San Jose State University - Computer Engineering Department

Course Name: CMPE287 – Software Quality Testing

Homework #2
Semester: Fall, 2019
Instructor: Jerry Gao, Ph.D.
Posted date: 8/22/2019 Due date: 10/17/2019

Question #1: Branch Software Testing (25%)

Based on the given Java program below, please complete the following questions:

a) Generate a program flow graph based on the source code of MergeSort() function. (10%)
b) Generate a branch table for branch testing. (5%)
c) Use the branch testing method to generate test cases for all predicate nodes of MergeSort( ) function. (10%)

Please find MergeSort function (such as Merge()), Java Code and algorithm below.

https://stackabuse.com/sorting-algorithmse-in-java/#mergesort

Question #2: Basis Path Testing (25%)

Cyclomatic complexity and basis-path testing:

a) Based on your generated program flow graph of Merge() Function (given below), please use three different ways to compute its Cyclomatic number.(5%)
b) Generate a graph matrix based on the given program flow graph of Merge() function, and compute the Cyclomatic metric. (5%)
c) Identify a basis path set (which consists of a number of basis paths) for Merge() function. (8%)
d) List the basis set of test cases (including test inputs and outputs for each test case) (7%)

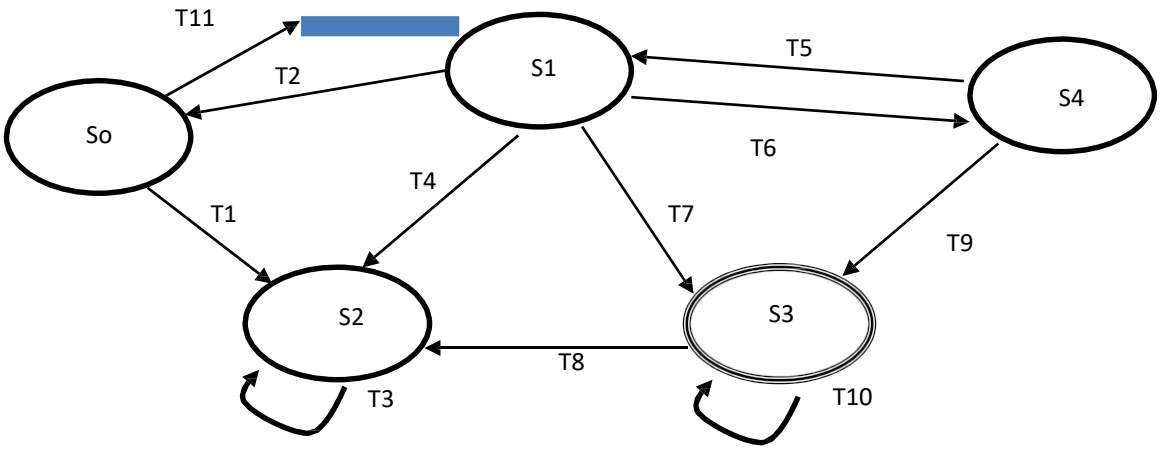

Figure 1 State Diagram

Question #3: State-Based Software Testing (30%)

Based on Figure 1, please work on the following questions: (Note: S0 is the starting state)

a) Define two state-based test criteria in details: (5%)
   - all-state test coverage criteria, and
   - all-transition test coverage criteria.

b) Generate a state-based tree based on Figure 1. (10%)

c) Identify and list all state paths (without redundant paths) from S0 to S3. (10%)

d) Use a tree-based approach to identify and list a state test set which achieves all-transition- node coverage in Figure 1. (5%)

Question #4: Big Data Quality Validation Tools (20%)

Please search the web to identify and discover your answer to the following questions.

A. List and capture 5 research papers relating unstructured data validation, and

   list them in IEEE Reference Paper Format. (5%)

B. List and explain top 5 big data quality tools for unstructured data with detailed tool information (5%)

C. Compare them and present the following table. (10%)

Tool name URL	Maker	Major Features	Technology	Focus Area	Platform	Limitations
		Feature #1 Feature #2 ….				