CS 4501/6501: Quiz 2

5-Sep-2017

Names:

Instruction: Answer the questions as concisely as you can. Please write neatly; if I can't read it I have to mark it wrong.

```
   /* countEmpty - count number of empty Strings
    * @param  strings - list of strings to search
    * @return number of empty strings in parameter
    * @throws NullPointerException if strings is null
    *         (No exception if strings contains null elements)
    * @throws ClassCastException if strings contains non-strings
    */
   public static int countEmpty (List<String> strings)
   {
      int count = 0;
      for (String s : strings)
      {
         if (s.equals("")) { count++; }
      }
      return count;
   }
// The fault is an inappropriate NPE.   The "if" test should be:
//         if ("".equals(s)) { count++; }
// Note that a correctly written equals() method will never throw an exception.
```

1. If possible, identify a test case that does not result in the fault being reached. If not possible, explain why not.

   Answer: An input with `strings` equal to null, or empty, or an initial element that results in class cast exception. Any of these answers is satisfactory for credit.

   ```
   Input: strings = null
   Expected Output: NullPointerException
   Actual Output: NullPointerException

   Input: strings = []
   Expected Output: 0
   Actual Output: 0

   Input: strings = [1, "cat"]
   Expected Output: ClassCastException
   Actual Output: ClassCastException
   ```

2. If possible, identify a test case that reaches the fault, but does not result in an error. If not possible, explain why not.

   Answer: Any list of Strings without a null works fine.

   ```
   Input: strings = ["" , "Hello", "Yawn"]
   Expected Output: 1
   Actual Output: 1
   ```

3. If possible, identify a test case that results in an error, but does not result in a failure. If not possible, explain why not.

   Answer: For this particular program, every input that results in error also results in failure. The reason is that error state (an exception is raised) is simply reflected back to the client as a failure. Notice that the contract does not allow for NPE except for the entire parameter being null.

4. Identify the first error state in the following test case. For full credit you must identify **all** relevant variables.

```
Input: strings = ["Hello", "", null, "cat"]
Expected Output: 1
Actual Output: NullPointerException
```

Answer:

```
strings         = ["Hello", "", null, "cat"]
count           = 1;
s               = null;
program counter = the next instruction is returning from the method with an
                  exceptional return.  (Should be at the next iteration of the loop)
```