Intro to Coding with Python– Classes Pt 2

Dr. Ab Mosca (they/them)

Slides based off slides courtesy of Jordan Crouser (https://jcrouser.github.io/)

Plan for Today

- Recap ff classes
- Object-Oriented Programming
  - Child classes
  - Inheritance

RECAP: `class` definitions ("blueprints")

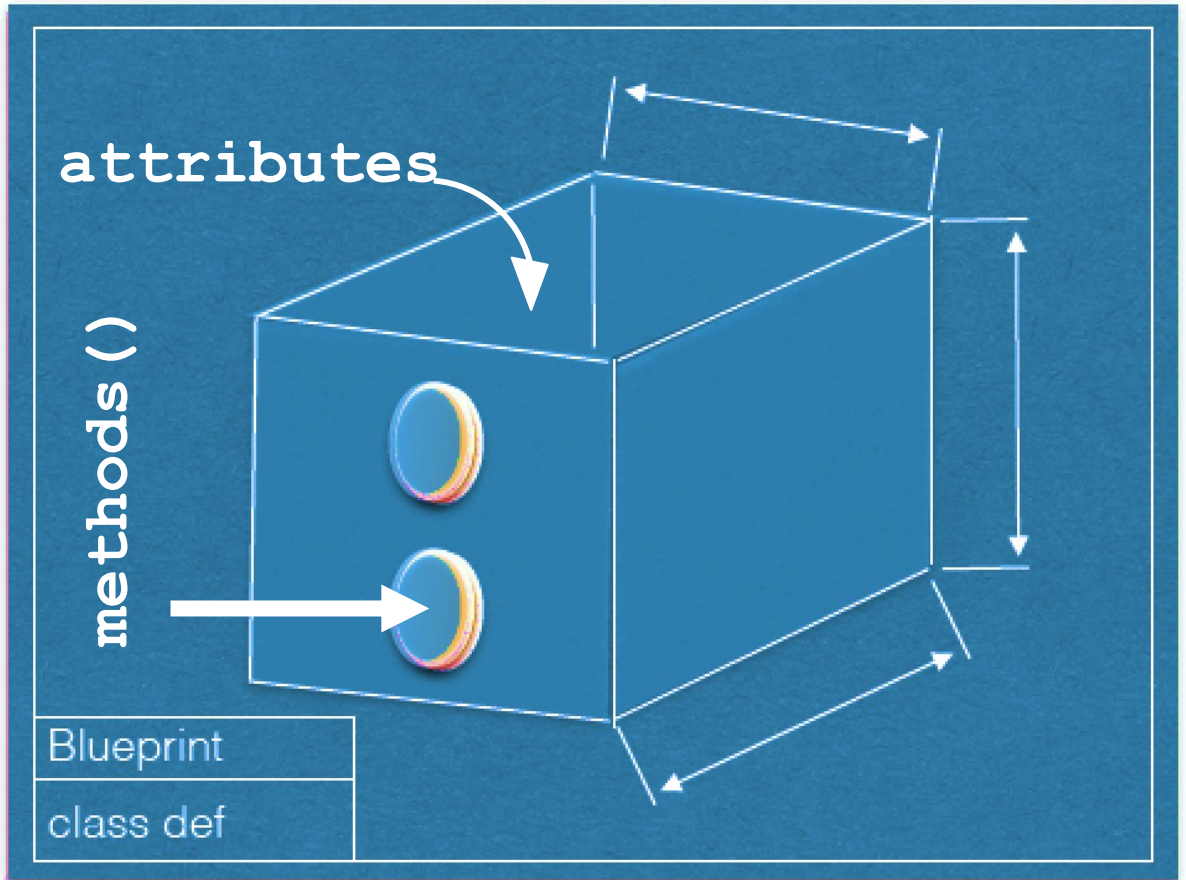

Image courtesy Dominique Thiebaut, Smith College

10 Minute activity: `Artist` class

- Define an `Artist` class
- An Artist should have the attributes:
  - name
  - birth year
  - death year
- An Artist should have the method:
  - print_info that prints:
    - "Artist: <name>, born: < birth year>" if the artist is alive and
    - "Artist: <name>, < birth year> - <death year>" if the artist is dead

Coding the `Artist` class

```
class Artist:

  def __init__(self, name='None', birth_year=0, death_year=0):
    self.name = name
    self.birth_year = birth_year
    self.death_year = death_year

  def print_info(self):
    if self.death_year == -1:
      print('Artist: {}, born {}'.format(self.name, self.birth_year))
    else:
      print('Artist: {} ({}-{})'.format(self.name, self.birth_year, self.death_year))
```

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    self.name = name
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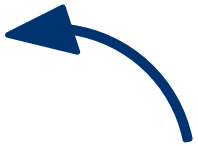
```



the constructor

Coding the `Artist` class

```
class Artist:

  def __init__(self, name='None', birth_year=0, death_year=0):
    self.name = name
    self.birth_year = birth_year
    self.death_year = death_year

  def print_info(self):
    if self.death_year == -1:
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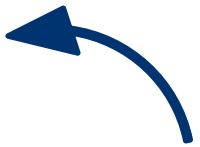
```



attributes

Coding the `Artist` class

default values

```
class Artist:

  def __init__(self, name='None', birth_year=0, death_year=0):
    self.name = name
    self.birth_year = birth_year
    self.death_year = death_year

  def print_info(self):
    if self.death_year == -1:
      print('Artist: {}, born {}'.format(self.name, self.birth_year))
    else:
      print('Artist: {} ({}-{})'.format(self.name, self.birth_year, self.death_year))
```

Coding the `Artist` class

```
class Artist:

  def __init__(self, name='None', birth_year=0, death_year=0):
    self.name = name
    self.birth_year = birth_year
    self.death_year = death_year

  def print_info(self):
    if self.death_year == 0:
      print('Artist: {}, born {}'.format(self.name, self.birth_year))
    else:
      print('Artist: {} ({}-{})'.format(self.name, self.birth_year, self.death_year))
```

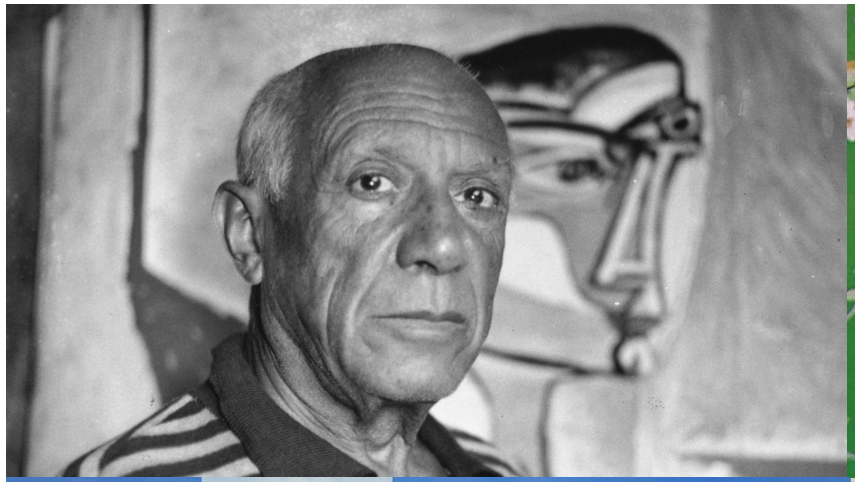
method

Creating an `Artist` instance

```
if __name__ == "__main__":
    user_artist_name = input()
    user_birth_year = int(input())
    user_death_year = int(input())
    user_title = input()
    user_year_created = int(input())

    user_artist = Artist(user_artist_name, user_birth_year, user_death_year)
```

Lots of possible **Artists**



All from the **same blueprint**

```
class Artist:

  def __init__(self, name='None', birth_year=0, death_year=0):
    self.name = name
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  def print_info(self):
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    else:
      print('Artist: {} ({}-{})'.format(self.name, self.birth_year, self.death_year))
```

Inheritance

Motivation

Dog

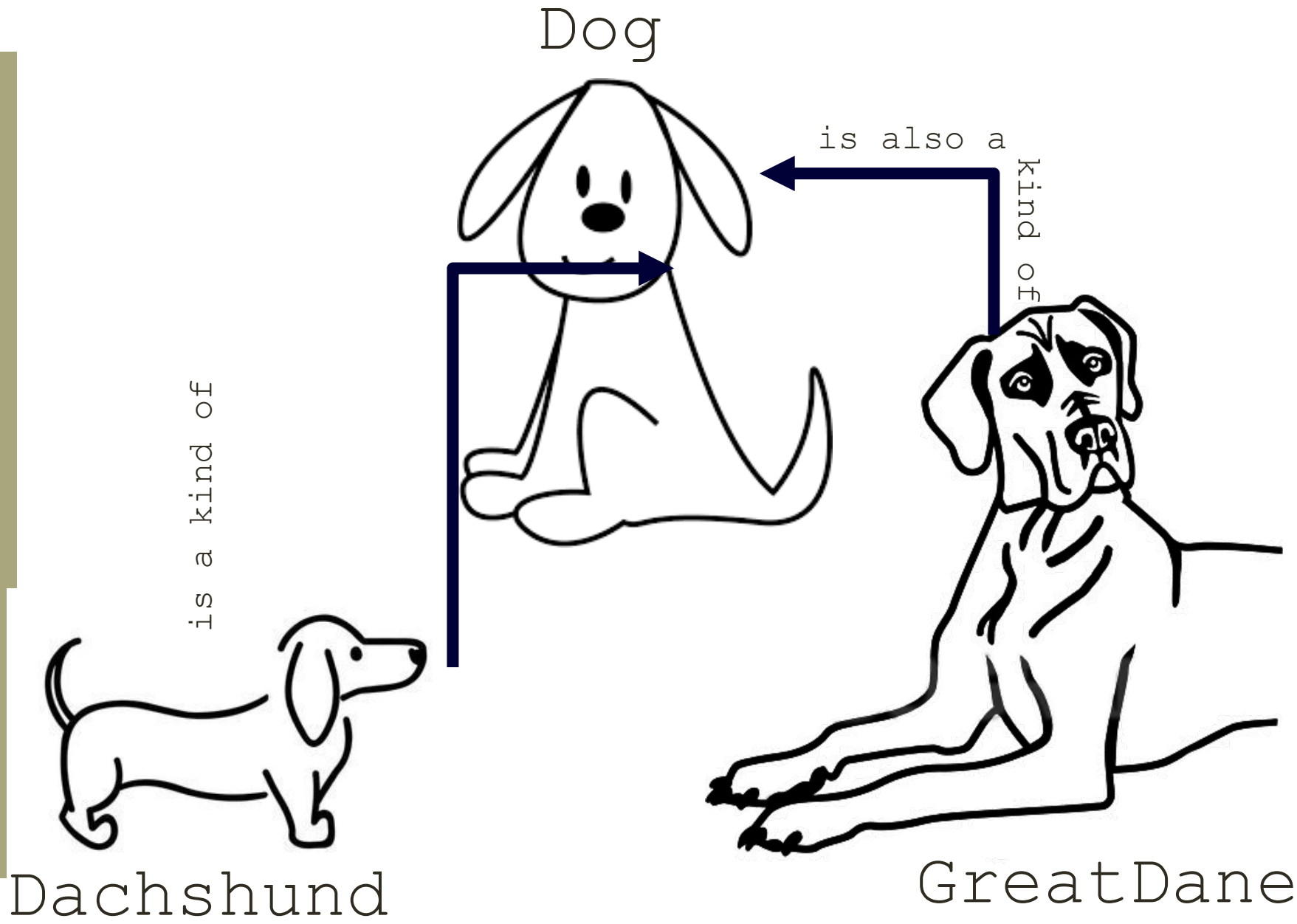
10 minute exercise: the Dog class

- Write a class called **Dog**, with a constructor that takes in the following parameters:

name (the dog's name)

age (the dog's age in years)

Motivation



As (sub)classes

```
class Dog:

  # A class attribute (every Dog has the same value,
  # so no self)
  species = "Canine"

  def __init__(self, name, age):
    self.name = name
    self.age = age

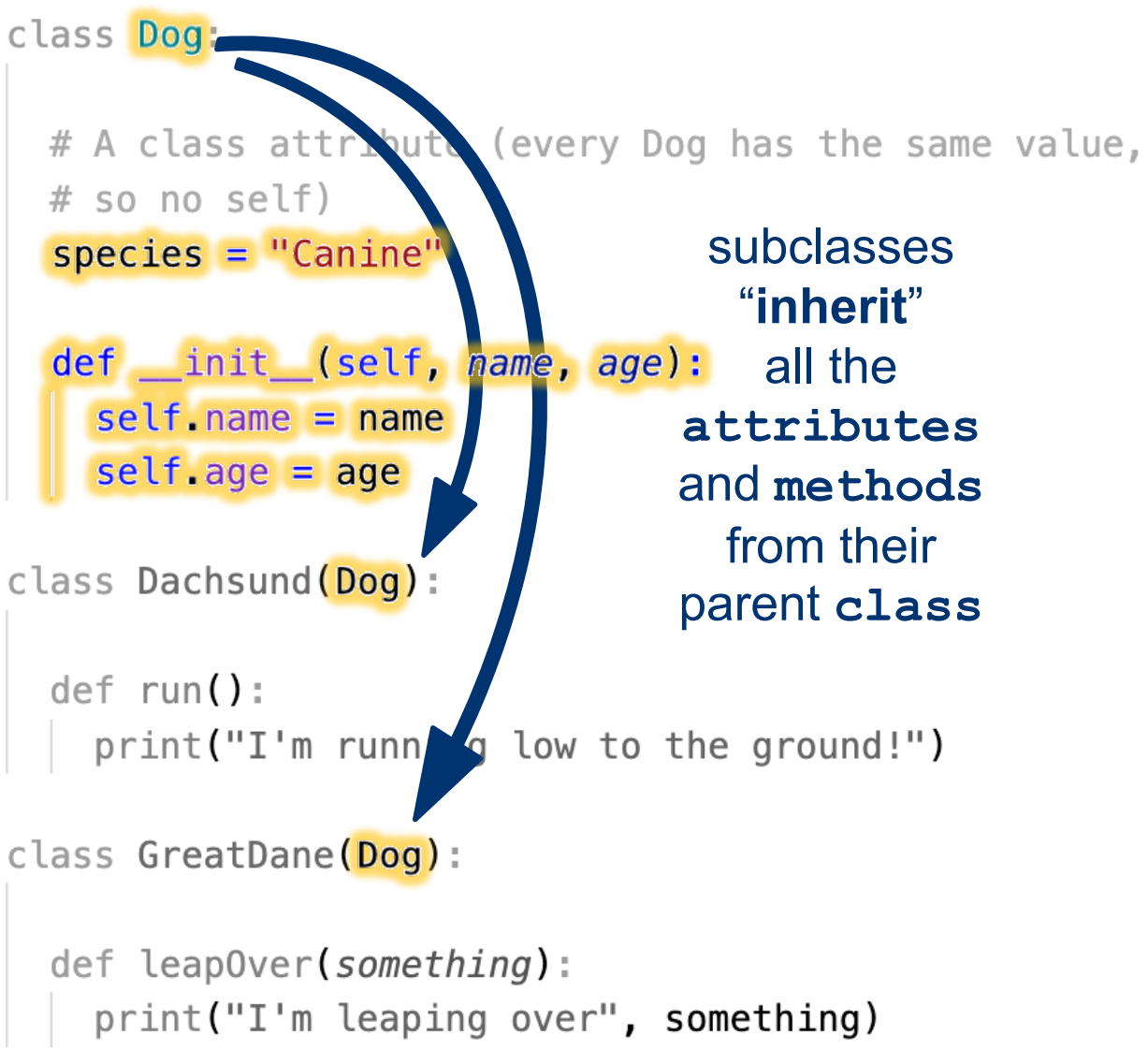
class Dachsund(Dog):

  def run():
    print("I'm running low to the ground!")

class GreatDane(Dog):

  def leapOver(something):
    print("I'm leaping over", something)
```

As (sub)`classes`



subclasses "**inherit**" all the **`attributes`** and **`methods`** from their parent **`class`**

As (sub)**classes**

```
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  # A class attribute (every Dog has the same value,
  # so no self)
  species = "Canine"

  def __init__(self, name, age):
    self.name = name
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class Dachsund(Dog):

  def run():
    print("I'm running low to the ground!")

class GreatDane(Dog):

  def leapOver(something):
    print("I'm leaping over", something)
```

they can also have **their own** **`attributes`** and **`methods`** separate from their parent

As (sub)**classes**

```
class Dog:

    # A class attribute (every Dog has the same value,
    # so no self)
    species = "Canine"

    def __init__(self, name, age):
        self.name = name
        self.age = age

class RobotDog(Dog):
    species = "Robot"
```

if necessary, they can override **attributes** and **methods** from their parent

Discussion

Why is this "inheritance" idea **useful**?