

Object Oriented Programming

Data Attributes

- Data attributes:
 - Private data
 - ◆ Starts with "__"
 - ◆ E.g. `self.__name = name`
 - Prevents external functions from accessing
 - Only accessed by class methods
- Data hiding
 - Achieved by declaring data members to be private
 - Can only be accessed through public methods
- Class Methods:
 - Public functions
 - Includes parameter `self`
 - Accesses class data attributes
- Encapsulation
 - Combining methods and attributes as a single object type
- Inheritance
 - Ability to create new classes (subclasses) which inherits ALL attributes and methods of existing class (superclass)
- Polymorphism
 - Ability of different classes to respond to same methods in different ways
 - Methods have the same name
 - Subclass method overrides superclass method
- Method overloading
 - Methods / functions of the same name
 - Different number of parameters / different types of parameters
- Reusability
 - Software components can be used in many different applications without having to modify code in the component
 - Reliability
 - ◆ Already tested and debugged
 - ◆ Developed by specialists
 - Saves time in software development
 - Decreases maintenance
- Advantages:

- Ability to hide data
- Reusability
- Methods can be changed without affecting how they are used

Class Methods:

- Initialising class:

```
class ABC:
    def __init__(self, data1, data2):
        self.data1 = data1
        self.data2 = data2

    def display(self):
        print(self.data1)
        print(self.data2)
```

- Subclass inheritance & polymorphism:

```
class DEF(ABC):
    def __init__(self, data1, data2, data3):

        # initialise superclass
        super().__init__( data1, data2 )

        self.data3 = data3

    # polymorphism (same name as function in superclass)
    def display(self):
        print(self.data3)

    # output: data1, data2, data3
```

Inheritance Diagram:

