COMP1531

3.1 - Objects in python

What are objects?

Objects

- Technically, a fairly simple idea
- Conceptually, a rich area of software design with complicated outcomes
- There's a whole course on Object-Oriented Design and Programming, so we'll only focus on basic stuff here

A simple example

```
 1 from datetime import date
 2
 3 today = date(2019, 9, 26)
 4
 5 # 'date' is its own type
 6 print(type(today))
 7
 8 # Attributes of 'today'
 9 print(today.year)
10 print(today.month)
11 print(today.day)
12
13 # Methods of 'today'
14 print(today.weekday())
15 print(today.ctime())
```

Objects in python

- Contain *attributes* and *methods*
- Attributes are values inside objects
- Methods are functions inside objects
- Methods can read or modify attributes of the object

Everything* is an object

- Almost all values in python are objects
- For example:
  - lists have an append() method

```
1 animals = ["dog", "cat", "chicken"]
2 animals.append("sheep") # Modifies the list 'animals'
```

  - strings have a capitalize() method

```
1 greeting = "hi there!"
2 print(greeting.capitalize()) # Returns a new string
```

Creating objects

- *Classes* are blueprints for objects

```
1  class Student:
2      def __init__(self, zid, name):
3          self.zid = zid
4          self.name = name
5          self.year = 1
6
7      def advance_year(self):
8          self.year += 1
9
10     def email_address(self):
11         return self.zid + "@unsw.edu.au"
12
13 rob = Student("z3254687", "Robert Leonard Clifton-Everest")
14 hayden = Student("z3418003", "Hayden Smith")
```

Details

- Methods can be *invoked* in different ways
  - rob.advance_year()
  - Student.advance_year(rob)
- The 'self' argument is implicitly assigned the object on which the method is being invoked
- The '__init__()' method is implicitly called when the class is *constructed*

Managing Data Example

Activity: Use the data in https://www.cse.unsw.edu.au/~cs1531/20T1/weatherAUS.csv to write a python program to determine the location with the most rain over the last years

Extra Help

- Fixture example (in week 3 lecture code)
- Python path setting with pwd
- These questions have the same answer