

CS 100J Prelim 2 Answers

Question 0: (omitted)

Question 1:

- (a) an assertion that remains invariantly true before and after each iteration of the loop.
- (b)  $x = x + (k + 1) + (k + 2)$ ;
- (c) `x instanceof Car`

Question 2:

```
public class MySum{
    /** = sum of Integers in v */
    public static int sumInteger(Vector v) {
        int index= 0;
        int sum= 0;
        //inv: sum = sum of Integers in
        //v[0.. index-1]
        while (index < v.size()) {
            if (v.get(index) instanceof Integer) {
                sum= sum +
                    ((Integer)v.get(index)).intValue();
            }
            index= index + 1;
        }

        return sum;
    }
}
```

Question 3:

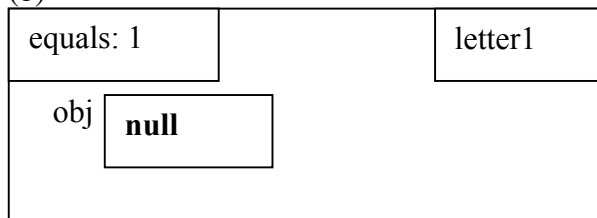
(a) apparent type: the type with which the variable was declared.  
 real type: the type of the object whose name is currently in the variable.

- (b) (1) **true**
- (2) 100
- (3) BAD. A letter object cannot be assigned to an Email variable.
- (4) 49
- (5) BAD. The apparent type of f is Document, but letterType() is not in class Document.

Question 4: (a)

```
/** = "obj is a non-null Letter with the same
values in its fields as this Letter */
public boolean equals(Object obj) {
    return obj != null &&
        obj instanceof Letter &&
        addressee == ((Letter)obj).addressee &&
        getNumPages() ==
            ((Letter)obj).getNumPages() &&
        getTitle() == ((Letter)obj).getTitle();
}
```

(b)



Question 5:

```
/** = "a String formed by the first character
of each word in title".
Precondition: title != null */
public String getTitleAcronym() {
    //precondition: title != null
    String s= "";
    int k= 0;
    // inv: s contains the first char of every
    // word in title[0..k-1]
    while ( k != title.length()) {
        if (k==0 || title.charAt(k-1)==' ')
            s= s + title.charAt(k);
        k= k + 1;
    }
    //postcondition: s contains the first char
    //of every word in title[0..title.length()-1]
    return s;
}
```