

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) $x = x + k + (k + 1)$;
 (c) `b instanceof Employee`

Question 2:

```
public class MyCount {
    /** = no of elements of v that are Integers
        with value 0 */
    public static int howMany(Vector v) {
        int c = 0;
        // inv: c = no. of elements of v[0..i-1]
        //      that are Integers with value 0
        for (int i = 0; i != v.size(); i = i+1) {
            if (v.get(i) instanceof Integer &&
                ((Integer)v.get(i)).intValue() == 0) {
                c = c+1;
            }
        }
        return c;
    }
}
```

Question 3:

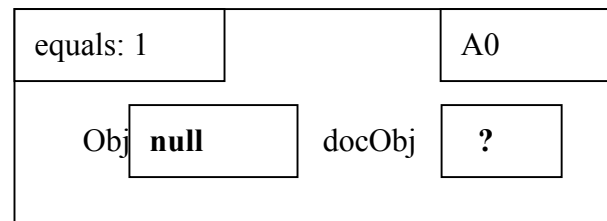
- (a) apparent type: the type with which the variable was declared. real type: the type of the object whose name is currently in the variable.
 (b) (1) **true**
 (2) 197
 (3) BAD. Can't cast a Documentary to a Short.
 (4) 239
 (5) BAD. The apparent type of f is Movie, but `documentaryType()` is not defined in class Movie.

Question 4: (a)

```
/** obj is a non-null Documentary with same
    values in its fields as this Documentary */
public boolean equals(Object obj) {
    if (obj == null ||
        !(obj instanceof Documentary))
        return false;
    Documentary docObj = (Documentary)obj;
    return
        getTitle().equals(docObj.getTitle()) &&
        getLength() == docObj.getLength() &&
        topic.equals(docObj.topic);
}
```

(b) d1

A0



Question 5:

```
/** = title but with vowels removed (except
    at beginning of a word) */
public String shortTitle() {
    String s = "";    int k = 0;
    // inv: s contains title[0,..k-1] but with vowels
    //      removed (except at word begins)
    while (k != title.length()) {
        if (title.charAt(k) != 'a' &&
            title.charAt(k) != 'e' &&
            title.charAt(k) != 'i' &&
            title.charAt(k) != 'o' &&
            title.charAt(k) != 'u')
            s = s + title.charAt(k);
        else if (k == 0 || title.charAt(k-1) == ' ')
            s = s + title.charAt(k);
        k = k+1;
    }
    return s;
}
```