

Python Objects

Charles Severance



Python for Everybody
www.py4e.com



Warning

- This lecture is very much about definitions and mechanics for objects
- This lecture is a lot more about “how it works” and less about “how you use it”
- You won’t get the entire picture until this is all looked at in the context of a real problem
- So please suspend disbelief and learn technique for the next 40 or so slides..

5. Data Structures

This chapter describes some things you've learned about already in more detail, and adds some new things as well.

5.1. More on Lists

The list data type has some more methods. Here are all of the methods of list objects:

`list.append(x)`

Add an item to the end of the list. Equivalent to `a[len(a):] = [x]`.

`list.extend(L)`

Extend the list by appending all the items in the given list. Equivalent to `a[len(a):] = L`.

`list.insert(i, x)`

Insert an item at a given position. The first argument is the index of the element before which to insert, so `a.insert(0, x)` inserts at the front of the list, and `a.insert(len(a), x)` is equivalent to `a.append(x)`.

`list.remove(x)`

Remove the first item from the list whose value is `x`. It is an error if there is no such item.

`list.pop([i])`

Remove the item at the given position in the list, and return it. If no index is specified, `a.pop()` removes and returns the last item in the list. (The square brackets around the `i` in the method signature denote that the parameter is optional, not that you should type square brackets at that position. You will see this notation frequently in the Python Library Reference.)

<https://docs.python.org/3/tutorial/datastructures.html>

12.6. `sqlite3` — DB-API 2.0 interface for SQLite databases

Source code: [Lib/sqlite3/](#)

SQLite is a C library that provides a lightweight disk-based database that doesn't require a separate server process and allows accessing the database using a nonstandard variant of the SQL query language. Some applications can use SQLite for internal data storage. It's also possible to prototype an application using SQLite and then port the code to a larger database such as PostgreSQL or Oracle.

The `sqlite3` module was written by Gerhard Häring. It provides a SQL interface compliant with the DB-API 2.0 specification described by [PEP 249](#).

To use the module, you must first create a `Connection` object that represents the database. Here the data will be stored in the `example.db` file:

```
import sqlite3
conn = sqlite3.connect('example.db')
```

You can also supply the special name `:memory:` to create a database in RAM.

Once you have a `Connection`, you can create a `Cursor` object and call its `execute()` method to perform SQL commands:

```
c = conn.cursor()

# Create table
c.execute('''CREATE TABLE stocks
            (date text, trans text, symbol text, qty real, price real)''')
```

<https://docs.python.org/3/library/sqlite3.html>

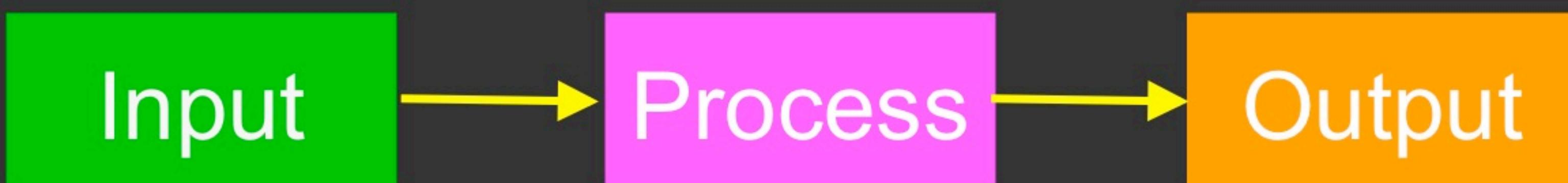


Lets Start with Programs



```
inp = input('Europe floor? ')
usf = int(inp) + 1
print('US floor', usf)
```

Europe floor? 0
US floor 1

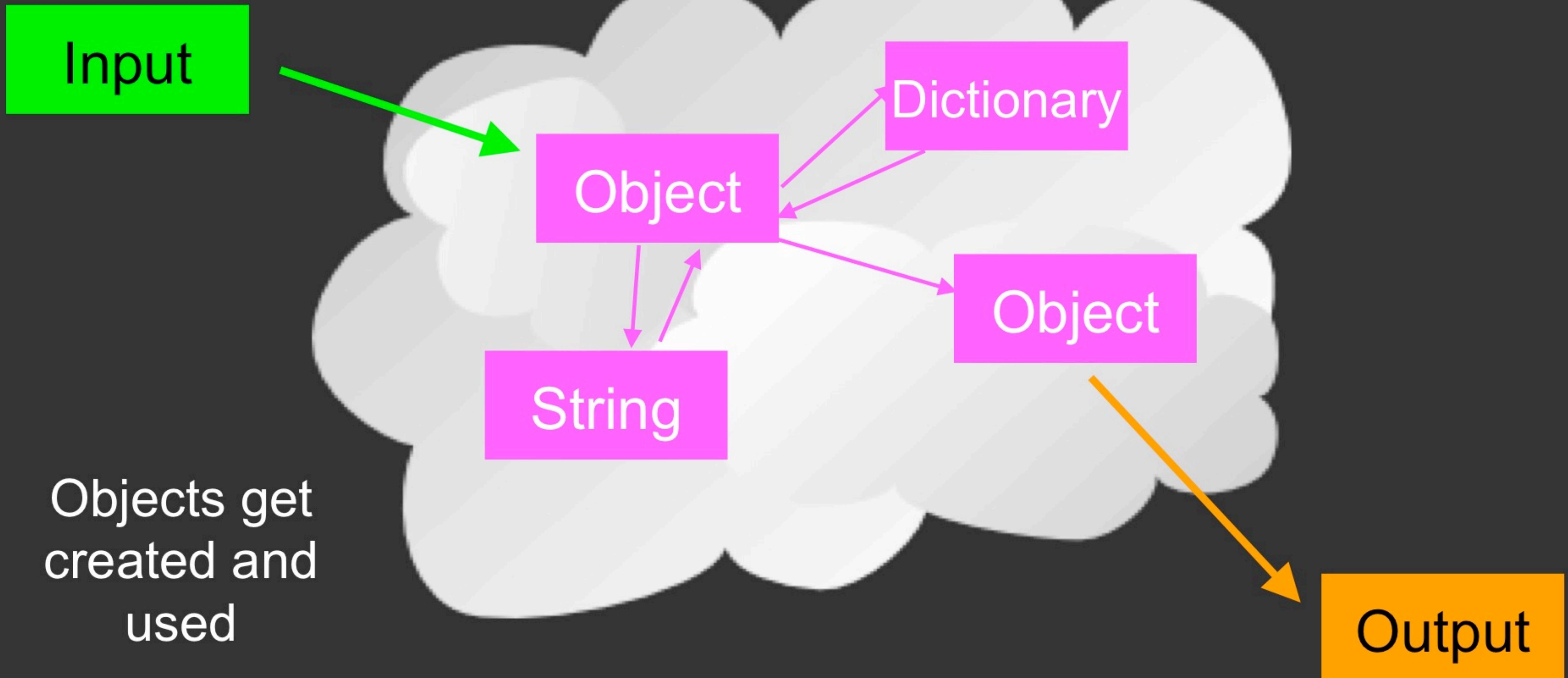


Object Oriented

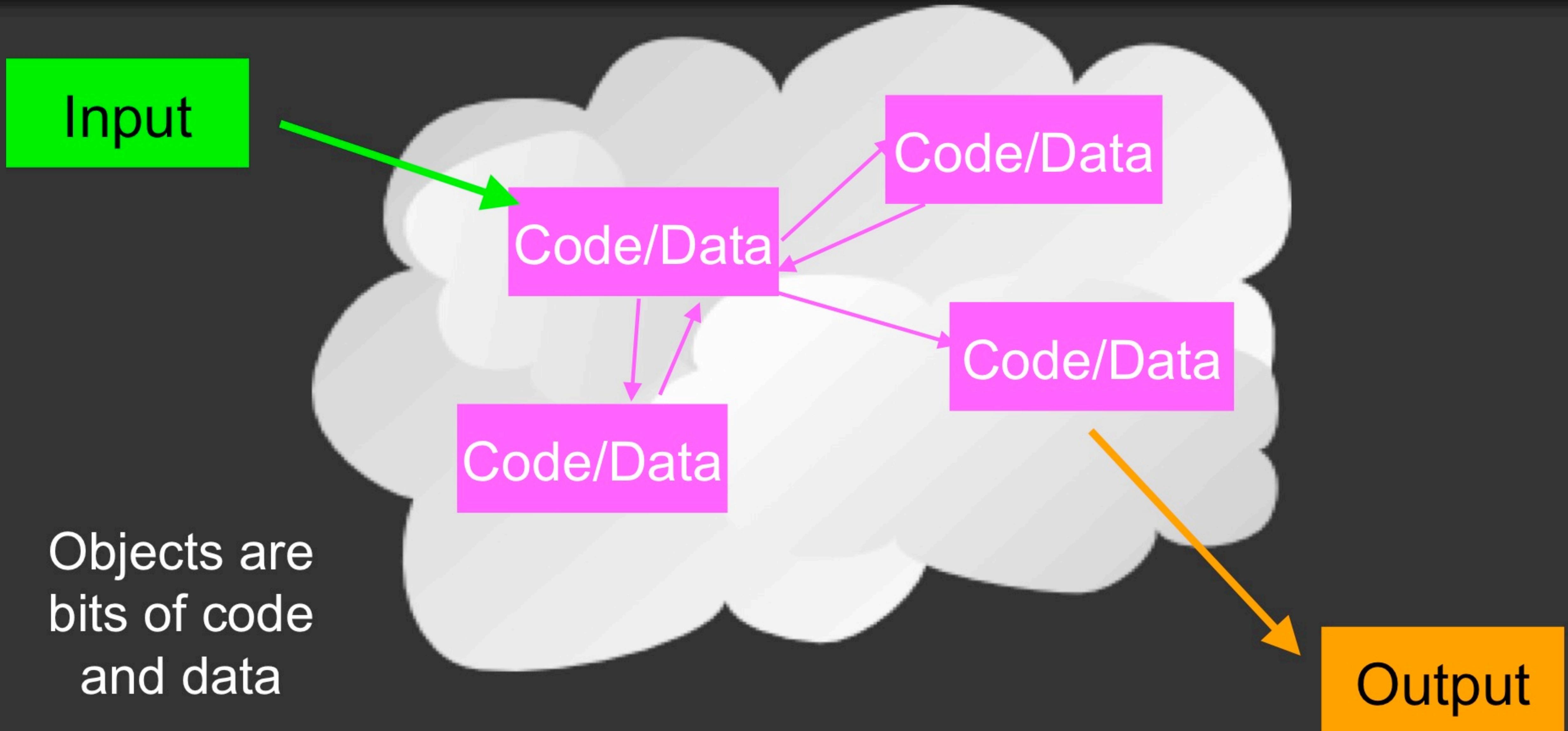
- A program is made up of many cooperating objects
- Instead of being the “whole program” - each object is a little “island” within the program and cooperatively working with other objects.
- A program is made up of one or more objects working together - objects make use of each other’s capabilities

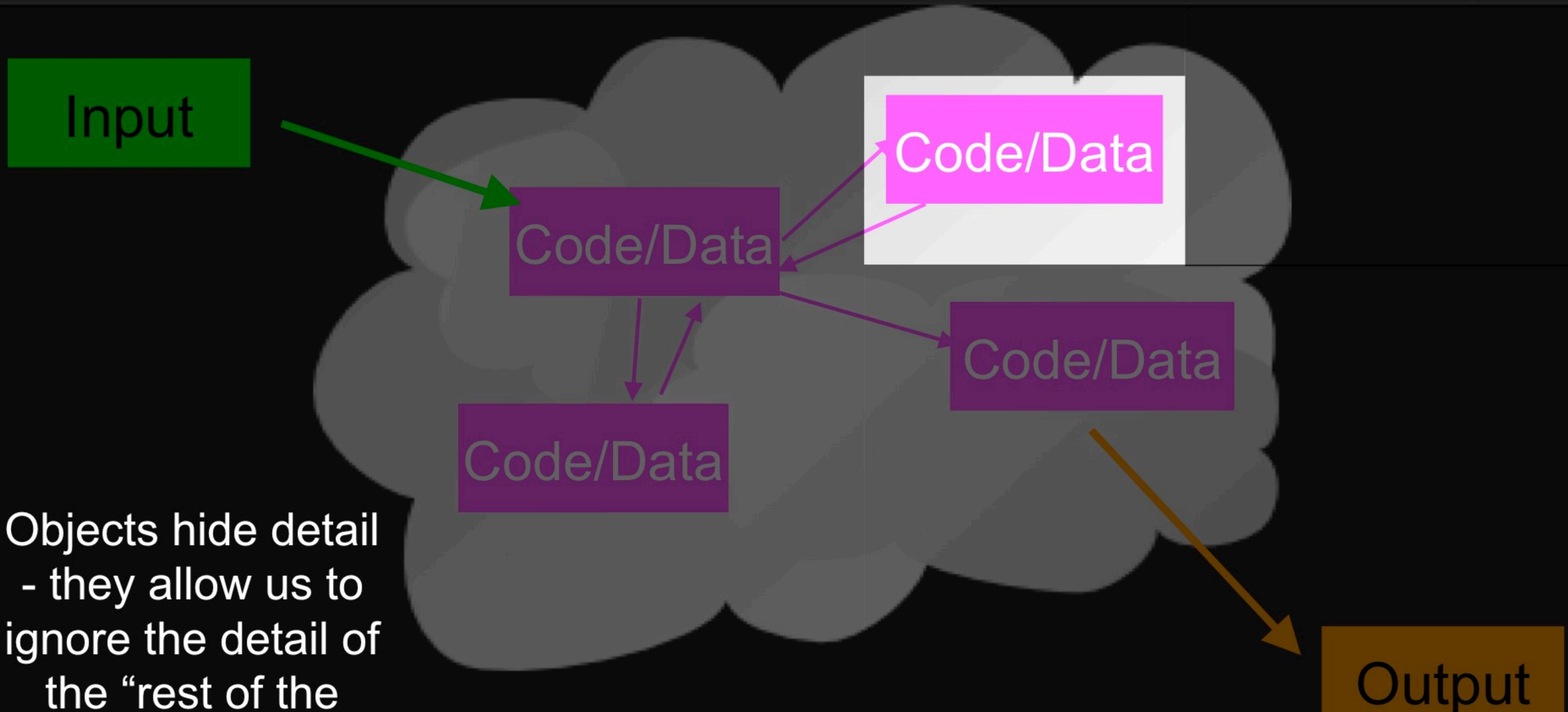
Object

- An Object is a bit of self-contained Code and Data
- A key aspect of the Object approach is to break the problem into smaller understandable parts (divide and conquer)
- Objects have boundaries that allow us to ignore un-needed detail
- We have been using objects all along: String Objects, Integer Objects, Dictionary Objects, List Objects...

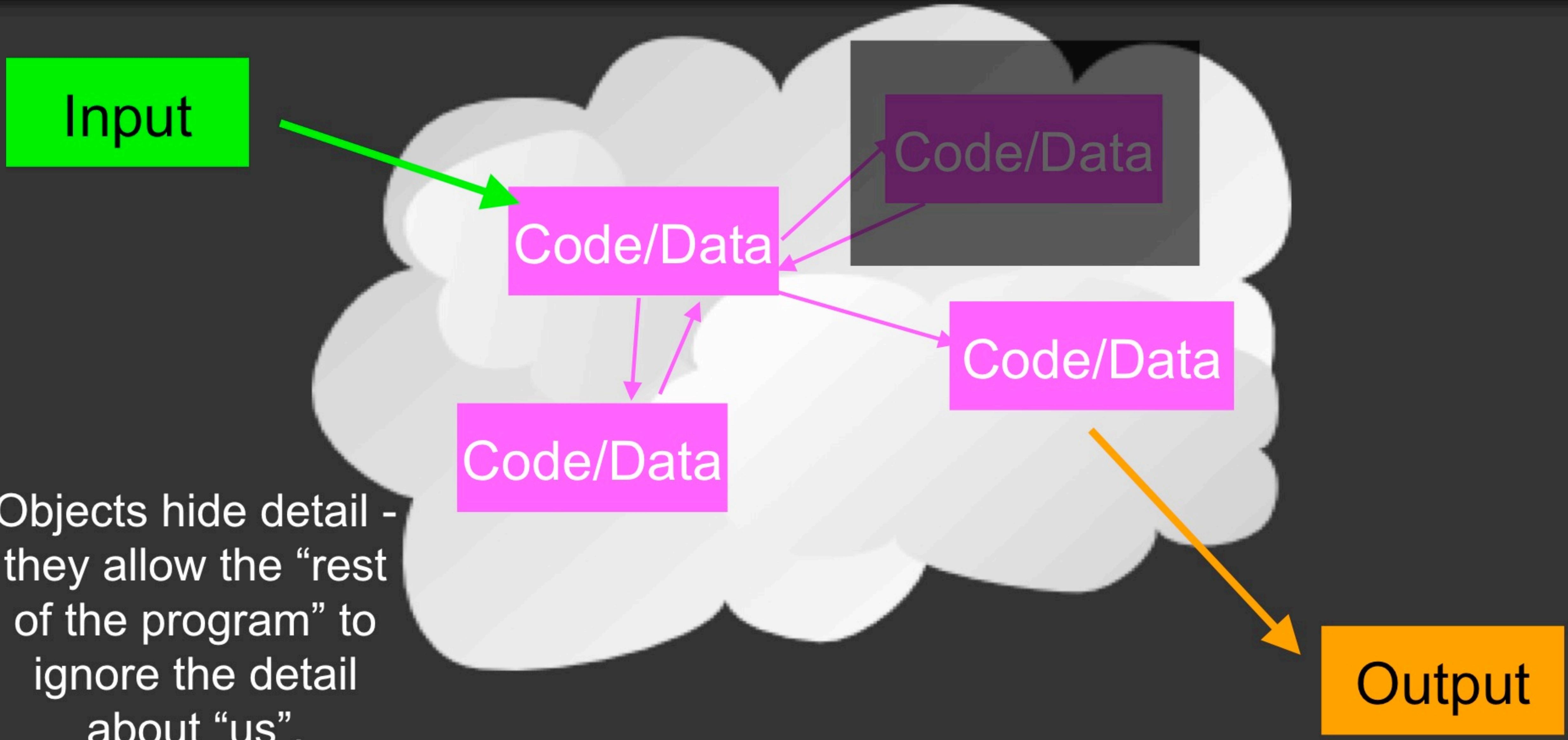


Objects get
created and
used





Objects hide detail
- they allow us to
ignore the detail of
the “rest of the
program”.



Definitions

Class - a template



Method or Message - A defined capability of a class

Field or attribute- A bit of data in a class

Object or Instance - A particular instance of a class

Terminology: Class



Defines the abstract characteristics of a thing (object), including the thing's characteristics (its attributes, **fields or properties**) and the thing's behaviors (the things it can do, or **methods**, operations or features). One might say that a **class** is a **blueprint** or factory that describes the nature of something. For example, the **class** Dog would consist of traits shared by all dogs, such as breed and fur color (characteristics), and the ability to bark and sit (behaviors).

Terminology: Instance



One can have an **instance** of a class or a particular object.

The **instance** is the actual object created at runtime. In programmer jargon, the Lassie object is an **instance** of the Dog class. The set of values of the attributes of a particular **object** is called its **state**. The **object** consists of state and the behavior that's defined in the object's class.

Object and Instance are often used interchangeably.

Terminology: Method



An object's abilities. In language, **methods** are verbs. Lassie, being a Dog, has the ability to bark. So bark() is one of Lassie's methods. She may have other **methods** as well, for example sit() or eat() or walk() or save_timmy(). Within the program, using a **method** usually affects only one particular object; all Dogs can bark, but you need only one particular dog to do the barking

Method and Message are often used interchangeably.

Some Python Objects

```
>>> x = 'abc'  
>>> type(x)  
<class 'str'>  
>>> type(2.5)  
<class 'float'>  
>>> type(2)  
<class 'int'>  
>>> y = list()  
>>> type(y)  
<class 'list'>  
>>> z = dict()  
>>> type(z)  
<class 'dict'>  
  
>>> dir(x)  
[ ... 'capitalize', 'casefold', 'center', 'count',  
'encode', 'endswith', 'expandtabs', 'find',  
'format', ... 'lower', 'lstrip', 'maketrans',  
'partition', 'replace', 'rfind', 'rindex', 'rjust',  
'rpartition', 'rsplit', 'rstrip', 'split',  
'splitlines', 'startswith', 'strip', 'swapcase',  
'title', 'translate', 'upper', 'zfill']  
>>> dir(y)  
[... 'append', 'clear', 'copy', 'count', 'extend',  
'index', 'insert', 'pop', 'remove', 'reverse',  
'sort']  
>>> dir(z)  
[..., 'clear', 'copy', 'fromkeys', 'get', 'items',  
'keys', 'pop', 'popitem', 'setdefault', 'update',  
'values']
```

A Sample Class





Acknowledgements / Contributions



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Initial Development: Charles Severance, University of Michigan School of Information

... Insert new Contributors here

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https://en.wikipedia.org/wiki/Lassie#/media/File:Lassie_and_Tommy_Rettig_1956.JPG