

Lecture 10: Static Methods and Class Methods

1. Introduction

Static methods and class methods are special types of methods in Python classes that have different use cases compared to instance methods. Understanding them helps in designing better class interfaces.

2. Instance Methods

Instance methods are the most common; they operate on individual objects (instances) of the class and have access to instance data through `self`.

3. Static Methods

Static methods do not receive an implicit first argument (neither `self` nor `cls`). They behave like regular functions but belong to the class's namespace.

Use the `@staticmethod` decorator.

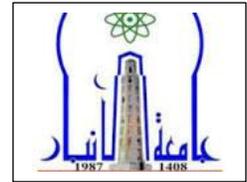
Example:

```
class Math:
    @staticmethod
    def add(a, b):
        return a + b

print(Math.add(5, 3)) # Output: 8
```

Static methods can be called on the class or instance but cannot access instance or class variables.

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4. Class Methods

Class methods receive the class itself as the first argument (`cls`) instead of the instance.

Use the `@classmethod` decorator.

Example:

```
class Person:
    species = "Homo sapiens"

    @classmethod
    def get_species(cls):
        return cls.species

print(Person.get_species()) # Output: Homo sapiens
```

Class methods can access and modify class state.

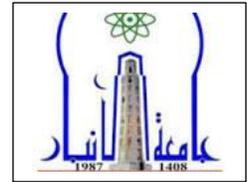
5. Differences Summary

Method Type	First Parameter	Can Access Instance Data	Can Access Class Data
Instance Method	<code>self</code>	Yes	Yes
Class Method	<code>cls</code>	No	Yes
Static Method	None	No	No

6. Exercises

1. Create a class `Employee` with class variable `raise_amount`.
2. Use class method to modify `raise_amount`.
3. Add static method to calculate tax on a salary.
4. Test these methods.

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7. Summary

Static methods are utility functions related to a class but do not modify class or instance data. Class methods can modify class state and are often used as factory methods.

8. References

1. Python Docs - Static Methods
2. Real Python - Class and Static Methods