



CS253A Assignment 3

Submitted on 18/2/2021 16:23

Instructions

- You are given an extra 10 minutes after due time to submit your assignment.
- However, please note that any submissions made after the due time are marked as late submissions.

CS253A Assignment 3

Question:

CS253 Assignment-3: Test-suite Reduction

Objective

Given a program, your first task is to create a test-suite by randomly generating n test-cases. Now given this test-suite, you are supposed to construct a reduced test-suite by selecting a subset of k test cases such that the branch-coverage of the program in the reduced test-suite stays as close as possible to the original test-suite. Hence, the goal is to reduce the cost of testing (size of a test-suite) while maintaining the quality (branch coverage). The steps you have to implement are as follows:

(1) Write a script named *generate* that takes as input a program P , a size n and generates a test-suite T containing n randomly generated test cases on this program.

(2) Write a script named *reduce* that takes as input P , T from step-1 and an integer k . The script should then select a subset of test cases S , such that $S \subseteq T$, $|S| \leq k$ and $\text{BranchCoverage}(S)$ is close to $\text{BranchCoverage}(T)$.

(3) Write a sample program. Try out your scripts on this sample program.

(4) Write a report on how you came up with the solution to this assignment. Please explain what was your objective in each step and how you solved it clearly.

Deliverables

A script named *generate*.

A script named *reduce*.

A directory named *test* containing a sample program P that you wrote yourself to experiment with the scripts mentioned above, a file named T containing the randomly generated test cases on P and another file named S containing the reduced test-suite.

A report file containing detailed explanation of the solution.

Some important comments

Experiment with the sample program P and the parameters n and k to come up with a good example.

You are free to use any language to accomplish the given objectives.

Plagiarism will result in severe penalties.

Uploaded Files:

