

# Python Dunder (Magic) Methods - Cheat Sheet

## Object Lifecycle

`__init__` - Constructor (called when object is created)  
`__new__` - Allocates memory, used rarely  
`__del__` - Destructor (called when object is deleted)

## String Representation

`__str__` - Returns readable string (used by `print()`)  
`__repr__` - Returns unambiguous string (used in shell/debug)

## Arithmetic Operators

`__add__` - +  
`__sub__` - -  
`__mul__` - \*  
`__truediv__` - /  
`__floordiv__` - //  
`__mod__` - %  
`__pow__` - \*\*  
`__neg__` - Unary -x

## Comparison Operators

`__eq__` - ==  
`__ne__` - !=  
`__lt__` - <  
`__le__` - <=  
`__gt__` - >  
`__ge__` - >=

## Type Conversion

`__int__` - Convert to int  
`__float__` - Convert to float  
`__bool__` - Convert to bool

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`__len__` - Returns length using `len(obj)`

### Collection Methods

`__getitem__` - `obj[key]`

`__setitem__` - `obj[key] = value`

`__delitem__` - `del obj[key]`

`__iter__` - Iteration (`for x in obj`)

`__next__` - Next item in iteration

`__contains__` - Used with `'in'` keyword

### Attribute Access

`__getattr__` - Fallback if attribute not found

`__setattr__` - Called when attribute is set

`__delattr__` - Called when attribute is deleted

`__getattribute__` - Intercepts all attribute access

### Callable & Context Manager

`__call__` - Makes object callable like a function

`__enter__` - Used in with-blocks (entry)

`__exit__` - Used in with-blocks (exit)