CSCI 127: Joy and Beauty of Data

Lecture 13: OOP

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Snowmester 2020
https://reesep.github.io/classes/127/main.html

Announcements

Lab 8 due **tomorrow** (Tuesday 11:59 PM)

- After today, you will be able to finish it

Program 4 due Tuesday Jan 5 @ 11:59 PM

- Hoping to have that posted tonight

No class on Thursday or Friday

When I meet my instructor on campus and they don't speak on 2X speed

Meme Credit: Kai

Object Oriented Programming

So far, we have used **procedural programming** to solve problems. We have written **functions** that do things

Now, we will talk about a different way to solve problems…

Object Oriented Programming (OOP) is a paradigm of solving problems using objects, which represent *something*

The objects we create usually have data (**states/attributes**) and behaviors (**methods**)

Object Oriented Programming Example

There are many different kinds of cars…

Images stolen from the internet

Object Oriented Programming Example

There are many different kinds of cars…

However, all cars share similar features

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Object Oriented Programming Example

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However, all cars share similar features

All cars have:

- A color
- Wheels
- Engine
- Windshield
- Windows
- Seating
- Lights

All cars can:

- Accelerate
- Slow down
- Stop
- Turn

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Object Oriented Programming Example

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Attributes

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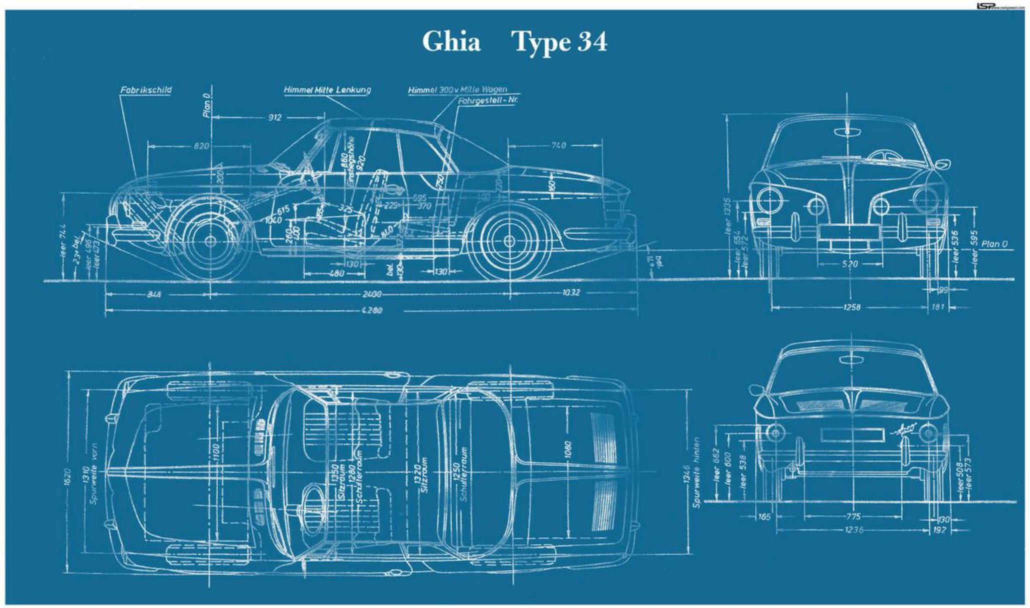
Functionality/Behavior

Images stolen from the internet

Object Oriented Programming Example

If we can create a **blueprint** for a generic car, then we can use that blueprint to create many different cars

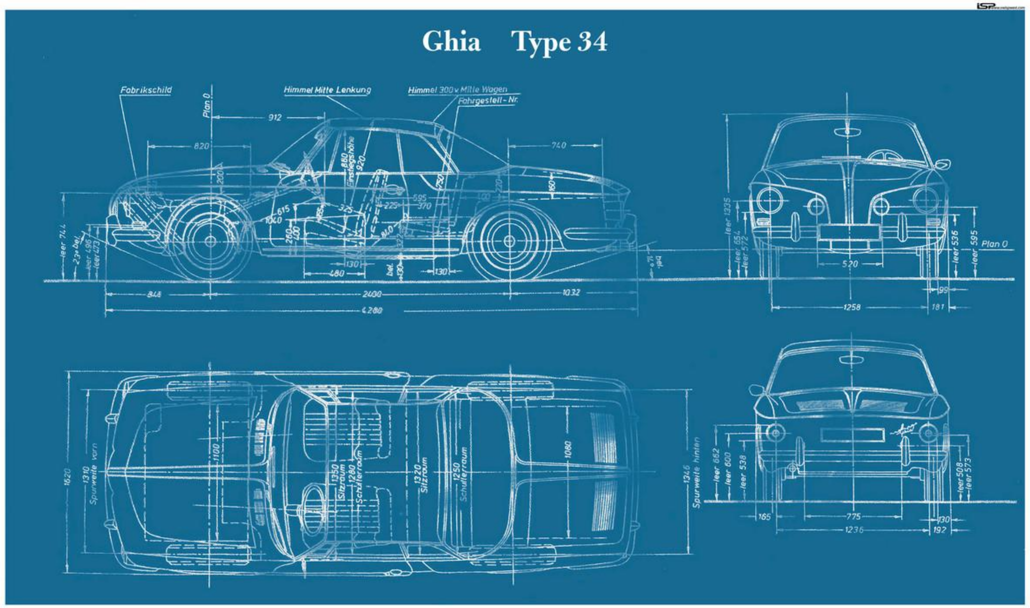


When we create a car using that blue print, we can specify the different **attributes** (color, # of seats, speed, etc)

When we create a car, we give the car access to different kinds of **behavior** (accelerating, stopping, turning, etc)

Object Oriented Programming Example

If we can create a ~~**blueprint**~~ class for a generic car, then we can use that ~~blueprint~~ class to create many different cars



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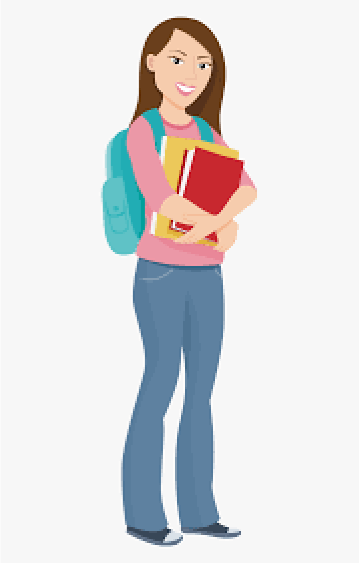
When we create a car, we give the car access to different kinds of **behavior** (accelerating, stopping, turning, etc)

Student Example

Consider a college student at MSU…

What sort of attributes may a college student have?



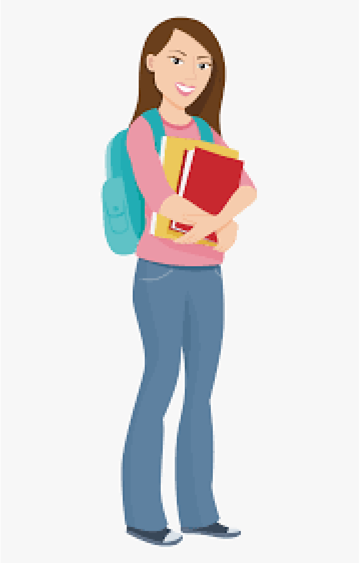
- Name
- Major
- GPA
- Student ID Number
- Year (freshman, sophomore, junior, senior)

And much more ….

OOP in Python

Define classes using the **`class`** keyword

- All class names should be capitalized



All classes need a constructor. A constructor is the method that will create the object

- Constructor will **always** be:

```
def __init__(<insert parameters here>):
```

All methods need to go inside of the class

Reader methods: getName(), getMajor(), etc

Writer methods: setName(), setMajor(), etc