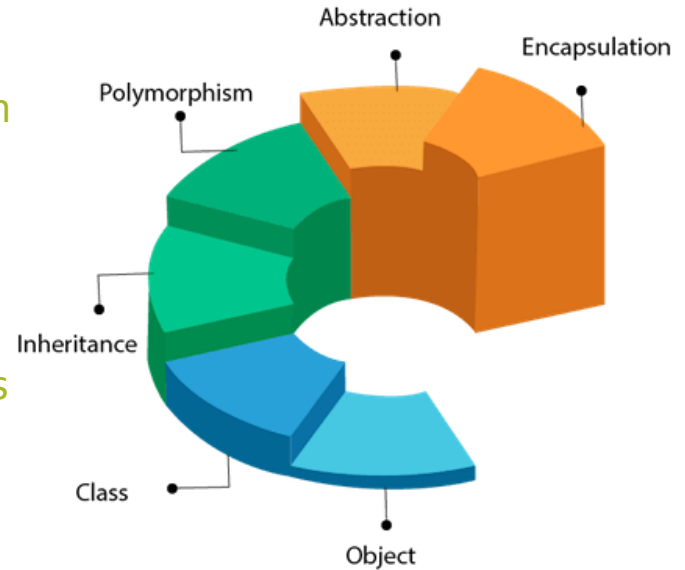


OOP  JAVA

OOP Concepts

Object-Oriented Programming

- Object-oriented programming is a programming paradigm based on the concept of "objects", which can contain data, in the form of fields (attributes, properties), and code, in the form of methods.
- In OOP, computer programs are designed by making them out of objects that interact with one another.
- OOP languages are diverse, but the most popular ones are class-based, meaning that objects are instances of classes, which also determine their types.
- Many programming languages are multi-paradigm and they support OOP to a greater or lesser degree, typically in combination with imperative, procedural programming.



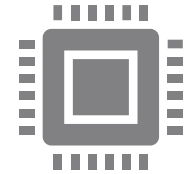
OOP Concepts. Abstraction



The process of picking out (abstracting) common features of objects and procedures



The process of removing physical, spatial, or temporal details or attributes in the study of objects or systems in order to focus attention on details of higher importance, it is also very similar in nature to the process of generalization



It is a fundamental concept to computer science and software development and is closely related to encapsulation and information hiding

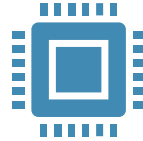
OOP Concepts. Information Hiding



The process of hiding details of an object or function



It is a powerful programming technique because it reduces complexity



It is also used to prevent programmers from intentionally or unintentionally changing parts of a program



One of the chief mechanisms for hiding information is encapsulation - combining elements to create a larger entity. The programmer can then focus on the new object without worrying about the hidden details

OOP Concepts. Encapsulation



Is closely related to abstraction and information hiding



The process of combining elements to create a new entity. A procedure is a type of encapsulation because it combines a series of computer instructions



It binds together the data and functions that manipulate the data, and that keeps both safe from outside interference and misuse

OOP Concepts. Inheritance

Is a parent-child relationship where we create a new class by using existing class code.

Allows a class to have the same behavior as another class and extend or tailor that behavior to provide special action for specific needs.

Allows easy re-use of the same procedures and data definitions.

Allows classes to be arranged in a hierarchy that represents "is-a" relationships. "Is-a" is a subsumption relationship between abstractions, wherein one class A is a subclass of another class B (B is a superclass of A).

OOP Concepts. Polymorphism

Generally, the ability to appear in many forms.

Allows process objects differently depending on their data type or class.

It is the ability to redefine methods for derived classes.

It is when calling code can be agnostic as to which class in the supported hierarchy it is operating on - the parent class or one of its descendants.

OOP Concepts. Object Composition

Is a way to combine objects or data types into more complex ones.

For a composition (i.e. with ownership) relation: a meronym (constituent) has a part-of relationship with its holonym (entity).

OOP Concepts. Aggregation

Differs from ordinary composition in that it does not imply ownership. In composition, when the owning object is destroyed, so are the contained objects. In aggregation, this is not necessarily true.

For an aggregation (i.e. without ownership) relation: a holonym (whole) has a has-a relationship with its meronym (part).

OOP Concepts

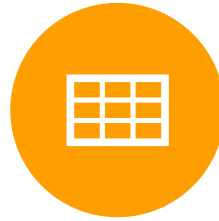
Composition over inheritance is the principle that classes should achieve polymorphic behavior and code reuse by their composition rather than inheritance from a base or parent class.

Multiple inheritance is a feature of some object-oriented computer programming languages in which an object or class can inherit characteristics and features from more than one parent object or parent class.

Objects and Classes. Class



A category of objects



Defines all the common properties of the different objects that belong to it



It is template used for defining new type



Describes both the properties and behaviors of objects

Objects and Classes. Object



Generally, any item that can be individually selected and manipulated



Is a self-contained entity that consists of both data and procedures to manipulate the data



Is an instance of a class

OOP

- [Wiki: Object-Oriented Programming](#)
- [Tutorial: Object-Oriented Programming Concepts](#)

