UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

UNIVERSITI TEKNOLOGI MALAYSIA
FINAL EXAMINATION SEMESTER I, 2018 / 2019

SUBJECT CODE	:	SCSJ 2203
SUBJECT NAME	:	SOFTWARE ENGINEERING
SECTION	:	ALL
TIME	:	9.00 AM – 11.30 AM
DATE/DAY	:	30 / 12 / 2018 (SUNDAY)
VENUES	:	BK 2 (N 28)

INSTRUCTIONS :

SECTION A	:	15 TRUE/FALSE QUESTIONS	(15 MARKS)
SECTION B	:	3 STRUCTURED QUESTIONS	(45 MARKS)
SECTION C	:	1 ESSAY QUESTION	(40 MARKS)
TOTAL			(100 MARKS)

ANSWER **ALL** QUESTION IN THE **ANSWER BOOKLET.**

(Please Write Your Lecturer Name And Section In Your Answer Booklet)

Name	
I/C No.	
Year / Course	
Section	
Lecturer Name	

This question paper consists of **SIX (6)** printed pages excluding this page.

SECTION A: TRUE/FALSE QUESTIONS   **[15 MARKS]**

Instruction: For each statement, determine whether it is **TRUE [T]** or **FALSE [F]**.

No.	Statement
1.	Architectural design is concerned with understanding how a software system should be organized and designing the **overall structure** of that system.
2.	Systems in the **same concept** often have similar architectures that reflect domain concepts.
3.	An architectural pattern is a stylized description of **good design practice**, which has been tried and tested in different environments.
4.	Layered architecture organises the system into a set of **concrete machines** each of which provide a set of services.
5.	In client-server architecture, a set of stand-alone **servers** provides specific services such as printing and data management.
6.	Object reuse involves **standard objects** that can be used over and over again within a system.
7.	**High cohesion** can be achieved if most of the interaction is within subsystems, rather than across subsystem boundaries.
8.	Package diagram associates classes of **different groups**.
9.	Every message in a sequence diagram requires a method in the **destination object**.
10.	**Stereotypes** in UML notation categorize a model element as a certain type.
11.	Software inspection involves **tools** examining the source representation with the aim of discovering anomalies (deviation from standard/expectation) and defects (errors).
12.	In system testing, a separate testing team tests an **incomplete version** of the system before it is released to users.
13.	Usability testing is usually done by **interaction specialists** who observe humans interacting with the system.
14.	The basis path method allows for the construction of test cases that are guaranteed to execute every statement in the program **at least once**.
15.	An independent path is **any path** through a program that introduces at least one new set of processing statements or a new condition.

Instruction: Answer **ALL** questions.

Question 1 [15 marks]

Suggest the most suitable **architectural pattern** for each system description below and justify your answer.

Repo

(a) Developers can create a simple, generic interface as a collection or a component in an integrated development environment (IDE). Adding, removing, updating, and selecting items from this collection is done through a series of straightforward methods, without the need to deal with database concerns. More collections are added as required.

Pipe and filter

(b) A report generator system that is run every month to generate the sales of various products by categories, locations, vendors and customers. The records are entered intensively by the data entry clerks. It also provides sales reports quarterly.

Layered

(c) A knowledge portal that is written in Java language and it has security concerns in term of the data being shared among the registered members. New features should be added on top of existing system without affecting the current modules.

mvc

(d) A university requires a web-based time table system that can be accessed by its students and lecturers in diverse views including personalised time table for each lecturer and student, available spaces by the admin and lecturers besides booking of available spaces by the assigned support staff.

Client-server

(e) Human resource staff members manage the distribution of uniforms among the operators at J&J Manufacturing via Uniform Distribution System (UDS). The system can be accessed by another five factories at different locations in Malaysia. The system allows the assigned staff members to view current stocks throughout all branches in a shared database.

Question 2 [15 marks]

WeLove Society provides short term loans without interest to their members for the maximum RM1000 to be paid within the maximum ten months. The committee requires a simple standalone system to keep track the loans. The member is identified uniquely by member ID of type Integer. Each member can only have one loan at one time and one document that is related to its loan.

(a) The classes and methods are given as in Table 1. Identify the parameter and its type (i), (ii), (iv), (v) and the return type (iii).

Table 1

Class	Methods
Checkout GUI	
Checkout Controller	checkout(___i___ : ___ii___) : ___iii___
DBMgr	getDocument(___i___ : ___ii___) : Document save(l: Loan) save(d: Document)
Loan	Create(m: Member, d: Document)
Document	isAvailable( ): boolean setAvailable(___iv___ : ___v___)

(5 marks)

(b) Based on the given classes in Table 1, identify which are (i) entity, (ii) boundary, (iii) control, and (iv) data access.

(3 marks)

(c) Draw the **sequence diagram** for the scenario "a member makes a loan". The details of the member and the loan made are recorded in member's document. All objects of the classes and messages complete with the parameters and return values must be included. The system should check whether existing document is available in order to create and save the member's loan otherwise a message should be returned "Document is available" and the loan cannot be created. Set the document available to true after the loan completed.

(7 marks)

Question 3 [15 marks]

(a) Interface testing is performed between the two sub-systems Order and Product as shown in Figure 1 through objects OrderController and ProductController. Suggest **ONE (1) interface testing type** and **ONE (1) interface error** based on the given example.
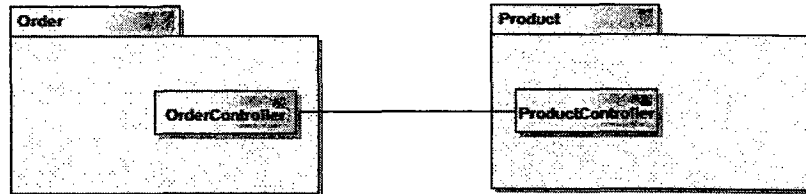
(5 marks)

Figure 1

(b) Given the program in Figure 2, draw the **flow graph**. Use the given number in the flow graph. Line 0 is the entry.

(8 marks)

```
0. Integer i, j, k;
1. read i, j, k;
2. if (i < j)
3.    if (j < k)
4.       i = k;
         else
5.       k = i;
      end if
   end if
6. print i, j, k;
end example
```

Figure 2

(c) Based on the flow graph produced in (b), calculate the **cyclomatic complexity**.

(2 marks)

4

SECTION C: ESSAY QUESTION [40 MARKS]

Instruction: Based on the given scenario, answer all questions.

MyFlorist Sdn. Bhd. sells flowers all over Malaysia. The company plans to computerize the manual delivery system as it is growing and planning to open branches in ten different states. The system should be online and provide multiple views for the CEO, managers for all branches, dispatch staff, store keepers and clerks. The system shall record the details of the manager who can view the total payment made for all delivered packages, customer who can track the package to be delivered, while the agent manages the delivery. As the consultant of Delivery Management Software (DMS), you suggest MyFlorist to purchase the existing solution as in Figure 3. The sub-systems include Customer App, Delivery Agent App and Manager Dashboard.

Customer App, Delivery Agent App & Manager Dashboard

Get on-demand delivery apps for your customers & complete delivery management software for your business. Customers can easily request pickup & delivery service directly on your branded delivery apps & website in a hassle-free way. Provide real time tracking to your customers and allow them to make payments through multiple payment gateways.

Figure 3

(a) Draw a **package diagram** with at least **TWO (2) suitable classes** and their relationships in each package and among the packages.

(15 marks)

(b) There is a new sub-system to be added to the existing DMS. The new features keep customers updated throughout the order delivery lifecycle by sending them real time SMS alerts at various stages. It also offers Uber-like delivery agent tracking on Google maps and allows customers to chat with their assigned agents. Draw a **component diagram** that connects DMS with the new external service providers.

(7 marks)

(c) MyFlorist charges RM2.95 postage for deliveries if the package weighs less than 2 kg, RM3.95 if the package weighs 2 kg or more but less than 5 kg, and RM5 for packages weighing 5kg or more. Generate **a** set of valid test cases using **equivalence partitioning (EP)** and **boundary value analysis (BVA)** to test the programs. Follow the format as in Table 2.

(15 marks)

Table 2

Equivalence Class	Status	Representative BVA	Expected Result

(d) Are there any **invalid inputs**? Explain.

(3 marks)

[END OF QUESTIONS]