# Course Name: CMPE287 - Software Quality Testing

Instructor: Dr. Jerry Gao
Homework #3:
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Semester: Fall, 2019
Posted date: 8/22/2019                                    Due date: 11/28/2019

## Question #1: Software Integration Testing (30%)

1.  (20%) Questions about software integration based on a program structure shown in Figure 1:
    a)  Explain the idea of the top-down integration approach. (5%)
    b)  List an integration sequence using the top-down approach and its required test stubs (or drivers). (5%)
    c)  List the required total number of test stubs. (5%)
    d)  Explain the idea of the bottom-up integration approach. (5%)
    e)  List an integration sequence using the bottom-up approach and its required test drivers. (5%)
    f)  List the required total number of test drivers. (5%)

Hints: Please writes your integration sequence as follows:
a)  Integrated system (IS) = module A and module B (required test stubs for C,D and E)
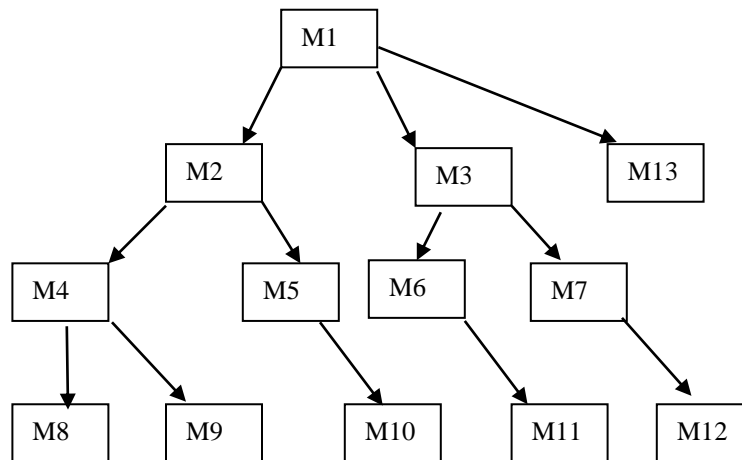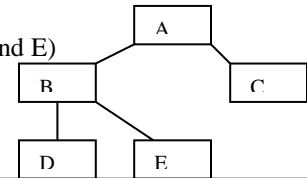b)  Integrated system (IS) = IS and module D
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**Figure 1.**

## Question #2: Questions about Software Regression Testing (35%)

(30%) Figure 2 shows the class relation structure among the classes of a program written in C++. "I" indicates an Inheritance relation between two classes. "AG" represents an aggregation relation between two class objects, "AS" indicates an association relation between two classes. Assume Class 7 is changed. Please follow the class firewall's concept to identify a minimum firewall to enclose all affected classes and re-integration links after changing Class 7. (Note: pleased Please present this class firewall by answering the following questions:

a) (10%) What is the class test order based on the class diagram in Figure 2.
b) (10%) Please show the class firewall of changing class 6
c) (5%) What are the possible affected classes by changing class 6?
d) (10%) What are the re-integration links inside the class firewall?

You may need to read the published papers below:

**Paper 1: Class Firewall, Test Order, and Regression Testing of Object-Oriented Programs, Journal of Object-Oriented Programming, 1993**.
by David C. Kung, Jerry Gao , Pei Hsia , Jeremy Lin , Yasufumi Toyoshima

URL: http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.53.6284

**Paper 2: A Test Strategy for Object-Oriented Programs**
By D. Kung ; J. Gao ; Pei Hsia ; Y. Toyoshima ; C. Chen,
Proceedings., Nineteenth Annual International conference on Computer Software and Applications, 1995. (COMPSAC 95)

URL: http://ieeexplore.ieee.org/abstract/document/524786/

**Paper 3: Change Impact Identification in Object-Oriented Software Maintenance**
By D. Kung, J. Gao, P. Hsia, F. Wen, Y. Toyoshima, Ray Chen
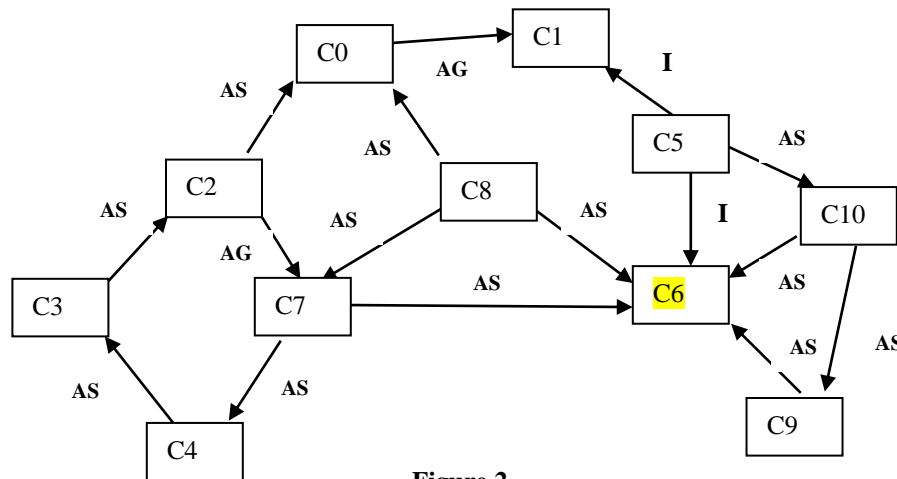URL: http://ieeexplore.ieee.org/abstract/document/336774/



**Figure 2.**

## Question #3: Testing a selected AI Mobile App (35%)

You need to present one AI-powered function from your selected intelligent mobile app work on AI testing by answering the following questions:

a) Present your AI-powered function requirements analysis using a tree model. (5%)
      A. Please consider yourself as a requirements analyzer for an intelligent mobile  app to identify, classify, and list the required functional features and sub-features.

b) Conduct AI test modeling in the following steps:
   a. Identify and present classified contexts of your selected AI-powered function in a classified context tree model. (5%)
   b. Identify and present classified inputs for your selected AI-powered function in a classified input model (5%)
   c. Identify and present 5 classified sample spanning trees for your context classification tree model using a decision table. (5%)
   d. Identify and present 5 classified sample spanning trees for your input classification tree model using a decision table. (5%)
   e. Identify and present a classified output tree using a tree model.
c) Using a 3-D classification decision table to show the outputs and actions/events for the mapping between the two group of spanning trees. (10%)

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