Java Programming I

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Intro

Recommended reading

Java: A Beginner's Guide, Sixth Edition

Herbert Schildt

Clean Code: A Handbook of Agile Software Craftsmanship

Robert C. Martin

Design Patterns: Elements of Reusable Object-Oriented Software

Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Grady Booch

Class Structure

Make it as close as possible to a real-life experience

- Hands on Exercises
- Working in teams
- Code reviews
- 2 Quizes
- Final Project

Computer languages

- Interpreted vs Precompiled vs Native
- Static typed vs Dynamic typed
- Strongly typed vs weak typed
- Brackets vs Indentation
- Spaces vs Tabs

So what's so great about Java?

Portable	Write once run everywhere
Secure	Memory management and isolation
Object-oriented	The current icon of OOP
Robust	strongly typed, good exception management
Multithreaded	Good for multithread and distributed environments
Fast	One of the fastest languages around
Popular	2nd most popular language on github

Who is using Java now?

- Google

- Spring Framework

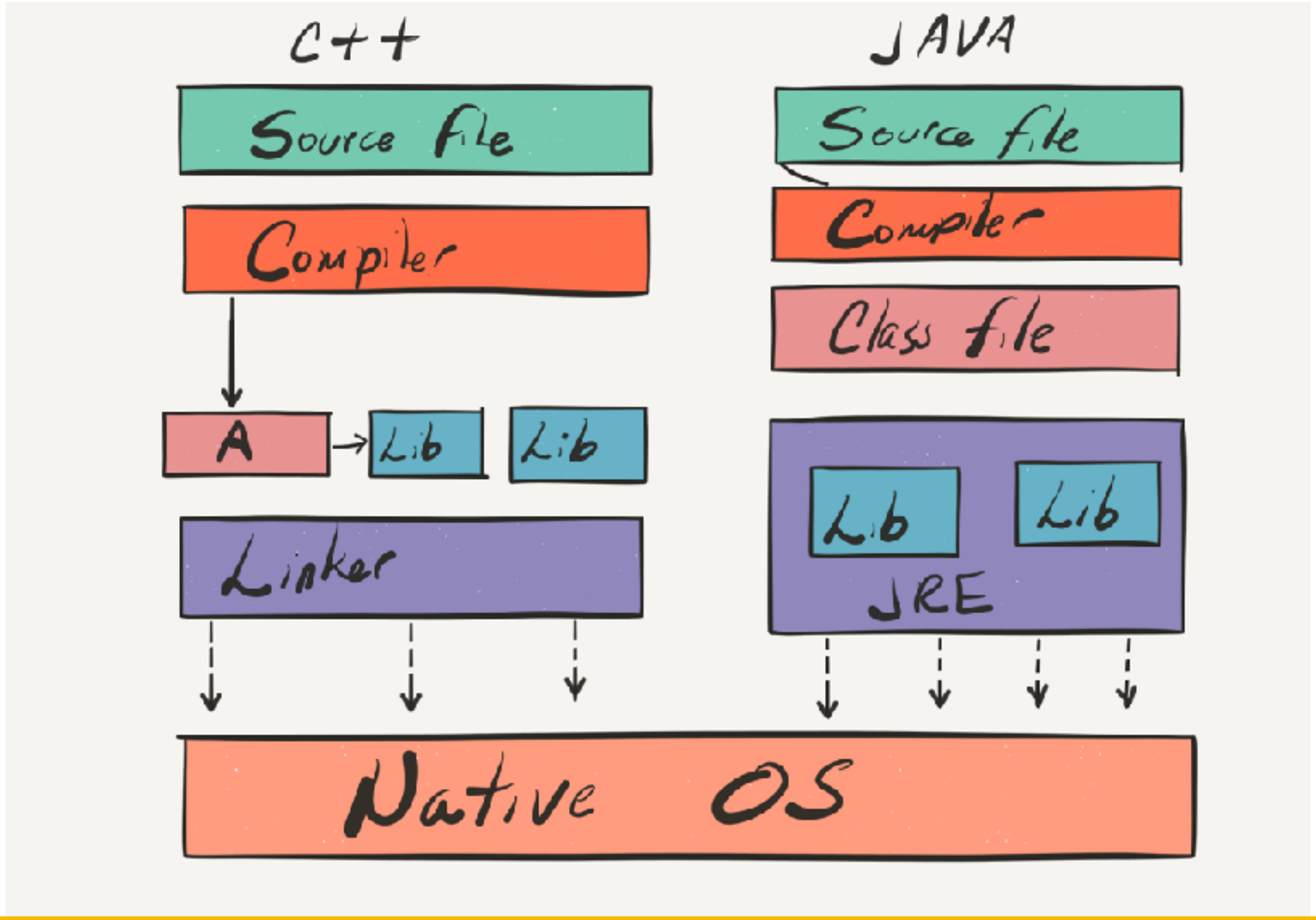
- Hadoop (Google FS clone)

- Android Apps

Disadvantages of Java

- Slow development process
- Deployments are complex
- Code can be “long and ugly”

The flow of a Java Program



Good programming practices

- Pair Programming
- Code Reviews
- IDE - IntelliJ
- Packaging, building, listing and distribution tools
- Clean Code

Computer Program basics

- STDOUT, STDERR
- Exit codes (Zero is ok)
- Entry point (main function)
- What is Multithreading?
- Servers?

Programming styles

- MVC - Model View Container
- MVVM - Model View ViewModel
- ReactiveX - Observer pattern
- Flux - Actions, stores, dispatcher

Hello World

```
public class HelloWorld {
    public static void main(String[] args) {
        // Prints "Hello, World" to the terminal window.
        System.out.println("Hello, World");
    }

}
```

Running it

- javac HelloWorld.java

- java HelloWorld.class

Hello World ++

```
public class HelloWorldPlusPlus {

    public static void main(String[] args) {
        System.out.print(“Hello, ");
        System.out.print(args[0]);
        System.out.println(". How are you?");
    }

}
```

Troubleshooting

- Handling compiler errors
- Handling runtime errors
- Debugging

Java terminology

- JRE - The runtime (Virtual Machine) that interprets precompiled code and translates it to native code.
- Bytecode - A precompiled code that the virtual machine understands that is translated to native instructions
- Package - A group of similar classes organized by folders
- JAR - Java Archive: A file that contains one or more packages for distribution

Object Oriented Programming

- Objects and Classes
- Encapsulation - (private, protected, public)
- Composition, Inheritance and Delegation
- Polymorphism

Encapsulation

hiding the implementation details from users

```
public class EncapsulationDemo{
    private int age;

    public int getAge(){
        return age;
    }

    public void setAge(int newValue){
        age = newValue;
    }
}

public class EncapsTest{
    public static void main(String args[]){
         EncapsulationDemo obj = new EncapsulationDemo();
         obj.setAge(32);
         System.out.println("Employee Age: " + obj.getAge());
    }
}
```

Inheritance

Allowing a class to inherit properties and methods from other classes

```
class Vehicle {
   String color;
   int speed;
   int size;

   void attributes() {
      System.out.println("Color : " + color);
      System.out.println("Speed : " + speed);
      System.out.println("Size : " + size);
   }
}

class Car extends Vehicle {
   int CC;
   int gears;

   void attributescar() {
      // The subclass refers to the members of the superclass
      this.attributes();
      System.out.println("CC of Car : " + CC);
      System.out.println("No of gears of Car : " + gears);
   }
}
```

Polymorphism

capability of a method to do different things based on the object that it is acting upon

```
class Overload
{
    void demo (int a)
    {
        System.out.println ("a: " + a);
    }

    void demo (int a, int b)
    {
        System.out.println ("a and b: " + a + "," + b);
    }

    double demo(double a) {
        System.out.println("double a: " + a);
        return a*a;
    }
}
```

Next Class

- git knowledge would be preferred

- When do you prefer to do it?