CS 474 Software Testing Techniques

Assignment#: 1 (Due Date: March 20, 2024)

Test verdict assignment in software testing is done by an ***oracle***. This oracle can either be a manual mechanism or automated. As part of this assignment, you will construct small programs of your own that will automate / semi automate the oracle either in Java / Python or C++.

Program 1)
In this program you will input a sequence of numbers preceded by a request character 'A' or 'D' to a sort routine. Depending upon the request characters 'A' or 'D' the program will sort the sequence into ascending or descending order. The input sequences can be stored in a file each on a different line. The sort routine should be able to read the sequence from this file and outputs the sorted sequence to the console/file. You can have another file which has the expected output for each of your input sequences. For each test sequence your oracle should be able to compare the observed output from console/file with the expected output (from file) and give a verdict as pass / fail which you can write in another file which we call the ***test log file***. This file will show the test case number, expected output, observed output and the verdict. Your test case data should be typically able to test with an empty sequence or with a wrong request character such as 'R' or 'F' instead of 'A' and 'D'.

Program 2)
Oracle automation can be simplified if you can express your programs as mathematical functions. For the second program you will input a square matrix **A** to your program. A square matrix has same number of rows and columns (i.e n × n). The program itself will invert the matrix and give the output $\mathbf{A^{-1}}$. The automated oracle in this case is required to check the condition $\mathbf{A \times A^{-1} = I}$. The identity matrix **I** which again will be an n × n matrix will be available to the oracle. You will just take the product of the input and output matrices of your program and compare with the corresponding identity matrix and give the verdict as pass / fail.

To begin with you can start with a 2 × 2 matrix**.**

Program 3) Develop a small program for a video renting system in with a database at the backend. Test the insertion and searching of records in this program by the approach discussed in the class.

Any ambiguities encountered in the above questions can be clarified with the course instructor.

The assignment will be graded on the basis of 5-7 viva/demo in which you will demonstrate your solution. All assignments should be emailed to me before the class starts on **Wednesday, March 20, 2024 by 0900 hrs**.

Good Luck