Software Testing, Quality Assurance & Maintenance (ECE453/CS447/CS647/SE465): Midterm Practice Questions

Here are a couple of midterm practice questions. These questions may be slightly ambiguous; I've taken more care in drafting the actual midterm questions.

Question

Consider a coverage criterion that is just like all-uses, but instead includes only the last two defs in a basic block. Does this criterion subsume all-uses? Does all-uses subsume this criterion?

Question

True or false:

1. A coupling-du-path contains exactly one use of the coupling variable. (false, you can contain more than one use before going through the call.)
2. Concatenating prime paths also gives a prime path.
3. You can only satisfy prime path coverage with test paths that are also prime.
4. Some structural graph coverage criteria subsume some dataflow criteria.
5. To get all-defs coverage, it is sufficient to cover the implicit def at program start for a static field.

Question

Create a finite state machine based on some Internet protocol. (First, identify the abstract states in this state machine; next, identify the transitions between the states.)

Related Question

Create a finite-state machine based on the following interface:

```
/* null-terminated */
class Node {
   Node next;
   Object data;
}

class ListIterator {
   Node current;

   public void init(Node first) { current = first; }
   public Object next() {
      Object rv = current.data;
      if (current.next == null)
         throw new RuntimeException("no more elements");
      current = current.next;
      return rv;
   }
   public boolean hasNext() {
      return current.next == null;
   }
}
```

You'll have to decide how to abstract the state of the `ListIterator`.

Question

Practice creating a control-flow graph and finding test sets that meet various criteria. Consider the interaction of the graph with the test requirements imposed by various criteria on that graph; that is, how does your choice of

graph affect the test requirements imposed e.g. by SRTC or AUC? On which graphs do different criteria impose the same requirements?

Question

Demonstrate a case where complete path coverage does not find a fault. (Yes, you have to produce code for this practice question; as I promised, you don't have to produce code on the midterm. If you did, though, I wouldn't take off marks for syntactically incorrect code, only semantic errors.)