JAVA应用技术

复习课

知识点 I

- Java 常识
  - Java 代码编译执行的过程
    - 真实编译
    - 字节码解释执行
  - 跨平台的原因
    - JVM
    - 数据类型统一
  - Java 和 C++的比较
  - Java 内存模型
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    - 对象变量是指针
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    - 数组下标检查
  - 单根结构：Object 类
  - main()
    - public static void main(String[] args)
    - 命令行参数
  - Java 关键字

- Java 基础：数据类型、对象和控制语句
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  - 对象变量
    - 对象变量的意义
    - 对象变量的赋值
    - 对象变量做函数参数和返回值
    - 对象变量的比较
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  - 带标号的 break 和 continue
- 类
  - this
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    - 调用其他构造函数
  - 成员变量初始化
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    - 静态成员的访问：通过“.”运算符
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      - 只处理byte
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知识点 IV

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  - 事务处理
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  - Lambda表达式
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  - 容器的stream接口
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    - 过滤
    - 映射
    - 聚合

样题

判断题

`char` of Java is 8-bit. (1分)	F
A Java class can extend from multiple base classes. (1分)	F
Member variables are to get default init values when the object is to be created. (1分)	T
`protected` member can be visited by extended class only. (1分)	F
InputStream and OutputStream read and write 8-bit data. (1分)	T
Swing container is used to organize other GUI components in. But other containers can not be put in a container. (1分)	F
To access a method of a class, an object of that class must be created first. (1分)	F
When an object is de-serialized, its constructor does not run. (1分)	T

样题

```
public class ParentDeserializationTest {

public static void main(String[] args){
    try {
        System.out.println("Creating...");
        Child c = new Child(1);
        ByteArrayOutputStream baos = new ByteArrayOutputStream();
        ObjectOutputStream oos = new ObjectOutputStream(baos);
        c.field = 10;
        System.out.println("Serializing...");
        oos.writeObject(c);
        oos.flush();
        baos.flush();
        oos.close();
        baos.close();
        ByteArrayInputStream bais = new ByteArrayInputStream(baos.toByteArray());
        ObjectInputStream ois = new ObjectInputStream(bais);
        System.out.println("Deserializing...");
        Child c1 = (Child)ois.readObject();
        System.out.println("c1.i="+c1.getI());
        System.out.println("c1.field="+c1.getField());
    } catch (IOException ex){
        ex.printStackTrace();
    } catch (ClassNotFoundException ex){
        ex.printStackTrace();
    }
}
```

没有implements Serializable

```
public static class Parent {
    protected int field;
    protected Parent(){
        field = 5;
        System.out.println("Parent::Constructor");
    }
    public int getField() {
        return field;
    }
}

public static class Child extends Parent implements Serializable{
    protected int i;
    public Child(int i){
        this.i = i;
        System.out.println("Child::Constructor");
    }
    public int getI() {
        return i;
    }
}
```

若implements Serializable
c1.i = 1, c1.field = 10

```
<terminated> Test (2) [Java
Creating...
Parent::Constructor
Child::Constructor
Serializing...
Deserializing...
c1.i =1
c1.field = 10
```

Output:

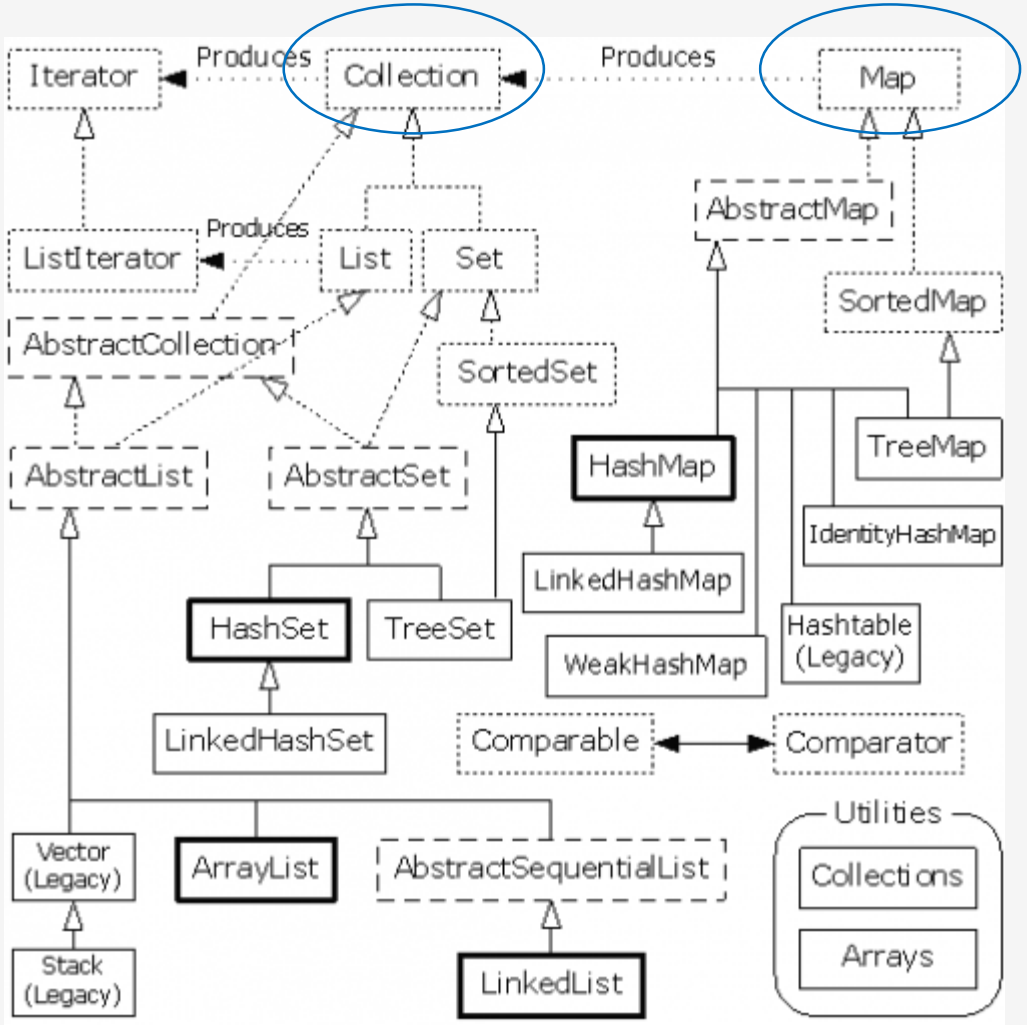
```
Creating...
Parent::Constructor
Child::Constructor
Serializing...
Deserializing...
Parent::Constructor
c1.i=1
c1.field=5
```

样题

单选题

About Java containers, which statement below is NOT correct? (2分)

- ○ A. `List` holds the elements in a particular sequence
- ○ B. `Set` cannot have any duplicate elements
- ○ C. `Map` has group of key-value object pairs
- ◉ D. `Iterator` can deal with `List`, `Set` and `Map`



HashMap

```
public Set<K> keySet() {
    Set<K> ks = keySet;
    if (ks == null) {
        ks = new KeySet();
        keySet = ks;
    }
    return ks;
}
```

```
public Collection<V> values() {
    Collection<V> vs = values;
    if (vs == null) {
        vs = new Values();
        values = vs;
    }
    return vs;
}
```

```
public Set<Map.Entry<K,V>> entrySet() {
    Set<Map.Entry<K,V>> es;
    return (es = entrySet) == null ? (entrySet = new EntrySet()) : es;
}
```

样题

For swing event handling mechanism, which one below is NOT correct? (2分)

- ○ A. Event source like JButton is able to have more than one ActionListener objects registered
- ○ B. When an event occurs, the source object notices all the registered listeners
- ○ C. A registered listener is able to be de-registered from a source object dynamically
- ◉ D. One listener can not be registered at more than one source object

For code below:

```
ArrayList<Integer> a = new ArrayList<Integer>();
ArrayList<Double> b = new ArrayList<Double>();
```

Which statement below is **NOT** correct? (2分)

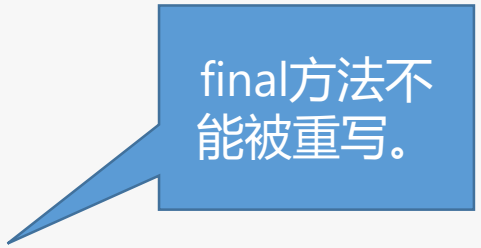
- ○ A. a.getClass().equals(b.getClass()) is true
- ○ B. a.getClass() == b.getClass() is true
- ○ C. a instanceof ArrayList is true
- ◉ D. a.getClass() == b.getClass() is false

样题

Given code below:

```
class Base{
        public final void method() {
                System.out.println("Base.method");
        }
}

public final class Fin extends Base{
        public void method() {
                System.out.println("Fin.method");
        }
        public static void main(String argv[]){
                Base b = new Fin();
                b.method();
        }
}
```



While one below is correct? (2分)

- ○ A. It does not compile because of method() in Fin is not defined final as its base one
- ○ B. It does not compile because Fin can not be final
- ◉ C. It does not compile because of method() in Base final so no function can override it in derived classes
- ○ D. It compiles and prints Fin.method

样题

For InputStream.read(), the read() with no parameters, which statement below is correct? (2分)

- (●) A. read() returns int, because it has to return EOF to indicate the end of the file
- ( ) B. read() returns byte, because it reads a byte from the stream
- ( ) C. read() returns char, because it reads a char from the stream
- ( ) D. read() returns int, as the number of bytes it just read

The value returned is a byte as an int type.

java.io.InputStream	
+read(): int	Reads the next byte of data from the input stream. The value byte is returned as an int value in the range 0 to 255. If no byte is available because the end of the stream has been reached, the value –1 is returned.
+read(b: byte[]): int	Reads up to b.length bytes into array b from the input stream and returns the actual number of bytes read. Returns -1 at the end of the stream.
+read(b: byte[], off: int, len: int): int	Reads bytes from the input stream and stores into b[off], b[off+1], …, b[off+len-1]. The actual number of bytes read is returned. Returns -1 at the end of the stream.
+available(): int	Returns the number of bytes that can be read from the input stream.
+close(): void	Closes this input stream and releases any system resources associated with the stream.
+skip(n: long): long	Skips over and discards n bytes of data from this input stream. The actual number of bytes skipped is returned.
+markSupported(): boolean	Tests if this input stream supports the mark and reset methods.
+mark(readlimit: int): void	Marks the current position in this input stream.
+reset(): void	Repositions this stream to the position at the time the mark method was last called on this input stream.

样题

Given the following code:

```
public class Test {
        String s;
        static class Inner {
                void testMethod() {
                        s = "Hello world.";
                }
        }
        public static void main(String[] argv) {
                Inner i = new Inner();
                i.testMethod();
                System.out.println(s);
        }
}
```

- Since a static inner class has no connection to an object of the outer class, within an inner class method
  - Instance variables of the outer class **cannot be** referenced
  - Nonstatic methods of the outer class **cannot be** invoked

which one below is correct?(2分)

- ○ A. It compiles and prints out Hello world.
- ◉ B. It does not compile because String s in class Test is not static.
- ○ C. It does not compile because Inner can not used in the way in main()
- ○ D. It compiles and exception raises at running indicates that s has not been initiated.

样题

Given the following class definition which of the following can be legally placed after the comment line //Here ?(2分)

```
class Base{
        public Base(int i){}
}

public class MyOver extends Base{
        public static void main(String arg[]){
                MyOver m = new MyOver(10);
        }
        MyOver(int i){
                super(i);
        }
        MyOver(String s, int i){
                this(i);
                //Here
        }
}
```

- ○ A. `MyOver m = new MyOver();`
- ○ B. `super();`
- ○ C. `this("Hello",10);`
- ◉ D. `Base b = new Base(10);`

样题

Why might you define a method as native? (2分)

- ◉ A. To get to access hardware that Java does not know about
- ○ B. To define a new data type such as an unsigned integer
- ○ C. To write optimized code for performance in a language such as C/C++
- ○ D. To overcome the limitation of the private scope of a method

For exception, which statement below is **NOT** correct? (2分)

- ○ A. It is possible to have a try block with out any catch clause but a finally clause
- ○ B. It is possible to have a try block inside another try block
- ○ C. It is possible to have a try block along with its catch clauses inside a catch clause
- ◉ D. To re-throw the exception object in a catch clause, simple put a throw statement without the name of the object.

Which of the following will output -3.0 (2分)

- ○ A. System.out.println(Math.floor(-3.7));
- ○ B. System.out.println(Math.round(-3.7));
- ◉ C. System.out.println(Math.ceil(-3.7));
- ○ D. System.out.println(Math.min(-3.7));

样题

What must be done when throwing an integer as an exception? (2分)

- (●) A. Integers cannot be thrown.
- ( ) B. Declare integers as Throwable.
- ( ) C. Import the exception class.
- ( ) D. Encapsulate the integer handler

What best describes the appearance of an application with the following code?

```
public class FlowAp extends Frame{
public static void main(String argv[]){
    FlowAp fa=new FlowAp();
    fa.setSize(400,300);
    fa.setVisible(true);

}

FlowAp(){
        add(new Button("One"));
        add(new Button("Two"));
        add(new Button("Three"));
        add(new Button("Four"));
    }
}
```

(2分)

- ( ) A. A Frame with buttons marked One to Four placed on each edge.
- ( ) B. A Frame with buttons marked One to four running from the top to bottom
- (●) C. A Frame with one large button marked Four in the Centre
- ( ) D. An Error at run time indicating you have not set a LayoutManager

样题

What will happen when you attempt to compile and run the following code?

```
public class Bground extends Thread{
        public static void main(String argv[]){
                Bground b = new Bground();
                b.run();
        }
        public void start(){
                for (int i = 0; i <10; i++){
                        System.out.println("Value of i = " + i);
                }
        }
}
```

(2分)

- ○ A. A compile time error indicating that no run method is defined for the Thread class
- ○ B. A run time error indicating that no run method is defined for the Thread class
- ○ C. Clean compile and at run time the values 0 to 9 are printed out
- ◉ D. Clean compile but no output at runtime

样题

Suppose there is no file Hello.txt in the current directory. Run the program: (2分)

```
import java.io.*;
public class ABC {
	public static void main(String argv[]) throws Exception {
		ABC m=new ABC();
		System.out.println(m.ff());
	}

	public int ff() {
		try {
			FileInputStream dis=new FileInputStream("Hello.txt");
		} catch (FileNotFoundException fne) {
			System.out.print("No such file found, ");
			throw fne;
		} finally {
			System.out.print("Doing finally, ");
		}
		return 0;
	}
}
```

- ○ A. No such file found,
- ○ B. No such file found ,0
- ◉ C. No such file found, Doing finally,
- ○ D. No such file found, Doing finally, 0

样题

About layout manager in AWT and Swing, which one below is correct? (2分)

- ○ A. `FlowLayout` is the default layout manager of `Frame`.
- ◉ B. `GridLayout` divides the whole space into even pieces.
- ○ C. It is not possible to specify coordinates of component regardless the effect of any layout managers.
- ○ D. Every place in a `BorderLayout` has to be fill with a component, or it will leave blank.

Which statement below is NOT correct? (2分)

- ○ A. A thread is an instance of Thread class.
- ○ B. A thread runs the run() method of the Runnable object.
- ◉ C. A new born thread can run immediately when start() is called.
- ○ D. Thread can access data of the Runnable object.

Given code below:

```
List<String> ls = new ArrayList<String>();
List<Object> lo = ls;
lo.add(new Object());
String s = ls.get(0);
```

Which statement below is correct? (2分)

- ◉ A. It does not compile
- ○ B. It compiles but exception raises at line 2
- ○ C. It compiles but exception raises at line 3
- ○ D. It compiles but exception raises at line 4

样题

程序输出题

请写出以下程序运行结果：

```
public class X {
    public static void main(String [] args) {
        try {
            badMethod();
            System.out.print("A");
        } catch (RuntimeException ex) {
            System.out.print("B");
        } catch (Exception ex1) {
            System.out.print("C");
        } finally {
            System.out.print("D");
        }
        System.out.print("E");
    }
    public static void badMethod() {
        throw new RuntimeException();
}}
```

BDE (2分)

请写出以下程序运行结果：

```
class Test {
    public static void main(String[] args) {
        Integer a = new Integer(3);
        Integer b = 3;
        int c = 3;
        System.out.println(a == b);
        System.out.println(a == c);
}}
```

false (2分)

true (2分)

请写出以下程序运行结果：

```
public class Test {
   public static void main(String[]args){
      House house1 = new Test().new House(1,100);
      House house2 = (House)house1.clone();
      System.out.println(house1==house2);
      System.out.println(house1.equals(house2));
      System.out.println(house1.whenBuilt==house2.whenBuilt);
      System.out.println(house1.whenBuilt.equals(house2.whenBuilt));
   }
   public class House implements Cloneable, Comparable<House> {
      private int id;
      private int area;
      private java.util.Date whenBuilt;
      public House(int id, int area) {
         this.id = id;
         this.area = area;
         whenBuilt = new java.util.Date();
      }
      @Override
      public Object clone() {
         try {
            House houseClone = (House)super.clone();
            houseClone.whenBuilt = (java.util.Date) (whenBuilt.clone());
            return houseClone;
         } catch (CloneNotSupportedException ex) {
            return null;
      }}
      @Override
      public int compareTo(House o) {
         if (area > o.area)
            return 1;
         else if (area < o.area)
            return -1;
         else
            return 0;
}}}
```

false (2分)

false (2分)

false (2分)

true (2分)

equals没有重写

样题

请写出以下程序运行结果：

```
enum EnumTry {
   MON, TUE, WED, THU, FRI;
   public static void main(String[] args)  {
      for (EnumTry e : EnumTry.values()) {
         System.out.println(
            e +":"+ e.toString() +":"+ e.ordinal() +":"+ e.name());
}}}
```

MON:MON:0:MON (2分)

TUE:TUE:1:TUE (2分)

WED:WED:2:WED (2分)

THU:THU:3:THU (2分)

FRI:FRI:4:FRI (2分)

样题

给出以下代码：

```
public class Test {
        public int t=4;
        public static void main(String[] args) {
                new Test().NumberPlay();
        }
        public void NumberPlay() {
                int t=2;
                t = t+5;
                this.t = this.t-2;
                t = t-this.t;
                System.out.println(t+this.t+"ok");
        }
}
```

程序运行后输出结果为：7ok (2分)

请写出以下程序运行结果：

```
class Main  {
        public static void main(String[] args) {
                String s1 = "Zhejiang University";
                String s2 = s1.substring(0, 7);
                s2.toUpperCase();
                System.out.println(s2+s1.substring(8));
        }
}
```

Zhejian University (2分)

样题

请写出以下程序运行结果：

```
public class Test {
        public static void main(String[] args) throws Exception{
            String str = "hello";
            Method m = str.getClass().getMethod("toUpperCase");
            System.out.println(m.invoke(str));
            System.out.println(str);
}}
```

HELLO (2分)

hello (2分)

```
public enum Main {
  PLUS   { int eval(int x, int y) { return x + y; } },
  MINUS  { int eval(int x, int y) { return x - y; } },
  TIMES  { int eval(int x, int y) { return x * y; } },
  DIVIDE { int eval(int x, int y) { return x / y; } };
  abstract int eval(int x, int y);
  public static void main(String args[]) {
                int x = 4;
        int y = 2;
        for (Main op : Main.values())
            System.out.printf("%d %s %d = %d%n", x, op, y, op.eval(x, y));
    }
}
```

程序运行结果为（一行一空）：

(2分)

(2分)

(2分)

(2分)

函数题

题目描述

有一连串任务，需要两个线程交替执行。线程1执行完任务1后，线程2才能执行任务2，接下来线程1执行任务1，如此交替执行下去。直到所有任务执行完毕。 (15分)

定义 `Repo` 类代表任务仓库，使用字符串代表任务。该类拥有：

构造函数:

```
/*将传递进来的字符串以空格分隔分解为多个不同的任务，并存储起来。如"1 2 3 4 5 6"被分解成6个任务1,2,3,4,5,6*/
public Repo(String items) {
}
```

方法:

```
int getSize();  //返回Repo包含的任务数量。注意：完成任务的时候，需要将任务删除。
//其他完成任务的方法
```

定义 `Worker1` 与 `Worker2` 类，代表两个交替完成任务的类，可以从Repo对象中获取任务。

###main函数如下：

```
public class Main {
    public static void main(String[] args) throws InterruptedException {
        Scanner sc = new Scanner(System.in);
        Repo repo = new Repo(sc.nextLine());
        Thread t1 = new Thread(new Worker1(repo));
        Thread t2 = new Thread(new Worker2(repo));
        t1.start();
        Thread.yield();
        t2.start();
        sc.close();
    }
}
```

输入样例

```
1 2 3 4 5 6 7 8 9
```

输出样例

```
Thread-0 finish 1
Thread-1 finish 2
Thread-0 finish 3
Thread-1 finish 4
Thread-0 finish 5
Thread-1 finish 6
Thread-0 finish 7
Thread-1 finish 8
Thread-0 finish 9
```

裁判测试程序：

```
/*Repo代码*/

/*Worker1代码*/

/*Worker2代码*/

/*系统已有代码，无需关注*/
```

函数题

题目描述

This program reads a line of logical expression with one logical operator and two boolean values, and evaluates the result. A logical expression is like: (5分)

```
true and false
```

The result of the expression above is: `false`.

The `Main` class and a skeleton of enum `LogicalOp` are provided.

函数接口定义：

```
enum LogicalOp {

    boolean test(boolean p1, boolean p2) {
        return false;
    };
}
```

Your `LogicalOp` should provide `and` and `or`.

裁判测试程序样例：

```
public class Main {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        boolean p1 = in.nextBoolean();
        String op = in.next();
        boolean p2 = in.nextBoolean();
        System.out.println(LogicalOp.valueOf(op).test(p1, p2));
        in.close();
    }
}
/* 请在这里填写答案 */
```

输入样例：

```
true and false
```

输出样例：

```
false
```

编程题

题目描述

定义 `IllegalScoreException` 异常类，代表分数相加后超出合理范围的异常。该异常是 `checked exception` ，即希望该异常一定要被捕获处理。

定义 `IllegalNameException` 异常类，代表名字设置不合理的异常。该异常是 `unchecked exception`

定义 `Student` 类。

属性:

```
private String name;
private int score;
```

方法:

```
toString          //自动生成
setter/getter     //自动生成
改造setName       //如果姓名首字母为数字则抛出IllegalNameException
public int addScore(int score)  //如果加分后分数<0 或>100，则抛出IllegalScoreException，加分不成功。
```

###main方法:

1. 输入 `new` 则新建学生对象。然后输入一行学生数据，格式为 `姓名 年龄` ，接着调用setName，addScore。否则跳出循环。
2. setName不成功则抛出异常，并打印异常信息，然后继续下一行的处理。
3. addScore不成功则抛出异常，并打印异常信息，然后继续下一行的处理。如果2、3都成功，则打印学生信息(`toString`)
4. 如果在解析学生数据行的时候发生其他异常，则打印异常信息，然后继续下一行的处理。
5. Scanner也是一种资源，希望程序中不管有没有抛出异常，都要关闭。关闭后，使用 `System.out.println("scanner closed")` 打印关闭信息

注意: 使用 `System.out.println(e);` 打印异常信息，e为所产生的异常。

输入样例:

```
new
zhang 10
new
wang 101
new
wang30
new
3a 100
new
wang 50
other
```

输出样例:

```
Student [name=zhang, score=10]
IllegalScoreException: score out of range, score=101
java.util.NoSuchElementException
IllegalNameException: the first char of name must not be digit, name=3a
Student [name=wang, score=50]
scanner closed
```