CSCI 141

Scott Wehrwein

Defining Functions

Goals

- Know the syntax for defining your own functions
- Know how to define and use functions that take no arguments and return no values

Functions, Revisited

- We've been using functions since day 1:

```
print("Hello, World!")
```

- Built-in functions so far:
  `print`, `input`, `type`, `len`, `int`, `str`, ...

- We can import more functions:

```
import math
import turtle
math.sqrt(4)
turtle.Turtle()
```

Functions, Revisited

What **is** a function, anyway?

It's a chunk of code with a name.

- It *may* take arguments as input
- It *may* do something that has an **effect**
- It *may* return a value

```
print("Hello world")
```

Input(s):

- 0 or more values
- (optional) sep and end keywords

Return value:

- none

Effects: prints arguments to the screen, with given separator and end

Functions, Revisited

What **is** a function, anyway?

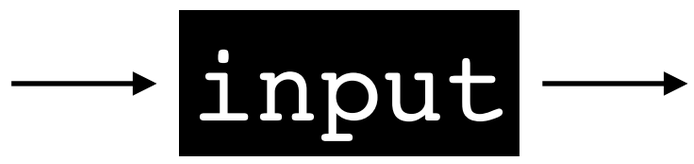
It's a chunk of code with a name.

- It *may* take arguments as input
- It *may* do something that has an effect
- It *may* return a value

```
input("Enter a number:")
```

Input(s):

- none, or
- a string to print as a prompt



Return value:

- the input from the user

Effects: prompts for user input and reads it from the keyboard

Functions, Revisited

What **is** a function, anyway?

It's a chunk of code with a name.

- It *may* take arguments as input
- It *may* do something that has an effect
- It *may* return a value

```
type(6/2)
```

Input(s):

- a value

Return value:

- the type of the value

Effects: none

Functions, Revisited

What **is** a function, anyway?

It's a chunk of code with a name.

- It *may* take arguments as input
- It *may* do something that has an effect
- It *may* return a value

```
math.sin(math.pi/2)
```

Input(s):

- a number

Return value:

- the sine of the value

Effects: none

Functions, Revisited

What **is** a function, anyway?

It's a chunk of code with a name.

- It *may* take arguments as input
- It *may* do something that has an effect
- It *may* return a value

Input(s):

- a number

`scott.forward`

Return value:

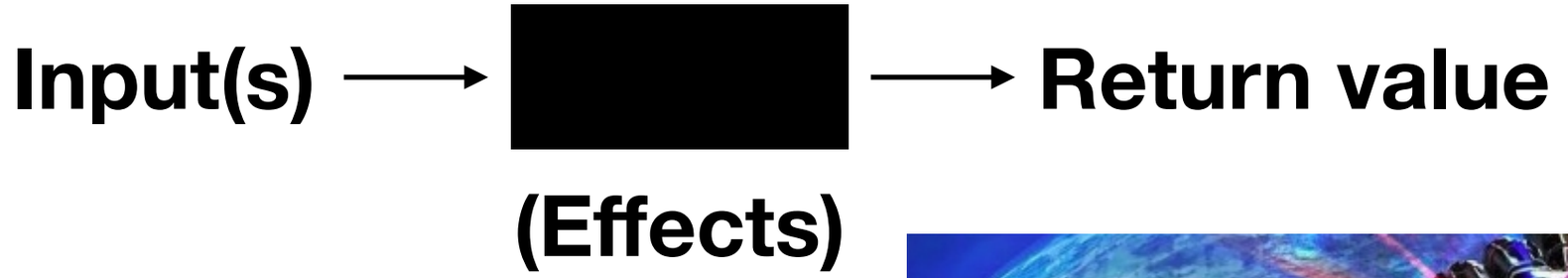
- none

Effects: moves the turtle forward by the given number of units

Functions, Revisited

What **is** a function, anyway?

- So far we've treated functions as **"black boxes"**, code someone else wrote that does stuff for us.
- All we know are the inputs, effects, and return value.
- We don't know how it's done.



This is a **great** situation to be in!

A bunch of (potentially complicated), powerful stuff is wrapped up in a nice, easy-to-use package.

What if

You want a nice easy-to-use function that does something complicated, but **nobody else has written it for you…**

Now, you will have the **power** to write your **own** functions.

Writing Functions: Syntax

```
def name(parameters):
    statements
```

Two important questions:

1. How does the function use its arguments (inputs)?
2. How does the function return a value (output)?

Let's **dodge** these questions for a moment…

Functions: the simplest kind

No arguments, no return value:

```
def name():
    statements
```

Example:

```
def print_hello():
    print("Hello, world!")
```

The `print_hello` function

Input(s):

- none

Return value:

- none

`print_hello`

Effects: prints "Hello" to the screen

Demo

- hello_fn.py

Demo: hello_fn.py

- define print_hello function
- The definition does nothing except make the function exist
- call it using print_hello()
- you can call it whenever/however many times
- except you can’t call it before it’s defined