

CS 2510 Exam 4 – Summer 2012

Name: _____

Student Id (last 4 digits): _____

- Write down the answers in the space provided.
- You may use all syntax of Java that we have studied in class.
- For tests you only need to provide the expression that computes the actual value, connecting it with an arrow to the expected value. For example `s.method()` -> `true` is sufficient.
- Remember that the phrase “design a class” or “design a method” means more than just providing a definition. It means to design them according to the **design recipe**. You are *not* required to provide a method template unless the problem specifically asks for one. However, be prepared to struggle if you choose to skip the template step.

Score		45
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Good luck!

Problem 1

An association list is a way of representing an association between values. For example, you might use an association list to associate students with their grades, or battleships with their position, or bank account numbers with their account balances.

The representation of an association list is much like a typical list, except that every “cons” has *two* elements and the rest of the list. One element is a “key”, the other is its association.

Here is a data definition for association lists parameterized over the types of keys and their values:

```
interface Assoc<K,V> {}

class EmptyAssoc<K,V> implements Assoc<K,V> {}

class ConsAssoc<K,V> implements Assoc<K,V> {
    K key;
    V val;
    Assoc<K,V> rest;
    ConsAssoc(K key, V val, Assoc<K,V> rest) {
        this.key = key;
        this.val = val;
        this.rest = rest;
    }
}
```

- A. Develop the visitor pattern for association lists.
- B. Design an implementation of an association list visitor that looks up the (first) value associated to a given key. If the key is not in the list, the visitor should throw an exception.
- C. Using the double dispatch approach, design a **same** method that determines if this association list is structurally equal to a given association list.

