THE UNIVERSITY OF TRINIDAD & TOBAGO

FINAL ASSESSMENT/EXAMINATIONS JANUARY - APRIL 2017

Course Code and Title: SFEN 2001 Software Engineering

Programme: B.A.Sc. in Computer Engineering

Date: Tuesday 18th April 2017 **Time:** 1:00 pm – 4:00 pm **Duration:** Three (3) Hours

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE YOU BEGIN THIS EXAMINATION

Instructions to Candidates

1. **This paper has 6 pages and 5 questions.**
2. **You are required to answer ALL questions in this paper.**
3. **All Questions do not carry equal marks.**
4. **Start each question on a new page.**
5. **You are required to return the question paper with the answer script**

Key Examination Protocol

1. Students please note that academic dishonesty (or cheating) includes but is not limited to plagiarism, collusion, falsification, replication, taking unauthorized notes or devices into an examination, obtaining an unauthorized copy of the examination paper, communicating or trying to communicate with another candidate during the examination, and being a party to impersonation in relation to an examination.
2. The above mentioned and any other actions which compromise the integrity of the academic evaluation process will be fully investigated and addressed in accordance with UTT's academic regulations.
3. Please be reminded that speaking without the Invigilator's permission is **NOT** allowed.

Question 1 **Total** **[21 marks]**

(a) You are part of the UTT ICT initiative with five other students to provide low cost ICT services to citizens of Trinidad and Tobago. A small repair shop owner identifies to the group that he has difficulty in managing his customer's jobs, keeping track of expenditure for spare parts and tracking repair time delivery. He request that the ICT group develop an application to work on his laptop so that he could keep track of jobs and update his customers via a popular messaging service.

(i) Using a labelled diagram, show how the waterfall approach can be applied to the scenario described above. **[5 marks]**

(ii) List three disadvantages of using such a model to develop software in this scenario. **[3 marks]**

(b) As the project goes through its initial stages, you determine that, the client is very impatient or demanding and calls are often made to add features to the system. One of your class mates recommends that the agile method may work.

(i) Outline how the extreme programing method can be applied to this scenario. **[8 marks]**

(ii) What are the advantages and disadvantages of using the agile method? **[5 marks]**

Question 2 **Total** **[26 marks]**

SolidGate is a small security company is adding a security system SpeedMonitor to monitor businesses within 30 miles of their location. The SpeedMonitor allows the owner to configure the security system when it is installed, monitors all sensors connected to the security system, and interacts with the owner through the Internet, a PC, or a control panel.

During installation, the PC is used to program and configure the system. Each sensor is assigned a number and type, a master password is programmed for arming and disarming the system, and telephone number(s) are stored for messaging when a sensor event occurs.

When a sensor event is recognized, the software invokes an audible alarm attached to the system. After a delay time specified by the homeowner during system configuration activities, the software text the telephone number of a remote monitoring service, provides information about the location, reporting the nature of the event that has been detected.

The owner receives security information via a control panel, the PC, or a browser, collectively called an interface. The interface displays prompting messages and system status information on the control panel, the PC, or the browser window.

For the description above:

(a) Develop a context level Data Flow Diagram for SpeedMonitor security function.

[8 marks]

(b) Develop a level 1 DFD, include all data stores. **[18 marks]**

Question 3 **Total** **[16 marks]**

You are part of a development team working on a monitoring system called WatchDog Surveillance (WDS) for a private security company. The security system gives owners the ability to log on the security company web site to access cameras at their business place.

The following are scenarios and exceptions that may occur within the system when a user is trying to view video.

Scenario:

i. The owner logs onto the *WDS* website by entering his or her user ID followed by password.
ii. The system displays all major function buttons.
iii. The owner selects the "surveillance" from the major function button list.
iv. The system displays the floor outline showing camera icons on the right and thumbnail view on the left side of screen.
v. The owner can selects a camera icon from the floor plan or thumbnail view to view surveillance video.
vi. The system displays a viewing window that is identified by the camera ID.
vii. The owner can return to select camera option screen to view another camera.

Question 3 continues on next page

Question 3 continued

Exception:

i. ID or passwords are incorrect or not recognized – Validate ID and passwords by prompting for username and password again up to 3 times.

For the description above:

(a) Develop a Use Case diagram. **[6 marks]**

(b) Develop an activity diagram for accessing the cameras by the user.

Show on the activity diagram the flow of control using UML components, like activities, decisions, merges, forks and joins.

[10 marks]

Question 4 **Total** **[13 marks]**

You are part of an IT unit managing an e-government project. In order to maintain the critical timeline the vendor has recommended deploying the software at offices without providing software test results.

(a) With the aid of a diagram, describe how the spiral software testing strategy is done. **[8 marks]**

(b) List five tests normally done during the unit testing phase? **[5 marks]**

Question 5 **Total** **[24 marks]**

(a) The software team you are a member of has been asked to build a real-time controller for a local manufacturing company to be delivered in 10 months. After careful estimation and risk analysis, you come to the conclusion that the software, as requested, will require 18 months to create with available staff.

How would you address this problem? **[5 marks]**

(b) A director of a government unit asked you to be part of a development team on an e-government project. The project is currently at the initial stage, there are a number of risks associated with this project. You have been asked to develop a risk item check list.

Identify and describe seven categories of this check list. **[14 marks]**

(c) The director is concerned that high staff turnover is at 70 percent and will critically impact on project cost and schedule. You have been mandated to develop a strategy to reduce turnover and the impact on cost and schedule.

List five possible steps you would recommend for inclusion in the strategy. **[5 marks]**

END OF PAPER