Object Oriented Programming in Java

COMP 348 Tutorial

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Basic concepts

- **Classes** - *“the definitions for the data format and available procedures for a given type or class of object; may also contain data and procedures (known as class methods) themselves, i.e. classes contain the data members and member functions”* [Wikipedia]
- **Objects-** *“instances of classes”* [Wikipedia]

The 4 principles

- Inheritance
- Encapsulation
- Polymorphism
- Abstraction

Inheritance

- The Child Class inherits the properties of the Parent Class.
- Types: Single, Multilevel, Hierarchical, Hybrid, ~~Multiple~~ [1]
- Keyword: **extends, super**
- Why? [2]
  - Code Reuse
  - Sub-typing
- Examples: https://github.com/singhsatnam/oops-tutorial/tree/master/src/inheritance

[1] ; https://www.geeksforgeeks.org/inheritance-in-java/ [2] Dr.Yann-Gaël Guéhéneuc's slides

Encapsulation

- Wrapping data and methods [1]
- Data hiding.
- Access specifiers for [2]
    - Data/Method/Inner Class: public, protected, private, *default*
    - Classes (not nested): public, *default*
- Examples: https://github.com/singhsatnam/oops-tutorial/tree/master/src/encapsulation

[1] https://www.geeksforgeeks.org/encapsulation-in-java/; [2] https://www.geeksforgeeks.org/access-specifiers-for-classes-or-interfaces-in-java/

Polymorphism

- Poly+Morphs :: Many+Forms
- Ability of an object to take many forms. Object passes multiple IS-A tests.[1]
- Types:
  - Run-time/Dynamic-binding/Late-binding; e.g.: method overriding
  - Compile-time/Static-binding; e.g.: method overloading
- Examples: https://github.com/singhsatnam/oops-tutorial/tree/master/src/polymorphism

[1]: https://www.tutorialspoint.com/java/java_polymorphism.htm;

Abstraction

- Hide the **implementation** details from the users.
- Interfaces and abstract classes. [1]
- A related keyword: **abstract**
- Examples: https://github.com/singhsatnam/oops-tutorial/tree/master/src/abstraction

[1]: https://www.geeksforgeeks.org/abstraction-in-java-2/