

Classes and Objects

Conceptual Introduction



You can define your own data types!

- A data type communicates a value's attributes and capabilities
 - e.g.: If you have a value of type `int`, you know you can do arithmetic with it
 - So far, you've primarily used built-in data types (exception: custom Tuples)
- You will often need to **model** more complex concepts
 - Some real-world examples: Twitter Profiles, Pizza Order, Data Records
- A **class** is how you define a custom, composite data type.
 - Its attributes are a grouping of variables.
- A value whose data type is a composite is an **object**.
 - Anything *bound* to an object (variables, items in a list, and so on) holds a **reference** to the object.

What is this?



A "Class"!

- *Classes aren't actually* visual templates.
- They're definitions of what a specific composite data type is.
- However, this is a useful analogy:

Twitter Profile Template : @KrisJordan's Profile :: Class : Object

← Kris Jordan



Kris Jordan
@KrisJordan

I teach programming at UNC.
Chapel Hill, NC · krisjordan.com

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@AOC

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12th chancellor of @UNC. Concussion researcher, husband, father and 20+ year faculty member in @UNCXSS. Go Heels, Steelers, Pirates.


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What are these?
"Objects"!

(They're all Twitter profiles.)

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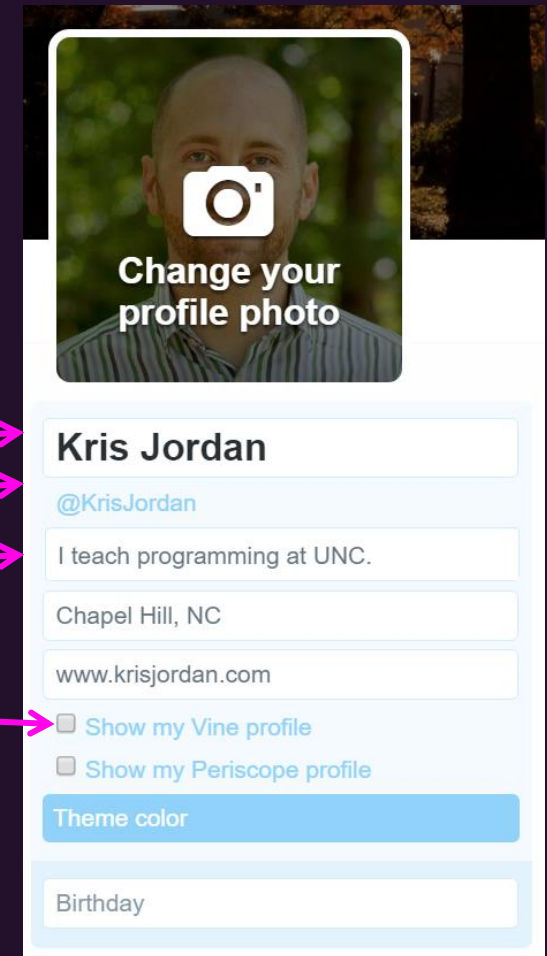
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How would you model a TwitterProfile in code?

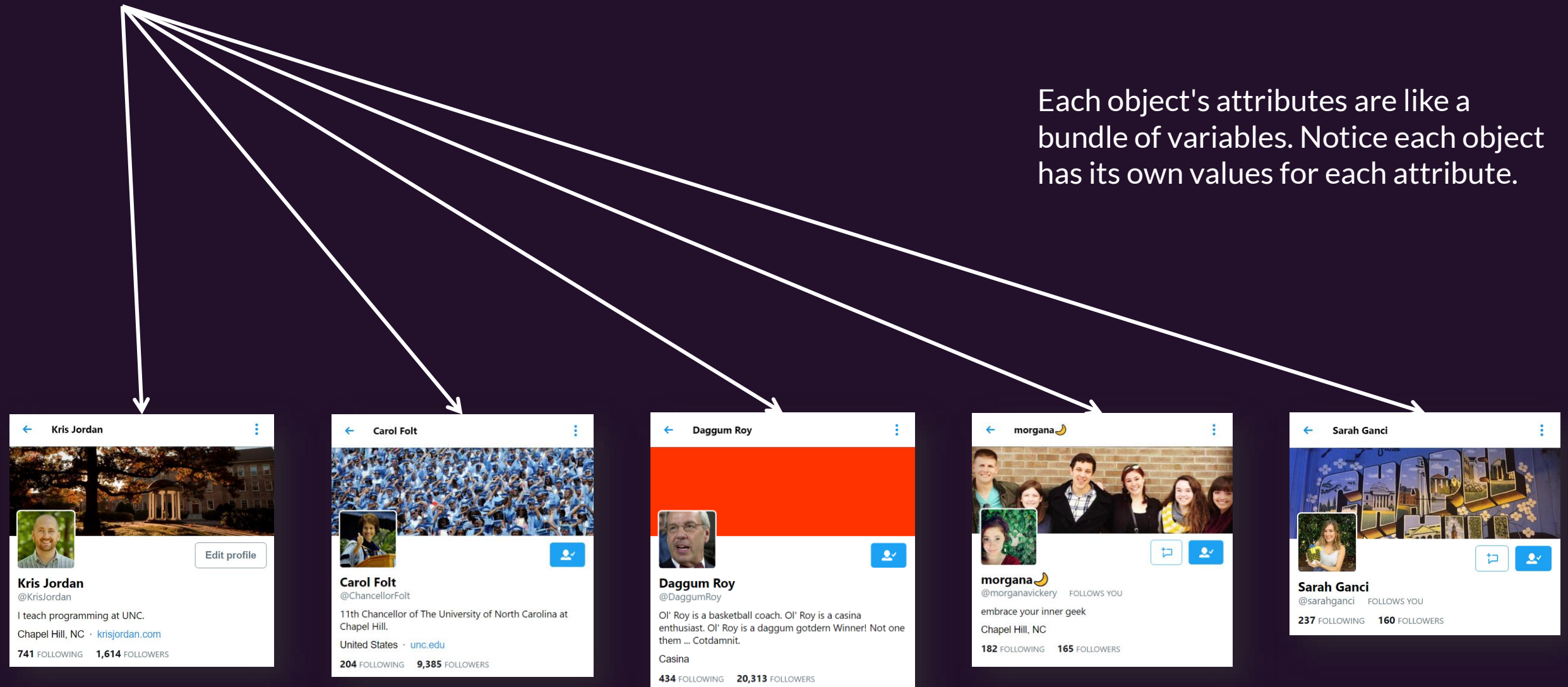
- The exact syntax will be covered in the next video.
- The big idea is you can "bundle" many related variables into a single data type.
- These variables are *attributes* of the TwitterProfile class.

```
class TwitterProfile:  
    name: str  
    handle: str  
    bio: str  
    show_vine: bool  
    is_private: bool  
    followers: int  
    following: int
```



Each Object's attributes are established by its Class

Each object's attributes are like a bundle of variables. Notice each object has its own values for each attribute.



Classes

vs

Dictionaries

- Attributes must be valid *identifiers*
 - Attributes are individually typed
 - All objects of a class have the same attributes* defined
 - Useful when: attributes of model have different types and are known ahead of time
- Keys are any immutable type
 - e.g. str, float, int, Tuple of immutables
 - str keys are not limited to identifier rules: can have spaces, special characters, and so on
 - All values associated with keys are of a single type*
 - No guarantee any two Dictionaries have the same keys
 - Useful when: keys ("attributes") of model are unknown ahead of time and of the same type

* When writing well formed, type annotated Python programs.