

JAVA 高级语言程序设计

<Block 1>

① 编译与运行 → compile → load phase javac my.java → java my

了解 ++, --, break; ~~continue~~ → 进入下一次循环。
strongly typed, strongly classed.

int → 32 bit long → 64 bit (OL) float → 32 bit (O.of)

double → 64 bits (O.Od) boolean → 1 bit char → 16 bits

大致无法直接存入小的基本类型, 但有强制类型转换进去, 如 $i = i + 1, \Rightarrow i = 0$.

if, if else, switch { case: ; }

while, do...while, for
&&, ||, !

Conditional operator → test ? b : c

group of objects → class. ↑ 真 ↓ 假 class/static variables
instance attributes → instance variables
operations → methods.

Pass by value (JAVA 特性).

class diagram notation → UML →

类名
变量
方法

Data Encapsulation refers to when the internal state and operation are hidden from others.

↳ accessor (getter)
mutator (setter)

<Block 2>

① Array → 声明 tyName array[];
tyName[] array; 长值是对, 无 ty 对 primitives.

直接 println (数组) → 返回地址, 需 toString() 方法.

Copy arrays 1. 使用 for.
2. 使用 arraycopy() 方法.

↳ System.arraycopy (源数组, 源数组起始位, 目标数组, 目标起始位, 需 copy 的长度)

array.length 返回一个 int.

Javadoc -d doc file.java

② ArrayList

java.util < ArrayList < object > my = new ArrayList < > ();

在开始 import
或使用命令
全名

my.add(); my.size(); my.contains(f) 是否有这个 object, 有返回 true.
my.indexOf(f); my.isEmpty(); my.remove();
my.get(i);

③ inheritance

Subclasses inherit the attributes and operations of their superclass.

Polymorphism: Use a single definition (superclass) with different types (subclasses)

abstract class / concrete class

abstract methods → must be overridden in the subclass.

Object.
equals()
toString()
hashCode()
getClass()

返回 class 类名.

extends

<Block 3>

① Interface.

100% abstract class, From Java 8, interface 可以有 default 和 static 方法.

implements 接口和抽象类的 constant 都将被继承.

接口
抽象类
abstract
default
static

变量池中方法与重载规则一致, 使用类时必须
不被继承和覆盖. 可以使用接口中的两个同名同参数方法.

public void show();

TestInterface1.super.show();

同名变量都保存, 因为只有静态, 通过接口调用.

② GUI.

高亮, 可移植

java.awt → java.swing
低, 不可移植

1. JFrame my = new JFrame();

JButton mybutton = new JButton(" ");

my.getContentPane().add(mybutton);

my.setSize(100, 100);

my.setVisible(true);

→ 未设置, 0 size, invisible.

JPanel 是继承自 JComponent (Graphics g) 方法需要交互, 创建继承 JPanel 的子类对象, 添加构造方法 paintComponent(...) 自动调用.

2. event handling → getting and handling

1. implement the ActionListener interface.

Define the event handling method

```
public class MyClass implements ActionListener {  
    public void actionPerformed (ActionEvent e)  
}
```

Register with the widget

针对 JButton

some component.add ActionListener (new MyClass());

MouseListener ↔ Event: mouse (MouseEvent e)

getText(), setText() 针对 JLabel 操作

3.

container.setLayout (new ...);

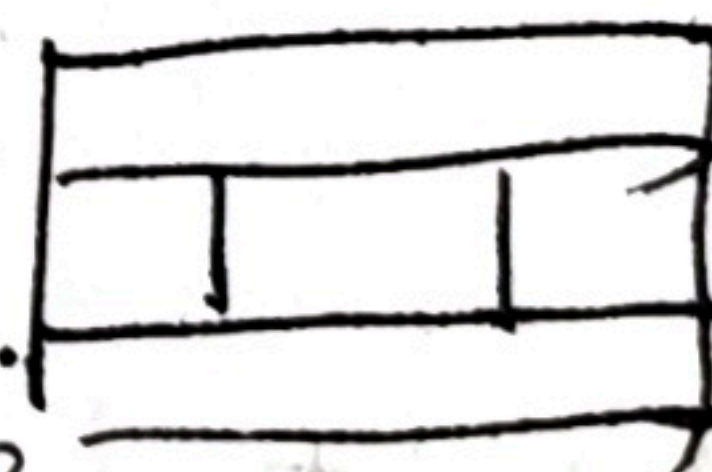
FlowLayout - JPanel default

GridLayout - GridLayout() - 行, 列 component - 3

BorderLayout - GridLayout(int rows, int cols, int hgap, int vgap)

JFrame default 东西南北中

add(BorderLayout.CENTER, myButton)



③ Garbage Collection

Heap, Stack

Life variable scope

be in scope, out of scope

Life → depend on the

life of the reference variable referring to it.

构造器 Constructor, super() / this() 是 constructors 首句

内存 → dynamically allocated.

garbage collection → 无 memory leak.

eligible for GC

有资格, 符合条件

④ Strings, (java.lang.String) immutable → String 常量

String s = "" → String pool

String s = new String("") → heap (pool 之外)

^{int} length(), char charAt(int index), int indexOf(ch)
 boolean equals(), int compareTo(str), String substring(^(index1, index2))
 String concat(s), toString(), char[] getChars(c, j, A, k)
 s += "子一样的事" 数字转换为 string 有串从 k 索引开始

String Buffer & String Builder

"Bugs" + "Bunny" → StringBuffer = "Bugs Bunny" variable string 可避免创建不必要的 string 实例
 只添加 string 不更改

StringBuffer s = new StringBuffer(20) = "cat"

Character class 包装类

isLetter(char c), isDigit(char c), isUpperCase(char c), isLowerCase(char c)
 字母 数字

常用方法

a) char[] split(":") 切分 string

b) StringTokenizer 类, 抽数器 StringTokenizer(String s, String delimiters, boolean 是否区分大小写)

Println(myTokenizer.nextToken())

c) Scanner

Scanner myScanner = new Scanner(s)

myScanner.useDelimiter("you")

while (myScanner.hasNext())

System.out.println(myScanner.next())

分隔符 即使子字符串也
 以子字符串中好 默认 false
 子字符串个数 默认分隔符
 space, tab, new line, carriage return
 回车

用法 读入
 ↓
 myScanner.nextInt()

String.format() → System.out.printf()

<Block 4>

① Numbers

final → 不可改变 / override / extends.

static → variable
 → method

抽象类, 接口, 含有 constructors } → 不可 instantiated

static final → 不可改变

```
static final double BA;  
static {  
    BA = ...;  
}
```

} static initialiser

Math.random() [0, 1)

Random class (java.util)

```
Random r = new Random();  
r.nextFloat();  
r.nextInt();
```

Math.random() 返回 0.5 以下, 随机数取整.

Wrapper Classes → int/char/boolean/Value → 包装.

Autoboxing

Static methods in wrappers.

```
Integer.  
    parseInt(str)  
    parseDouble(str2).  
Double.
```

这些基本类型包装类都是 Number 的子类.

Recursion.

② Exception Handling

Exception: an object that signals to the calling code, the occurrence of an unusual condition.

```
try {
```

```
} catch { }
```

```
} finally {
```

```
}
```

异常 → jump out of the stack.

throw // Catch

↓
它 throws 这个异常 (再次, 捕获).

catch 失败, JVM print information about the exception, and the location where it occurred (Stack Trace messages)

Runtime Exceptions → 不可查, unchecked.

→ RuntimeException 的子类.

Assertions

在开发中 (debugging), more efficient than 打印.

assert assertion-expression : detail message
assert 语句为假, 终止, 并输出信息. 与 assertTrue 类似, 通常 - 白显示, 失败时显示.

java -ea 打开 enable 可

③ I/O 知识.

Stream 是字节流和字符流, 它们 represent any data; sequence of byte.

Byte $\rightarrow$ output. $\xrightarrow{\text{input}}$ character.
8 bit. 16 bit

java.io. File $\rightarrow$ 封装, 有路径 $\rightarrow$ 无路径.

BufferedReader buff = new BufferedReader(new FileReader(文件));

contents = buff.readLine(); while (contents != null);
buff.close();

BufferedWriter bufferedWriter = new BufferedWriter(new FileWriter(文件));

④ 集合 & Sorting

二维数组 需要 声明 一个 $\frac{[?][?]}{[]}$

ArrayList<ArrayList<Integer>> topList
= new ArrayList<>();

topList.get(i).add(new Integer(j)).

topList.get(i).get(j)

Swap list[j] with list[j+1].

Comparator $\rightarrow$ compare() 方法.

Comparable $\rightarrow$ compareTo() 方法.