## Object Oriented Programming (OOP)

### What is object oriented programming?

Python is object oriented programming language. Object oriented is not language, it is programming paradigm or approach or concept which define set of rules and regulation for organizing data and instructions.

The main objective of object oriented programming is building user defined data types. These data types are build using the following object oriented concepts

1. Encapsulation
2. Polymorphism
3. Inheritance
4. Abstraction
5. Class
6. Object

### Encapsulation

Encapsulation is a process of grouping the properties and behavior of an object within single entity.
Encapsulation is a process of wrapping data and instructions which operates on data within single entity or container.
Binding data with related operations is called encapsulation.

### Advantage of encapsulation

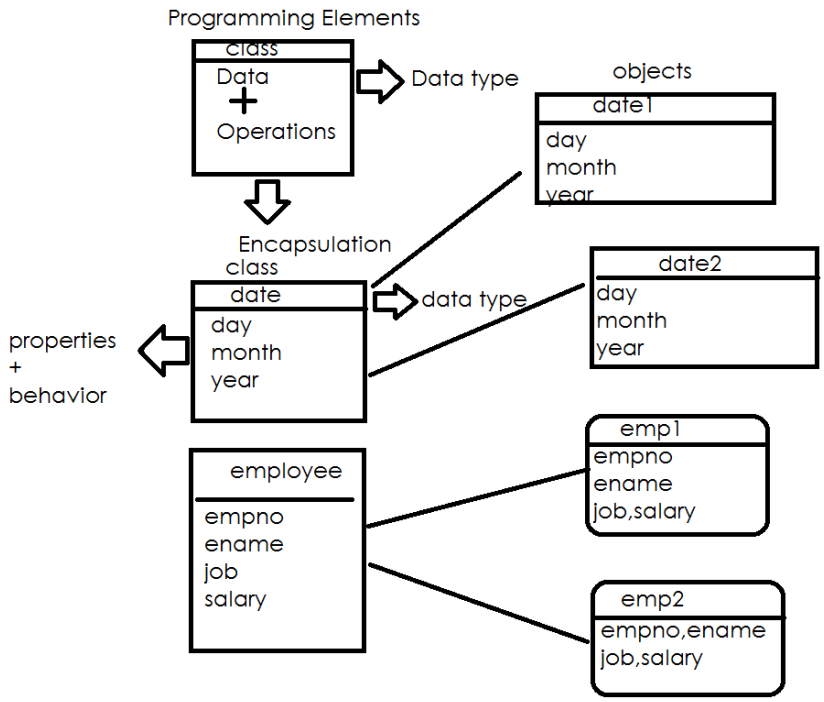
1. Data hiding
2. Binding

### What is data hiding?

Preventing data access from unrelated operations is called data hiding.
This allows developing secured applications.

### What is binding?

Linking data with related operations is called binding.




**Class**

Class is a building block of object oriented programming.
In object oriented programming languages, data types are represented as classes.
These classes are two types.

1. Predefined classes (predefined data types)
2. User defined classes (user defined data types)

Predefined classes → int, float, complex, bool, str, list,dict, set,…
User defined classes → student, player, salesperson, Customer,..

Class is encapsulated with properties and behavior of object.
Class defines the structure of object.
Class allocates memory for object.
Class is blue print of object.
Class is collection of variables and methods/functions.
Every object is required class.

**Object**

Object is an in implementation of class.
Object is an instance of a class.
In object oriented data is represented as objects.

**How to build class?**
Class is a collection of variables/attributes/properties and methods/functions/behavior

**Syntax:**
class <class-name>:
    '''doc string'''
    variables/attributes
    methods/functions

"class" keyword is used to define class.
variables define properties of object
functions/methods define behavior of object

**Variables declared inside class are two types**
1. Instance variables or object level variables
2. Class level variables

**Methods are 3 types**
1. Instance method or object level method
2. Class level method
3. Static method

**Example:**
```
>>> class Employee:
...     pass
...
>>> emp1=Employee()
>>> type(emp1)
<class '__main__.Employee'>
>>> emp2=Employee()
>>> type(emp2)
<class '__main__.Employee'>
>>> class Student:
...     pass
...
>>> stud1=Student()
>>> type(stud1)
<class '__main__.Student'>
```

**How to defined properties of object?**

```
>>>class Employee:
    pass

>>> emp1=Employee()
>>> comp1=complex()
>>> emp1.empno=101
>>> emp1.ename="naresh"
>>> print(emp1.empno)
101
>>> print(emp1.ename)
naresh
>>> emp2=Employee()
>>> emp1.empno=102
>>> emp2.empno=102
>>> emp2.ename="suresh"
```