Classes and Object-Oriented Development

Ho Dac Hung

What is an Object?

- In object-oriented programming, an object stores data and can perform actions and provide communication. The state of an object refers to the data it stores. The behavior of an object is defined by the action and communication it provides.

2

What is an Object?

- An object is an instance of a class, A class is a data type that defines variables for the state of an object and method for an object's behavior.

Designing and Writing a Class

- Designing a class requires choosing the data the object will store and determining the actions and communication the object will provide. The design should include variable names and method names along with a description of the method and any required parameters.

Designing and Writing a Class

- A class is written in a separate file and consists of a declaration and a body. The class declaration includes the access level, the keyword class, and the class name. The class body contains variables, constructors, and methods. A class takes the form:

```
<access level> class <name> {
    <variables>
    <constructors>
    <methods>
}
```

Writing Constructors

- A constructor of a class is automatically executed when object is instantiated. Once an object is instantiated, the method members of the class can be called in any order. Unexpected results may occur if an accessor method is called before a member variable has been set to a valid value. To prevent this, variables should be initialized in the constructor.

    public <class name> (<parameters>){

    <statements>

    }

Instance and Class Members

- Each object, or instance, of a class has its own copy of variables called instance variables.

- A class may also contain class variables. A class variables is declared with the keyword static and only one copy is maintained for all objects to refer to.

The Object Class

- The Object class is the superclass of all other classes.

superclass

Object

Circle   String

subclasses
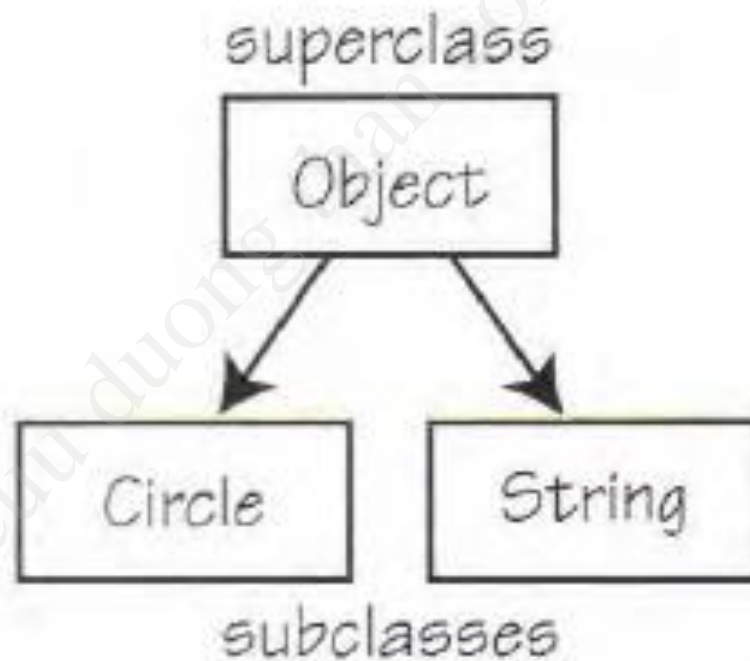
Classes Using Classes

- A cless may contain member variables that are class data types. Complex data can be easily represented in this way.

- A class that contains class member variables demonstrates a has-a relationship.

Object-Oriented Development

- Object-oriented programming requires that the solution to a task be implemented as a system of objects. In this system, objects communicate with other objects to provide a solution to the task. This approach to creat software is called object-oriented development.