

Statistical Debugging

Question 1. Post-deployment software monitoring is an increasingly popular method that complements in-house (pre-deployment) software testing in order to improve software quality. State one advantage of post-deployment monitoring over in-house testing, and state one advantage of in-house testing over post-deployment monitoring.

Question 2. When prioritizing which predicates to examine in a multi-bug scenario, what is the problem with ranking predicates by their Increase score? Describe a ranking strategy that can be used to help mitigate this problem.

Question 3. Consider the following code fragment:

```
w = 2          /* The code fragment is run 500 times. */
if (x > 0)
    {y = foo(x)} /* 300 runs reach this line, and 60 fail on this line. */
else
    {y = bar(x)} /* 200 runs reach this line, and 120 fail on this line. */
z = 10         /* All 320 runs reaching this line succeed. */
```

Let P be the branch condition predicate $(x > 0)$.

a. What is $\text{Increase}(P)$?

b. What is $\text{Increase}(\neg P)$?