Lecture 25: Classes

A class allows us to create our own object types.

E.g. Not just use what turtle has to offer — opens up tons of possibilities!

Let's say we wanted to make a type of object for a Colby student — `Student`

Having student class allows us to make objects of that type:

```
Our class like calling
rect = gr. Circle(gr. point(0,0), 10)

jane = Student ('Jane')

bob = Student ('Bob')
    name = 'bob'

joe = Student ('Joe')
    name = 'joe'
```

Each object has unique data.
What is a good thing to create objects of?

**Nouns** : things — e.g. Student is a thing, rectangle is a thing, turtle is a thing.

**Why make a class for a thing?**

1) Groups data/information related to unique instances of that thing.

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Each object instance has same variables (name, age), but unique values, called instance variables.
An instance variable could be basic data type or an object, will be defined for any object you make of a class.

E.g. a Car class would probably have instance variables for: make, and color, all cars have these properties but of course specific values across Cars could be different.

All cars have a make and color.
These 3 Cars may have different specific colors and makes.

Example:

Define what data any circle should have.
2) Classes allow us to perform actions on each instance, with its own data. Methods allow us to do this.

We could add a method to our Student class to compute each student's GPA — Compute GPA.

Common types of methods:

- Access data from each instance of a class (object)
  - get method — Method has “get” in it.
    e.g. get GPA(), get Name(), get Age()
  - ask a student what his/her GPA is — jane.get GPA()
• Change data from an instance — **set method**
  — method has "set" in it.
  
  e.g. `set Age()`, `set GPA()` `set Name()`

  It’s Bob’s birthday, we call `bob. set Age(21)`
  to update age 20 → 21.

• Make new instances (objects) of a class by calling
  Special method called **constructor**

  Calling Constructor method for class Student

  ```
  jane = Student ( 'Jane' )
  bob = Student ( 'Bob' )
  joe = Student ( 'joe' )
  ```

• Let’s write a simple class for a Student
  and play around with it.

• Let’s analyze the memory model for a program
  involving Student class