14-15

A:

a)What are abstract classes and what is their use in software development?

Abstract classes may or may not contain abstract methods ie., methods with out body ( public void get(); )can define,and may partially implement,common behavior; Abstract class and inheritance collectively ensures that most of the code are written using abstract and higher level classes, so that it can leverage Inheritance and Polymorphism to support future changes.

B)What is the meaning of the specifier final which appears in the heading of the method fin()? A novice programmer asks you the question “does Java allow abstract final methods?”. Explain, with reasons, your reply.

Final method cannot be overridden by subclass. No, we can not declare abstract method as final. We have to proved implementation to abstract methods in subclasses.

C)Explain the purpose of the call to super() in the first line of the constructor Sub(). Is the order of the statements in the Sub() constructor important?

The parent class' constructor needs to be called before the subclass' constructor. This will ensure that if you call any methods on the parent class in your constructor, the parent class has already been set up correctly.It’s important to make sure call super() at first line in subclass constructor so that fields in superclass can be found,otherwise you can not pass compilation.

D)Explain with reasons the effect of the following statement Root root = new Root();

Explicitly Create a object,name “root”, belong to type Root and refer to new Root instance.

E, “Root Con. called”, “Sub Con. called”, “Root Con. called”, “Sub Con. called”

“Sub.f() called”,“Root.fin() called”,“Sub.g() called”,“different”

1. Explain why the code fragment in e) will compile despite the fact that neither the Root nor Sub classes contain an explicit equals method. What changes would you need to make to the class Sub so that instances were compared by value?

They all inherit Object class which has equal method,so they call “equal” directly. 在sub里加value属性，构造函数里加参数Rewrite the equal method with “override” ----方法体随意，比较value

A2:

1. Describe the meaning of the term package scope for a class and for a method.

A package is a namespace within which to organize related classes.

For class:1) public:accessible from anywhere, 2)protected: only class in the package where the member is declared 3)private:only inside the class 4)no modifier: either package-private

For method:1)public:from anywhere 2)private:only inside the class

1. What is an immutable class? Give two advantages of immutable classes

Its instances cannot be modified,no mutator method in it,forbid method override,all field private and final. Good:1)safe,simple,make good building blocking. 2 an immutable is only ever in exactly one state 3 thread safe

1. I:Explain the meaning of the final qualifier in the class declaration and in the declaration of the member fields of the Journal class.

Once a final variable has been assigned, it always contains the same value. A final class cannot be subclassed. Doing this can confer security and efficiency benefits, so many of the Java standard library classes are final

Ii:Explain why instances of both Article and Journal are mutable.

In Article,it provide mutator to set text and author;In Journal’s constructor,after give reference to a new treeset,assign the value with contents,means assign for many times。

Iii Re-write the Journal class to make it immutable (without modifying the Article class).

先将content转成treeset再复制给edition就好

Iii: Briefly describe the changes necessary to make Article immutable. If these changes were made, would it still be necessary to re-write the Journal class as you did in iii) above? Briefly explain your answer.

删掉set方法就好; still necessary,because immutable means......but the original version of Journal do the assignment to edition many times

A3:

1. Describe and illustrate with a diagram the structure of a hash set and a tree set.

P43,+

HashSet is Implemented using a hash table. Elements are not ordered. The add, remove, and contains methods have constant time complexity O(1).

TreeSet is implemented using a tree structure(red-black tree in algorithm book). The elements in a set are sorted, but the add, remove, and contains methods has time complexity of O(log (n)). It offers several methods to deal with the ordered set like first(), last(), headSet(), tailSet(), etc.

1. It is possible to use hashing or trees to implement a Map interface. Preferably using the Big ‘O’ notation, compare and contrast the performance of the two data structures for the following operations:

i) get or set a value at a given key in the map,

ii) insert or remove a key at an arbitrary position in the map.

Explain the conditions under which worst-case performance will arise for the hashing and tree implementations.