Overview of Java Object-Oriented Programming Language Concepts

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Learning Objectives of this Lesson

- Understand the key object-oriented concepts supported in Java

See en.wikipedia.org/wiki/Java_(programming_language)
Overview of Key Object-Oriented Concepts Supported by Java
Key Object-Oriented Concepts Supported by Java

- Java was originally an object-oriented programming language

See en.wikipedia.org/wiki/Object-oriented_programming
Key Object-Oriented Concepts Supported by Java

• Java was originally an object-oriented programming language
• Thus, Java apps were organized in terms of *structural* elements

See en.wikipedia.org/wiki/Object-oriented_programming
Java was originally an object-oriented programming language. Thus, Java apps were organized in terms of structural elements, e.g., classes, interfaces, and packages.

See [en.wikipedia.org/wiki/Software_design_pattern](en.wikipedia.org/wiki/Software_design_pattern)
Key Object-Oriented Concepts Supported by Java

• An object is an instance of a class that performs certain operations & interacts with other objects

See docs.oracle.com/javase/tutorial/java/javaOO/objects.html
Key Object-Oriented Concepts Supported by Java

- An object is an instance of a class that performs certain operations & interacts with other objects
- An object in Java resides in a memory location of a computer

```java
SimpleSet<T>

Object[] mElementData
int mSize
int mEnd
...

boolean add(E element)
boolean contains(Object o)
int size()
...
```

Key Object-Oriented Concepts Supported by Java

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- An object in Java resides in a memory location of a computer
- It consists of
  - *State* – represented via data fields

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See [docs.oracle.com/javase/tutorial/java/javaOO/variables.html](docs.oracle.com/javase/tutorial/java/javaOO/variables.html)
Key Object-Oriented Concepts Supported by Java

- An object is an instance of a class that performs certain operations & interacts with other objects
- An object in Java resides in a memory location of a computer
- It consists of
  - *State* – represented via data fields
  - *Behavior* – represented via methods

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Key Object-Oriented Concepts Supported by Java

- Objects often correspond to real-world entities

```java
public class Account {
    private Money mCurrentBalance;
    private boolean mOverdraftProtection;
    private ...;

    public void deposit(Money amount) {
        ...;
    }

    public void withdrawl(Money amount) {
        ...;
    }

    public Money checkCurrentBalance() {
        ...;
    }

    // Other methods...
}
```
Key Object-Oriented Concepts Supported by Java

- Objects often correspond to real-world entities

```
anAccount : Account

Money mCurrentBalance
boolean mOverdraftProtection
...

void deposit(Money amount)
void withdrawl(Money amount)
Money checkCurrentBalance()
...
```
Key Object-Oriented Concepts Supported by Java

- Objects often correspond to real-world entities

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anAccount : Account

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Many non-object-oriented programming languages organize apps in terms of *functional* elements.

See [en.wikipedia.org/wiki/Procedural_programming](en.wikipedia.org/wiki/Procedural_programming)
Key Object-Oriented Concepts Supported by Java

- Many non-object-oriented programming languages organize apps in terms of *functional* elements
  - e.g., actions & logic
Object-oriented Java programs also perform actions & contain logic.

### Account

- Money `mCurrentBalance`
- Boolean `mOverdraftProtection`
- ... 
- `void deposit(Money amount)`
- `void withdraw(Money amount)`
- `Money checkCurrentBalance()`
- ...
Object-oriented Java programs also perform actions & contain logic

However, these functional elements don’t constitute main focus in the object-oriented parts of Java
Key Object-Oriented Concepts Supported by Java

- Object-oriented Java programs also perform actions & contain logic
- However, these functional elements don’t constitute main focus in the object-oriented parts of Java

Java 8 does focus heavily on functional programming
Key Object-Oriented Concepts Supported by Java

- Java supports key object-oriented concepts
Java supports key object-oriented concepts, e.g.

- Data & control abstractions

See [en.wikipedia.org/wiki/Abstraction_(computer_science)](en.wikipedia.org/wiki/Abstraction_(computer_science))
Java supports key object-oriented concepts, e.g.

- Data & control abstractions
- Inheritance

See en.wikipedia.org/wiki/Inheritance_(object-oriented_programming)
Java supports key object-oriented concepts, e.g.:
- Data & control abstractions
- Inheritance
- Polymorphism

See en.wikipedia.org/wiki/Polymorphism_(computer_science)
Key Object-Oriented Concepts Supported by Java

- There are many other object-oriented languages

C++ Python Objective-C
Java Scala
C# Smalltalk Ada95
JavaScript Eiffel
Swift Modula-3

See [en.wikipedia.org/wiki/List_of_object-oriented_programming_languages](en.wikipedia.org/wiki/List_of_object-oriented_programming_languages)
Key Object-Oriented Concepts Supported by Java

• These are (arguably) the most popular today

See en.wikipedia.org/wiki/List_of_object-oriented_programming_languages
Key Object-Oriented Concepts Supported by Java

- Learning other object-oriented languages is much easier once you know Java.
Key Object-Oriented Concepts Supported by Java

- If you already know Java well you’ll be bored by some parts of this material!
Key Object-Oriented Concepts Supported by Java

- If you already know Java well you’ll be bored by some parts of this material!
- We will therefore move through this material fairly quickly

Please ask any questions about this material since other lessons depend on it..
End of Overview of Java Object-Oriented Programming Language Concepts