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Abstract Classes & Static/Class Methods

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What we're going to learn

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- What static methods are
- When we would use static methods
- What class methods are
- When we would use class methods
- What abstract classes are
- When to use abstract classes

Static Methods

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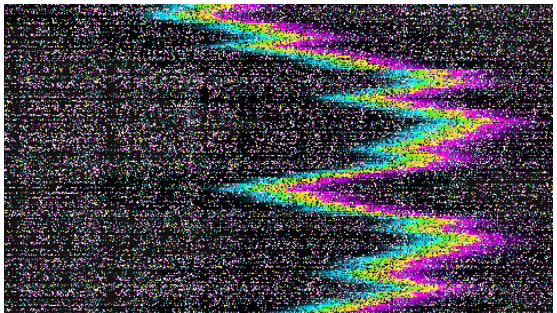
A method that belongs to a class rather than an instance of class

Basically this means this method can be called without an object for that class

This also means that a static method cannot modify the state or data of an object instance

The static method does not know about the class it is bound to



Why Use Static Methods?

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- Mostly used for utility, logic that may be related to the class but doesn't need to modify the class data
- Reduces memory usage
- Helps with readability for methods that don't depend on the data inside of an object instance
- Use sparingly

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Static vs. instance methods

Students browse: repl.it/@MakeSchool/staticvsinstancemethods?lite=true

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Class Methods

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Class methods are also bound to the class rather than an instance of an object

They differ in that class methods do have some information about the class it is bound to

This means they can modify state or data that is shared across all objects that would be built from this class

Class methods can be called by both the class and an object instance

But it still cannot modify data that is related to an object instance

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We can see several class methods present in Python's built-in's like date and time

Students browse: docs.python.org/3/library/datetime.html

Why Use Class Methods?

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The most common application of class methods are create what are called “factory methods” or basically alternative constructors

These alternates can be easily inherited by subclasses

Rather than using the various overloading methods we discussed which could make your code more confusing and unreadable

We can use class methods to create object instances of a class for different types of parameters

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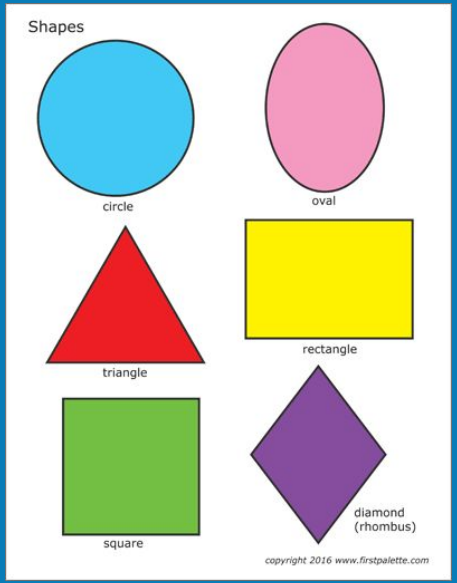
Let's look at an example



Students browse: repl.it/@MakeSchool/classmethodexample?lite=true

Think about this:

We are building the back-end for a zoo animal management application

This application will need to store information about several different animals such as monkeys, tigers, and pythons

All of the animals have some things in common:

They all have names and ages

They all eat and sleep

But they also have behaviors unique to each: monkeys build and use tools, tigers and pythons hunt etc.

Describe the classes and objects you might create to start building this application

Abstract Classes

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An abstract class is often used as a “base class”

The idea is not to directly instantiate this class, but rather to inherit from it

Abstract classes can provide some basic functionality but they are really used to define basic information that all subclasses will derive

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Let’s take a look at the zoo example

Students browse: repl.it/@MakeSchool/abstractclass?lite=true

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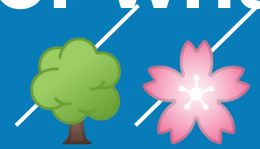
Now it's your turn! Create an abstract class called a Plant and then create Orchid and OakTree subclasses (or whatever plants you choose) 

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Abstract Base Classes make our code much more concise and reusable! 

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Shout Outs

Students, write your response!