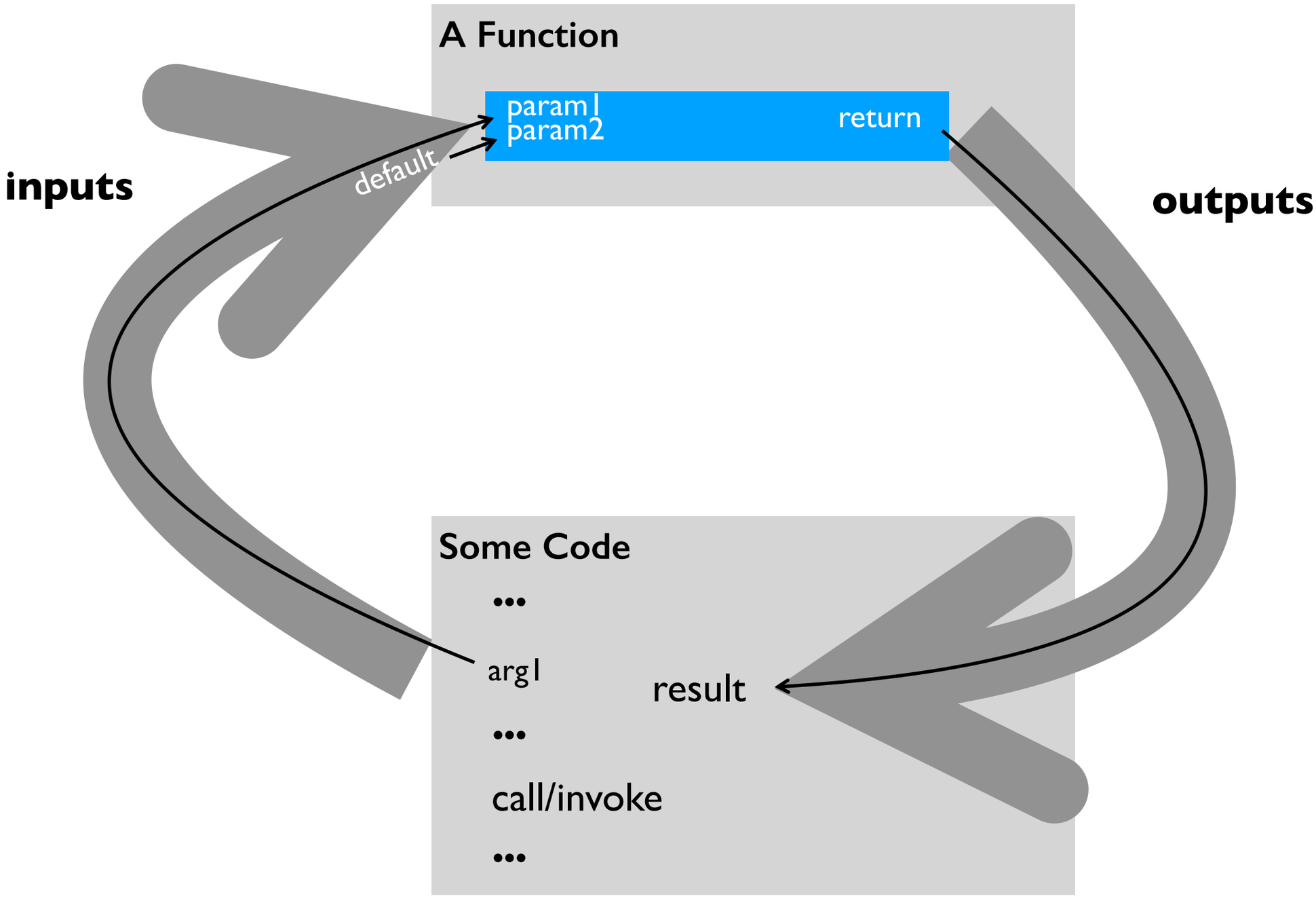
General Function Concepts



Yikes, copied code!

Vocabulary

- **refactor**: change organization of code (e.g., to avoid repetition)
- **parameter**: variable that receives input to function
- **argument**: value sent to a function (lines up with parameter)
- **return value (or result)**: function output sent back to calling code
- **default argument**: value put in parameter if argument not passed



Vocabulary

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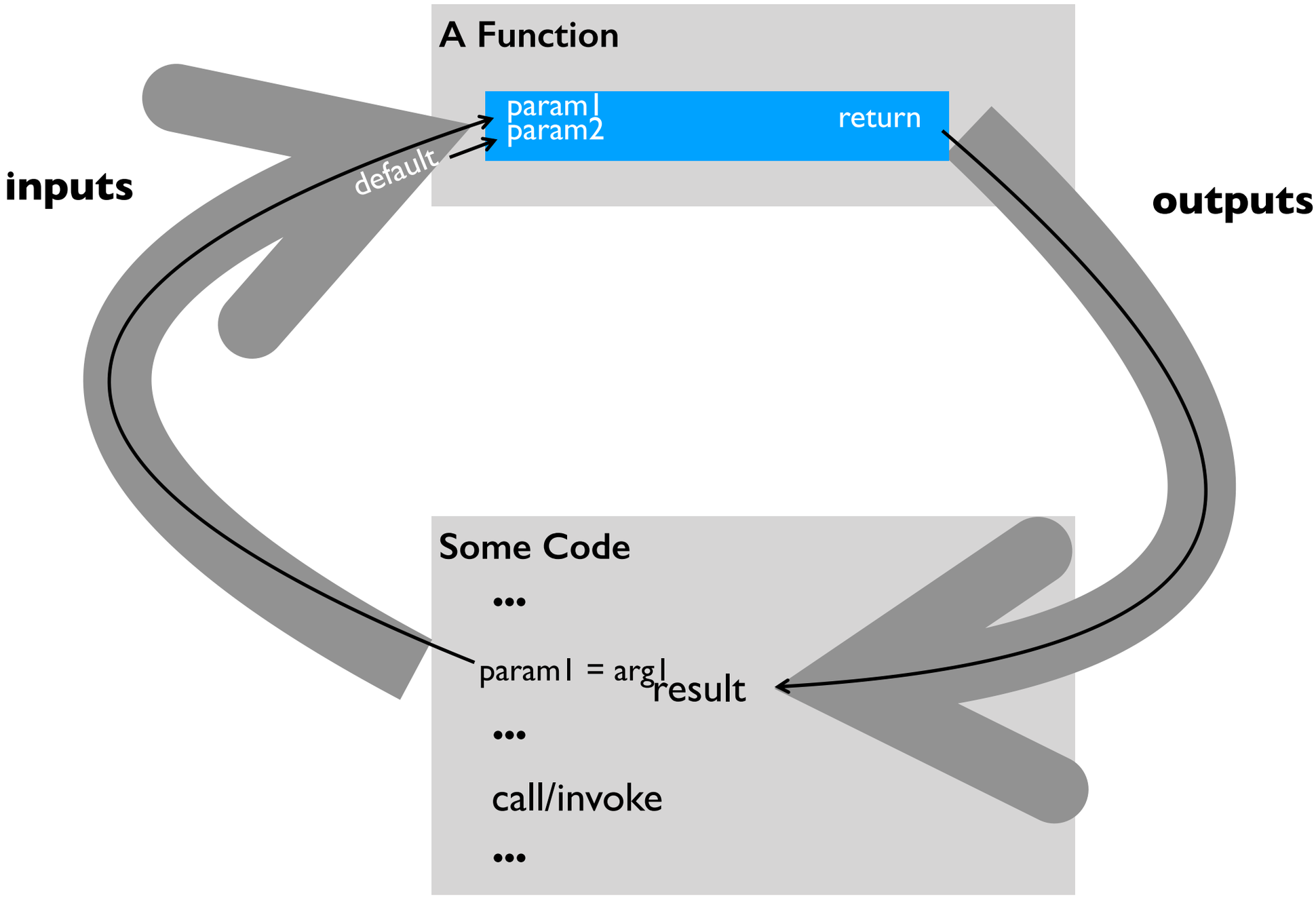
- **parameter**: variable that receives input to function
- **argument**: value sent to a function (lines up with parameter)
- **return value (or result)**: function output sent back to calling code
- **default argument**: value put in parameter if argument not passed
- **named/keyword argument**: argument explicitly tied to a parameter



Calling/Invoking a Function in Python

```
print("hello")
```

```
result = f(x)
```

return value

ALWAYS: function's name

ALWAYS: followed by parentheses

SOMETIMES: with one or more arguments

SOMETIMES: producing a result

Calling/Invoking a Function in Python

```
print("hello", "world")
x = input()
```

ALWAYS: function's name

ALWAYS: followed by parentheses

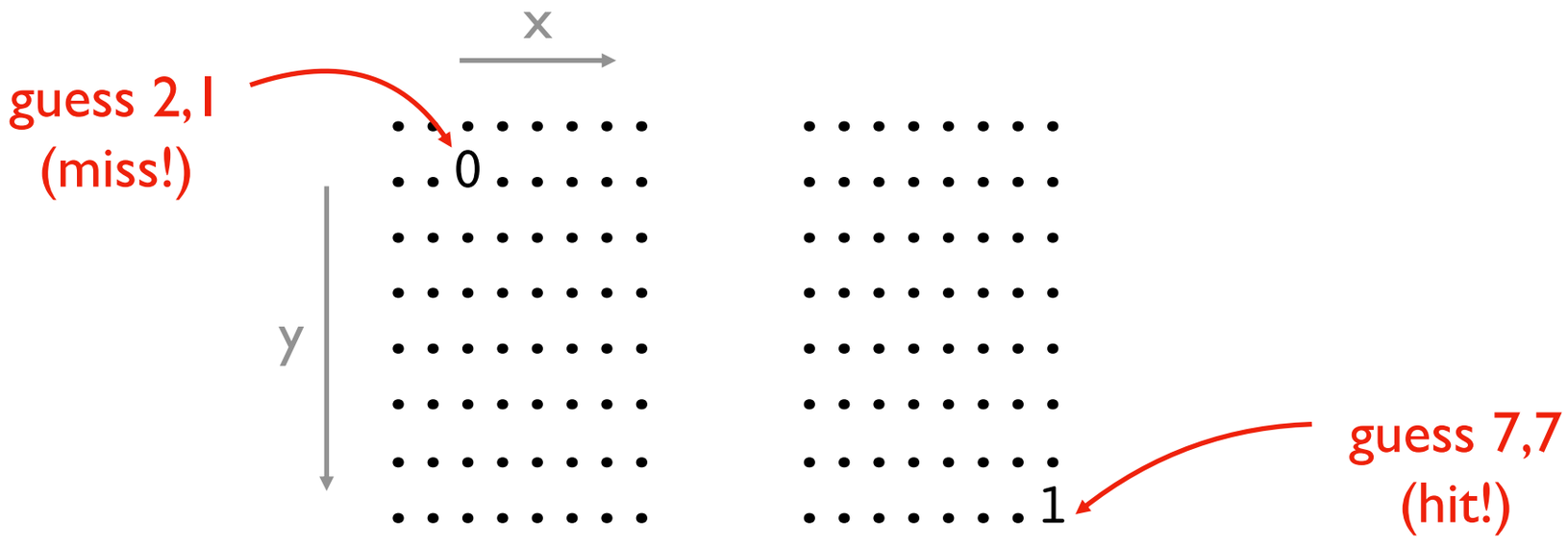
SOMETIMES: with one or more arguments

SOMETIMES: producing a result

demos

Battleship Demo (Version 1)

https://boardgamegeek.com/image/288374/battleship



Version 1 (MVP)

- 1 ship, 1 guess
- ship is 1 space
- fixed position
- top/left is 0,0
- horrible graphics

practice demos

Battleship Demo (Version 2)

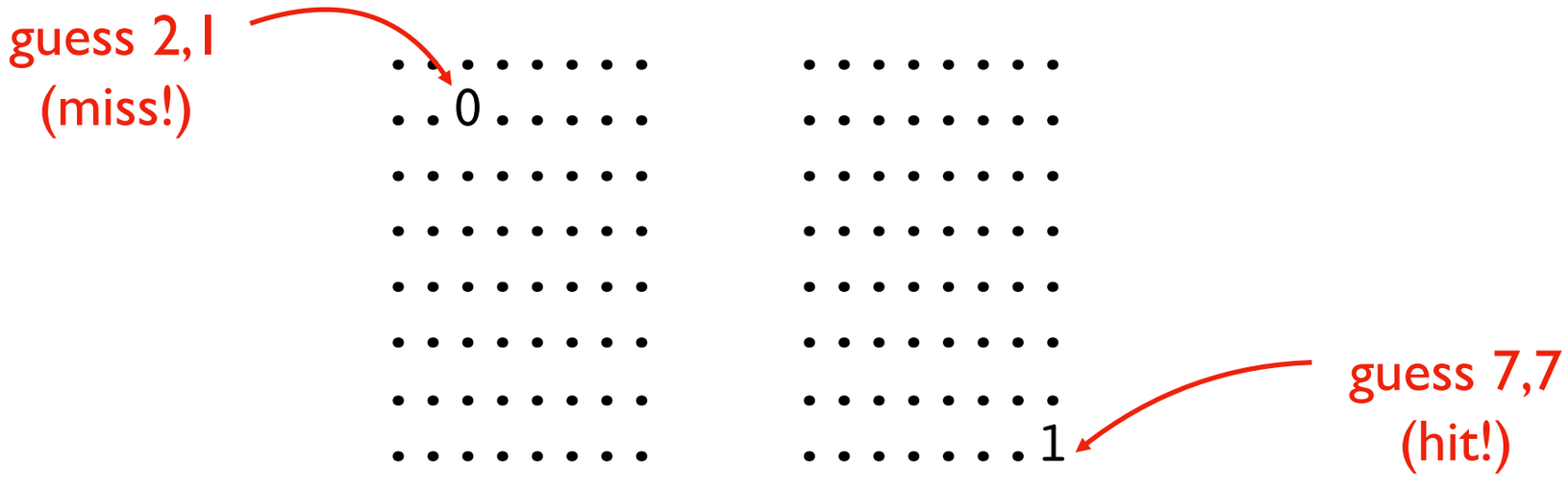
https://boardgamegeek.com/image/288374/battleship

Version 1 (MVP)

- 1 ship, 1 guess
- ship is 1 space
- fixed position
- top/left is 0,0
- horrible graphics

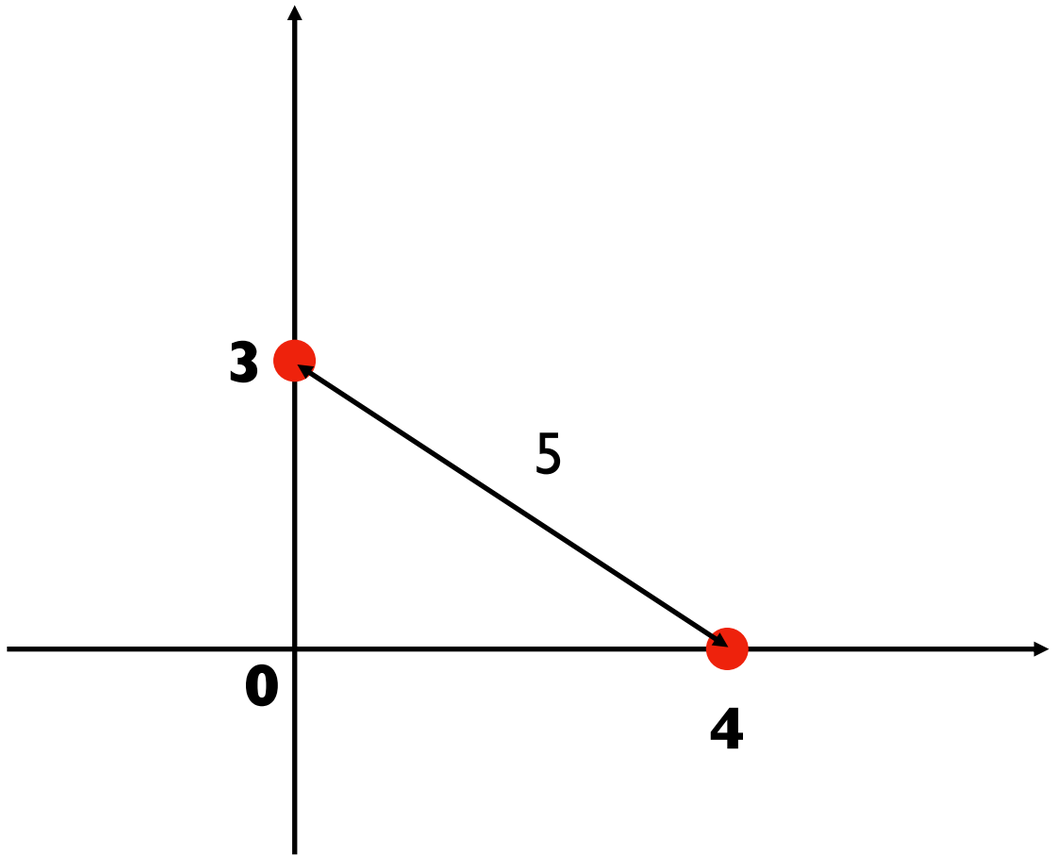
Version 2

- larger ship
- multiple ships
- random locations



time permitting

Demo: Polar Coords Distance



point 1: distance 3 at angle 90°

point 2: distance 4 at angle 0°

distance: 5