UNIVERSITY OF MAURITIUS

FACULTY OF ENGINEERING

FIRST SEMESTER EXAMINATIONS

NOVEMBER/DECEMBER 2015

PROGRAMME	**BSc (Hons) Computer Applications – Part-Time** **BSc (Hons) Computer Applications – Full-Time** **BSc(Hons) Information Systems – Part-Time** **BSc(Hons) Information Systems - Full-Time**		
MODULE NAME	**Software Engineering**		
DATE	**Saturday** **05 December 2015**	**MODULE CODE**	**CSE2142(3)**
TIME	**09:30 – 11:30 Hrs**	**DURATION**	**2 hours**
NO. OF QUESTIONS SET	**4**	**NO. OF QUESTIONS TO BE ATTEMPTED**	**4**

INSTRUCTIONS TO CANDIDATES

Answer All questions.

All questions carry equal marks.

Answer All questions.

Question 1 - (Total 25 Marks)

Read the Case Study below and answer ALL the following questions.

Reeves Floral Product Company

Located in Georgia, Reeves Floral Products, Inc. has been servicing the floral and decorative needs of designers, florists, interior decorators, caterers and event planners throughout Southeast America since 1980. What began as a greenhouse grower and supplier of fresh flowers in a small northern suburb of Atlanta, Georgia, has evolved into one of the largest importers and distributors of cut flowers, floral supplies, artificial flowers and decorative accessories in the United States. The company has over 100,000 square feet of showroom and warehouse space in its main facility located in Woodstock, Georgia and offers an extensive range of floral products and services that include seedlings, cuttings, wholesale flowers, florist supplies and much more.

In August 2010, the company decided to implement an IT solution to manage its critical business functions across sales, distribution and financials. The company needs one flexible responsive system that could integrate and provide real time access to information. All the information on supplier, products and customers have to be stored in a central database. Due to the growing demand for their products and services, the company has to provide the facility of ordering and accepting payment online. As a full service florist, they required cost effective POS software that could process sales transactions, monitor inventory movement, manage order entry and integrate data in real time at their head office in Woodstock. In addition, they required a solution that could confidently and quickly process transactions and credit card payments, offer easy check outs, was easy to use and could support future growth.

With the computerized system, sales figures would be easy to obtain at any given point of time at either of their locations, providing visibility and streamlining retail operations. The company is also able to track orders in real time, manage growth and meet customer expectations for higher service levels to support repeat business. The system would provide user-friendly interface for the staff. To remain competitive, the system has to be reliable and operate over 24 hours. With many branches that exist over the country, the system should be support different platforms on which it can be deployed.

(continued next page)

(Question 1 continued)

(a) Discuss why it is important to consult all the stakeholders for the above Reeves Floral Product Company during requirement engineering process.

[4 marks]

(b) During the eliciting requirement phase, the use of natural language may yield some problems.

(i) Describe THREE problems that may be encountered.

[3 marks]

(ii) List the alternatives that are available for requirements specification over the use of natural language.

[3 marks]

(c) System requirement specification (SRS) are used by several stakeholders and the requirements should be written properly. As a system analyst, explain TWO characteristics of a good requirement.

[4 marks]

(d) As a team lead, you have been requested to mentor the junior analysts so that the requirement gathering process is carried out properly. You have to explain to them that requirements should state what a system should do, without stating how it should do it. Elaborate on why this distinction is very important?

[5 marks]

(e) Write down **THREE** functional and **THREE** non- functional requirements from the above case study.

[6 marks]

Question 2 - (Total 25 Marks)

Al-Shams Hotel Reservation System (ASHRS)

You work as a developer in a software development company and implement software according to the specifications of clients. You have been assigned the Al-Shams Hotel Reservation System (ASHRS). The proposed software system will be used to manage the front-desk activities of a hotel. The progress of the work will be on weekly basis, where the development team will do presentations and interact with the client. It will be able to accept reservations, to record information about the hotel guests, to verify room availability, and to allocate rooms to guests. The goal of this project is to create a system to manage the front-desk activities of the "Interface Rapids Hotel". The system will be used to enter reservations as well as to check people in and out of the hotel. The hotel contains 30 rooms in which guests can stay. When a hotel guest wishes to make a reservation, the hotel clerk asks him or her which nights he or she wants to stay and the type of room he or she wants. The system must verify if room(s) are available on those nights before allowing a reservation to be made. The hotel needs to record basic information about each guest, such as his/her name, address, telephone number, credit card etc. A reservation can be cancelled at any time. When a guest checks in, a room is allocated to him or her until he/she checks out. The system must keep track of the guest's account, and print his/her bill. In its first version, the ASHRS will be a simple application to be run from a single computer. The second version should be a client/server system where the client component is used to manage the reservations and the server centralizes the corresponding data. A third version is also envisaged where guests will be able to make their reservations from the Internet. Each version has to be developed in around 1 month.

(a) Given the above scenario, recommend a life-cycle that you would adopt for the new system. Justify your answer by explaining why you have chosen this life-cycle; ensure that you provide clear evidence for your choice of the life-cycle.

[7 marks]

(b) Suppose that you are in the design team for the above system.

(i) You have been asked by your team leader to make a presentation on cohesion and coupling. Highlight the difference between cohesion and coupling.

[4 marks]

(continued next page)

(Question 2 continued)

(ii) During the design process, the architectural design and the data structure design of the system are being planned. Describe these two types of design.

[4 marks]

(iii) For designing the above system, a layering architecture can be adopted. Evaluate the use of layering.

[5 marks]

(c) Suggest the most suitable architectural design model that can be used in the following case. Justify your answer.

A film and photo library is available on the internet. Users are able to view the library catalogue. The video repository of the library provides the entire film store whereas the picture repository provides a range of photo store upon the user request. The web server allows the users to obtain the film and photo information. **[5 marks]**

Question 3 - (Total 25 Marks)

(a) Differentiate between direct and indirect measures. Use examples to elaborate your answer.

[2+2 Marks]

(b) Lines of code (LOC) is a common software metric used to measure size in software development. Discuss TWO possible drawbacks when using this type of metric.

[2 marks]

(c) A system specification for an online chat room describes 9 inputs, 2 of which are described as 'simple', 5 as 'average' and 2 as 'complex'. The system has 2 outputs, both of which are considered as 'average'. The system can be queried via 4 commands, which are considered to be 'complex' to implement. The system uses a file for user details, the implementation of which is considered 'simple' and another file for holding logs of conversations which is considered as 'average'. The system uses a standard protocol for interface to the Internet which is considered a 'simple' implementation.

(continued next page)

(Question 3 continued)

Use the table below to calculate the number of function points in the system, assuming that the adjustment factor is 50.

COMPONENT	COMPLEXITY LEVEL		
	simple	average	complex
Input	3	4	6
Output	4	5	7
Inquiry	3	4	6
Internal File	7	10	15
Interface	5	7	10

[5 marks]

(d) Software is the most expensive element of all computer-based system. A large cost estimation error can make the difference between profit and loss.

i) Explain why software cost estimation is difficult. **[2 marks]**

ii) List and briefly describe three techniques for estimating software cost. **[3 marks]**

iii) Compare and contrast each of the estimation techniques you mentioned above. **[3 marks]**

(e) A project team, in the process of creating a risk table, listed the following risk.

- Delivery deadline will be tightened
- Less reuse than planned
- Staff inexperienced
- Customer will change requirement
- Size estimates may be significant low
- End user resist system

For each of them, identify the category of the risk to which each one of them belongs. Justify for each of them, your reason for including it in the specific category. **[6 marks]**

Question 4 - (25 Marks)

(a) In software project management, a project work must be broken down into discrete tasks so that the appropriate resources are estimated and allocated.

The following table outlines the necessary tasks that must be performed for a flight booking system.

TASK	DESCRIPTION	DURATION (DAYS)	DEPENDENCIES
T1	Concept document	10	None
T2	Project Plan	15	T1
T3	Project Schedule	10	T1,T2
T4	Requirements Analysis	20	None
T5	Requirements Definition	10	None
T6	System Specification	15	T3, T4
T7	Requirements Validation	20	T3
T8	Architectural Design	35	T7
T9	Interface Design	15	T6
T10	Detailed Design	5	T5, T9
T11	Coding	10	T9
T12	Unit Testing	20	T10
T13	Integration Testing	35	T3, T4
T14	System Testing	10	T8,T9
T15	Acceptance Testing	20	T12, T14
T16	User Manual	10	T15

(i) Draw the activity network diagram for the above software project as per the task dependency table listed above.

[6 marks]

(ii) Identify the critical path and show your calculations. **[3 marks]**

(continued next page)

(Question 4 continued)

(b) **Capability Maturity Model Integration** (CMMI) is a process improvement approach consisting of five maturity levels (*using the staged representation*) that helps organizations to improve their performance. Briefly describe the different levels of the CMMI model. **[5 marks]**

(c) One of the functionalities of a Hotel Reservation System is to allow a customer to check the room availability. Given that the customer has to logon to access any services and that room availability can be viewed by typing in a hotel's name, the basic flow and possible alternative flows are as follows:

Basic flow:
Enter user credential
Enter hotels's name
Room Availability are displayed

Alternate flows:
A1: Wrong password
A2: User ID does not exist
A3: No room availability for that Hotel
A4: Logout

The scenario matrix is represented below:

Scenario ID	***Starting flow***	***First alternate***	***Second alternate***
1. Login ok with room availability for that Hotel	*Basic Flow*		
2. Incorrect password	*Basic Flow*	*A1*	
3. Login ok but no room availability for the Hotel and logout	*Basic Flow*	*A3*	*A4*

(i) Given that the data elements and conditions required to execute the above scenarios are userid, password, Hotel and logout, construct a test case matrix for the above three scenarios. You are required to use the table header below to populate your matrix.

Test case ID	*Scenario/condition*	*Userid*	*Password*	*Hotel*	*Logout*	*Expected result*

[6 marks]

(ii) Given that the only userid and password available for testing are '1789' and '9871' respectively and the room availability exist for Dubai only. Generate the values for the above test case matrix. **[5 marks]**

END OF QUESTIONPAPER

sg/