Memo

For Homework - 2

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Project Overview

Status: Complete

Difficult part: Deploy, since no previous knowledge

Work space tree:

```
tree haomin-shi-HW-2/
haomin-shi-HW-2/
├── Homework_2
│   ├── build
│   │   ├── classes
│   │   │   └── java
│   │   │       ├── main
│   │   │       │   ├── A.class
│   │   │       │   ├── B.class
│   │   │       │   ├── C.class
│   │   │       │   ├── D.class
│   │   │       │   ├── E.class
│   │   │       │   ├── F.class
│   │   │       │   ├── ImporvedStringTokenizer.class
│   │   │       │   └── ImprovedRandom.class
│   │   │       └── test
│   │   │           ├── ATest.class
│   │   │           ├── BTest.class
│   │   │           ├── CTest.class
│   │   │           ├── DTest.class
│   │   │           ├── ETest.class
│   │   │           ├── FTest.class
│   │   │           ├── ImporvedStringTokenizerTest.class
│   │   │           └── ImprovedRandomTest.class
│   │   ├── libs
│   │   │   └── Homework_2-1.0.jar
│   │   ├── reports
│   │   │   └── tests
│   │   │       └── test
│   │   │           ├── classes
│   │   │           │   ├── ATest.html
│   │   │           │   ├── BTest.html
│   │   │           │   ├── CTest.html
│   │   │           │   ├── DTest.html
│   │   │           │   ├── ETest.html
│   │   │           │   ├── FTest.html
│   │   │           │   ├── ImporvedStringTokenizerTest.html
│   │   │           │   └── ImprovedRandomTest.html
│   │   │           ├── css
│   │   │           │   ├── base-style.css
│   │   │           │   └── style.css
│   │   │           ├── index.html
│   │   │           ├── js
│   │   │           │   └── report.js
│   │   │           └── packages
│   │   │               └── default-package.html
│   │   ├── test-results
│   │   │   └── test
│   │   │       ├── TEST-ATest.xml
│   │   │       ├── TEST-BTest.xml
│   │   │       ├── TEST-CTest.xml
│   │   │       ├── TEST-DTest.xml
│   │   │       ├── TEST-ETest.xml
│   │   │       ├── TEST-FTest.xml
│   │   │       ├── TEST-ImporvedStringTokenizerTest.xml
│   │   │       ├── TEST-ImprovedRandomTest.xml
│   │   │       └── binary
│   │   │           ├── output.bin
│   │   │           ├── output.bin.idx
│   │   │           └── results.bin
│   │   └── tmp
│   │       ├── compileJava
│   │       ├── compileTestJava
│   │       └── jar
│   │           └── MANIFEST.MF
│   ├── build.gradle
│   ├── gradle
│   │   └── wrapper
│   │       ├── gradle-wrapper.jar
│   │       └── gradle-wrapper.properties
│   ├── gradlew
│   ├── gradlew.bat
│   ├── out
│   │   ├── production
│   │   │   ├── Homework_2
│   │   │   └── classes
│   │   │       ├── A.class
│   │   │       ├── B.class
│   │   │       ├── C.class
│   │   │       ├── D.class
│   │   │       ├── E.class
│   │   │       ├── F.class
│   │   │       ├── ImporvedStringTokenizer.class
│   │   │       └── ImprovedRandom.class
│   │   └── test
│   │       └── classes
│   │           ├── ATest.class
│   │           ├── BTest.class
│   │           ├── CTest.class
│   │           ├── DTest.class
│   │           ├── ETest.class
│   │           ├── FTest.class
│   │           ├── ImporvedStringTokenizerTest.class
│   │           └── ImprovedRandomTest.class
│   ├── settings.gradle
│   └── src
│       ├── main
│       │   ├── java
│       │   │   ├── A.java
│       │   │   ├── B.java
│       │   │   ├── C.java
│       │   │   ├── D.java
│       │   │   ├── E.java
│       │   │   ├── F.java
│       │   │   ├── ImporvedStringTokenizer.java
│       │   │   └── ImprovedRandom.java
│       │   └── resources
│       └── test
│           ├── java
│           │   ├── ATest.java
│           │   ├── BTest.java
│           │   ├── CTest.java
│           │   ├── DTest.java
│           │   ├── ETest.java
│           │   ├── FTest.java
│           │   ├── ImporvedStringTokenizerTest.java
│           │   └── ImprovedRandomTest.java
│           └── resources
├── Memo.pdf
└── README.txt
```

```
36 directories, 82 files
```

Problem 1:

> **Packets** are sent from one **location** to another. Packets have a certain **weight**. Locations are characterized by their **transportation facilities**, e.g. **railway stations, airports and highway connections**. Some locations are **neighbored**, i.e. there exists **a direct transportation route** between these locations. The transportation route between the locations has a **certain length**, i.e. the **distance** between the locations. **Planes, trains, and trucks are used for transportation**; each plane / train / truck may load **a maximum packet weight**. ***For each packet we want to know where it is, i.e. at which location or transport (plane, train, truck).***

Imagine this:

We have a class `Packet` that has `Route`, and in `Route` we have:

> `startLocation:Location`, `endLocation:Location`, `length`, and `Vehicle`

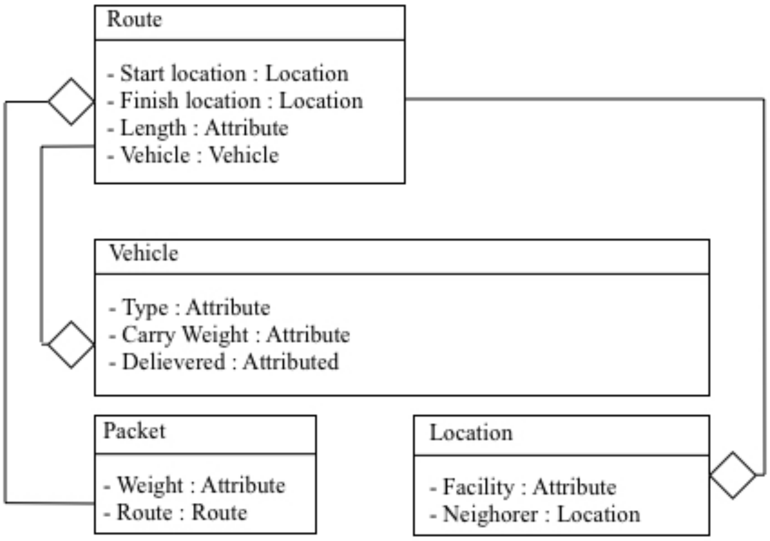
In `Vehicle` we have:

> `type`, `carryWeight`, and `Delievered:boolean`

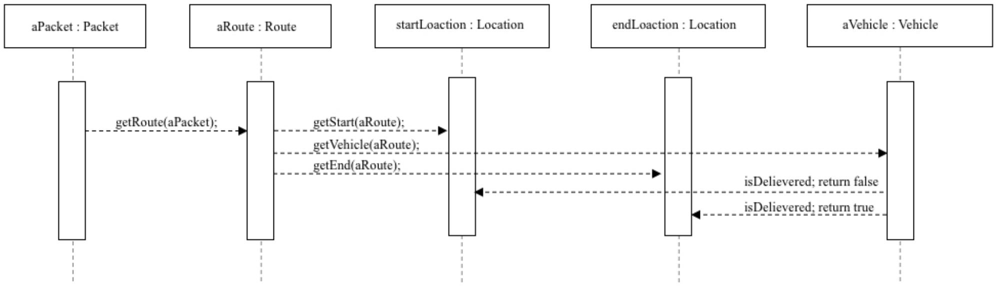
Now, based on the questionL Suppose we want to know __ where a package is currently at, and at what location by what transport?__ all we need is to do this:

```
aPacket.getRoute().getVehicle; //Return Type of Vehicle
if (aPacket.getRoute().getVehicle.isDelievered(); // Return Packet at End Location
if (!aPacket.getRoute().getVehicle.isDelievered()); // Return Packet at Start Location
```

- Class Diagram

  - 

- Sequence diagram

  - 

Problem 2:

The solution of this problem is provided in the `src`

Problem 3:

Integer is part of the Java API. Suppose you attempt to extend the Integer class and add a new method that returns the integer as a String that is written in hexadecimal.

1. The reason why we cannot extend the Integer class is that the class itself is defined as final, that is = you cannot inherit the class.

2. Some people argue that this is to prevent an "Inheritance Chain of Doom". However, In Java, we cannot do multi-inheritance. Thus, this is not a good reason to NOT allow inheritance. Meanwhile, to declare a class final, we basically gave up **1** big chunk of **OOP** that is **Polymophism**. We can argue that the reason people do this to have better **Encapsolation**, but I don't think this reason is sufficient enough. However, here are some of the more interesting reasons why we want to `final` our class:
    - Encouraging composition
    - Public API protection
        - Avoid change in API causing Client Code to break
    - Encapsulation
3. It is possible for us to create a **wrapper** class that takes care of the integer. Say, for example, we want to include the **square root of itself** to Integer. What we can do is to create a class called `IntegerWrapper` and in the constructor of that class, we can create a `Integer` by user's argument. Then we can implement `squareRoot` in this `IntegerWrapper` class that uses the `Integer` obj that we create in the constructor.

Problem 4:

The solution of this problem is provided in the `src`

Problem 5:

The solution of this problem is provided in the `src`

Appendix

1. **Complexity: By methods**

A.A(B)	**1.0**	**1.0**	**1.0**
A.getInfoAboutClass()	1.0	1.0	1.0
A.returnBinfo()	1.0	1.0	1.0
B.B()	1.0	1.0	1.0
B.getEditable()	1.0	1.0	1.0
B.getInfoAboutClass()	1.0	1.0	1.0
B.setEditable(String)	1.0	1.0	1.0
C.C(B,D)	1.0	1.0	1.0
C.getInfoAboutClass()	1.0	1.0	1.0
C.returnDinfo()	1.0	1.0	1.0
D.D()	1.0	1.0	1.0
D.getEditable()	1.0	1.0	1.0
D.getInfoAboutClass()	1.0	1.0	1.0
D.instanceCounter()	1.0	2.0	2.0
D.setEditable(String)	1.0	1.0	1.0
E.E(B,D)	1.0	1.0	1.0
E.getInfoAboutClass()	1.0	1.0	1.0
E.returnBinfo()	1.0	1.0	1.0
E.returnDinfo()	1.0	1.0	1.0
F.F(D)	1.0	1.0	1.0
F.getInfoAboutClass()	1.0	1.0	1.0
F.instanceCounter()	1.0	2.0	2.0
ImporvedStringTokenizer.ImporvedStringTokenizer(String)	1.0	1.0	1.0
ImporvedStringTokenizer.ImporvedStringTokenizer(String,String)	1.0	1.0	1.0
ImporvedStringTokenizer.ImporvedStringTokenizer(String,String,boolean)	1.0	1.0	1.0
ImporvedStringTokenizer.toArray()	1.0	1.0	1.0
ImprovedRandom.ImprovedRandom()	1.0	1.0	1.0
ImprovedRandom.ImprovedRandom(long)	1.0	1.0	1.0
ImprovedRandom.randIntInRange(int,int)	1.0	2.0	2.0
Total	29.0	32.0	32.0
Average	1.0	1.103448275862069	1.103448275862069

2. **Lines of Code:**

Total:	**423**	**314**	**0.7423167848699763**	**24**	**0.05673758865248227**	**85**	**0.20094562647754138**
	Lines	Source Code	Source / Total	Comment	Comment / Total	Blank	Blank / Total

3. **Unit Test Coverage:**

A	100% (1/1)	100% (3/3)	100% (6/6)
B	100% (1/1)	100% (4/4)	100% (7/7)
C	100% (1/1)	100% (3/3)	100% (7/7)
D	100% (1/1)	100% (5/5)	100% (16/16)
E	100% (1/1)	100% (4/4)	100% (7/7)
F	100% (1/1)	100% (3/3)	100% (10/10)
ImporvedStringTokenizer	100% (1/1)	50% (2/4)	40% (4/10)
ImprovedRandom	100% (1/1)	100% (3/3)	100% (7/7)