THE UNIVERSITY OF THE WEST INDIES

Semester I ☒   Semester II ☐   Supplemental/Summer School ☐

Examinations of December ☒/ April/May ☐ /July ☐ 2013

Originating Campus: Cave Hill ☐   Mona ☒   St. Augustine ☐   Open ☐

Mode: On Campus ☒   By Distance ☐

Course Code and Title: **COMP2140 SOFTWARE ENGINEERING**

Date: **December 11, 2013**   Time: **1 – 3 PM**

Duration: **2 Hours.**   Paper No: **1**

Materials required:

Answer booklet: Normal ☒   Special ☐   Not required ☐

Calculator: Programmable ☐   Non Programmable ☐
(where applicable)

Multiple Choice answer sheets: numerical ☐   alphabetical ☐   1-20 ☐   1-100 ☐

Auxiliary/Other material(s) – Please specify:

Candidates are permitted to bring the following items to their desks:

Instructions to Candidates: This paper has 5 pages, 4 questions

DO QUESTION 1 AND ANY TWO OTHER QUESTIONS

Candidates are reminded that the examiners shall take into account the proper use of the English Language in determining the mark for each response.

SEMESTER 1 2013/2014

The University of the West Indies   Course Code   COMP2140   20..../..../...

Question 1 [24 marks]

a) Name any two principles of the ACM/IEEE Code of Ethics and give a brief explanation of each principle you have named. [2]

b) Give a brief description of any two phases of the Waterfall Model. Your description should include a short account of the activities that are carried out, and the documentation that is produced in each phase. [2]

c) Appendix A contains a partial description of a software system that manages software component certificates. Included there are: a brief overview of the problem; a Use Case Diagram, and a Sequence Diagram for the Logon Use Case in the Use Case diagram.

    i. Identify two errors in the Use Case diagram. [2]

    ii. Which users participate in the "Submit Specification" use case? [2]

    iii. Using class names only (no attributes or operations), sketch a UML Class diagram representing the major entities in the problem. Your diagram should show inheritance and aggregation relationships where these exist. Also, associations must show multiplicity (cardinality) [4]

d) Refer to Figure 2 of Appendix A where a sequence diagram for the Logon use case is given.

    i. Explain briefly how the software will behave if the user inputs an invalid password. Your explanation should include a description of the sequence of events that occur and any output that is displayed. [2]

    ii. Describe briefly how the algorithm that is depicted by the sequence diagram can be modified to ensure that a user is limited to 3 invalid logon attempts. [2]

e) Explain the difference between Release Testing and User Acceptance Testing in terms of the personnel who are involved, and the objective of each type of testing. [2]

f) With respect to Software Configuration Management explain what is meant by the terms branching and merging. [2]

g) Name two factors other than those related to a software process that must be carefully managed in a software project. [2]

h) Give two reasons to support the statement: "*Software change is inevitable*". [2]

*** **End of Question 1** ***

Question 2 [8 marks]

a) Give two examples of non-functional requirements that might be stated for software and suggest a metric by which each requirement might be stated.   [2]

b) Describe two features of Agile Processes that distinguish them from plan driven software processes.   [2]

c) Explain briefly the difference between *"scaling up"* and *"scaling out"* in the context of software processes and discuss which of plan driven, or agile processes is better suited to scaling out giving reasons to support your opinion.   [4]

Question 3 [8 marks]

a) Explain what is meant by a domain requirement and describe how domain requirements are included in system requirements.   [2]

b) Chose any of the architectural patterns that were discussed in this course and:

   i.   Draw a diagram depicting the organization of the architecture.   [2]

   ii. Discuss how the architecture you have described can impact on each of system performance and reliability giving reasons for your opinions.   [4]

Question 4 [8 marks]

a) Explain briefly what is meant by system re-engineering and say why this might become necessary in the life of software.   [2]

b) With reference to Software Configuration Management explain the difference between a version number and a release number.   [2]

c) Some software developers test software by issuing it to users who report errors which are then fixed by the developer.

   i.   State the name given to this type of software testing and suggest one type of software for which its use can be considered appropriate with a reason for your opinion?   [2]

   ii. Identify one ethical principle that is violated if this practice is carried out in the development of software that controls an automated insulin pump.   [2]

*** END OF PAPER ***

APPENDIX A: SUPPORTING MATERIAL

Problem Overview

The Use Case Model of the MORRESA Component Certification System is depicted (see Figure 1) below. The system is used to manage certificates for reusable software components. A certificate can be either a process certificate or a product certificate. Every certificate has a number and a certification date. A process certificate has a list of inspections while a product certificate has a list of tests. Due to the nature of certification it is possible to have a process certificate which does not have any associated tests. A product certificate, on the other hand must have at least one test.
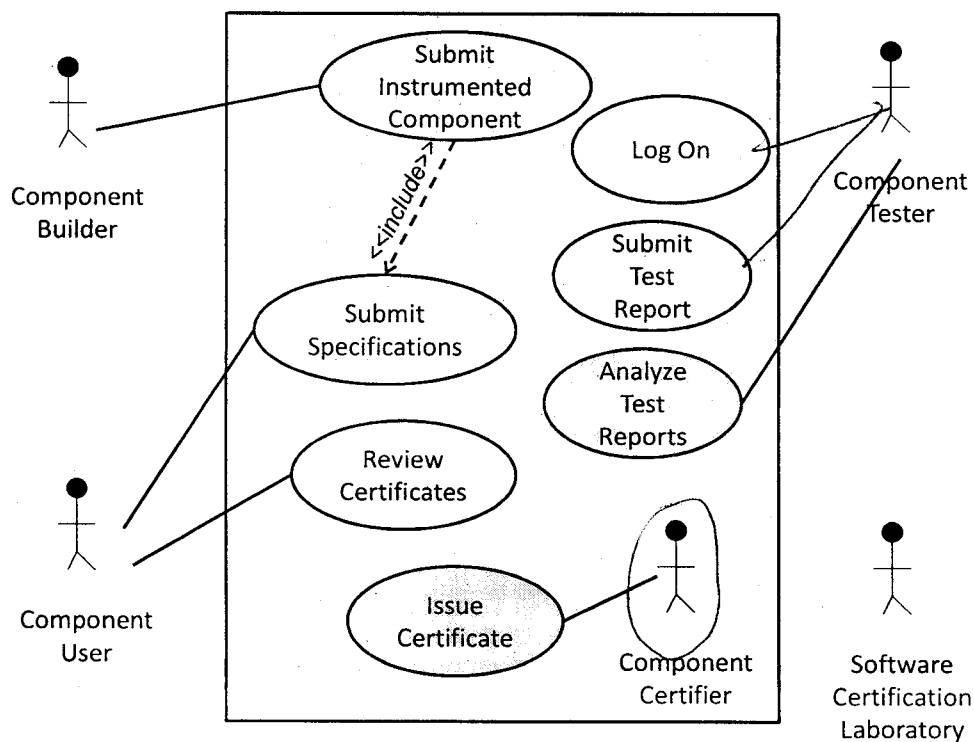

Figure 1: MORRESA Component Certification System Use Case Model
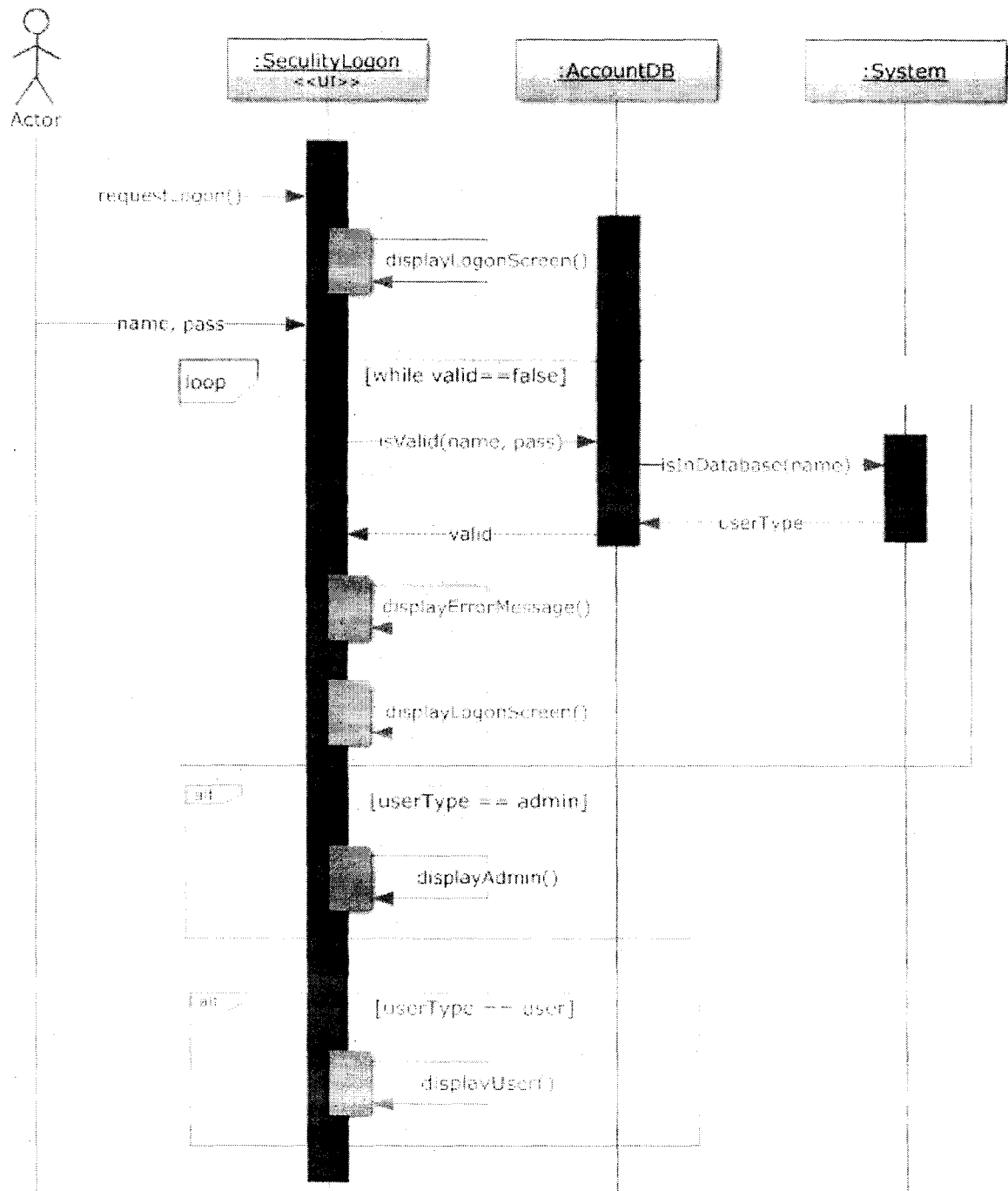
APPENDIX A: SUPPORTING MATERIAL (contd.)

Log-On Scenario

Figure 2: Sequence Diagram for the Logon Use Case