FACULTY OF COMPUTING

UTM Johor Bahru

FINAL EXAMINATION SET1

SEMESTER I 2023/2024

COURSE CODE   :   **SECD2613**

COURSE NAME   :   **SYSTEM ANALYSIS AND DESIGN**

YEAR / PROGRAM   :   **1 / 2 (SECB/SECJ/SECR/SECV)**

TIME   :

DATE   :

PLACE   :

INSTRUCTIONS TO CANDIDATES:

1. Fill in your particulars in the question booklet and answering booklet:

Name	
Passport No.	
Matric No.	
Year / Program	
Lecturer	

2. Read instructions given for each question carefully.

3. Answer **ALL** questions.

4. This paper consists of three sections.

> Section A: **10 MULTIPLE CHOICE** questions (10 Marks).
>
> Section B: **4 STRUCTURED** questions (60 Marks).
>
> Section C: **1 CASE STUDY** question (30 Marks).
>
> TOTAL MARKS is **100 Marks**

THIS PAPER CONSISTS OF () PRINTED PAGES INCLUDING THIS PAGE.

   SECTION A   :   MULTIPLE CHOICE QUESTIONS

                              10 MARKS (EACH QUESTION 1 MARK)

   INSTRUCTION   :   ANSWER ALL QUESTIONS.

                              Please write your answer (A/B/C/D) in the answer sheets.

Question 1

Which option **BEST** defines a logical data flow diagram?

A. It does not include any primitive processes.

B. It is a model of how the business operates.

C. It includes types of programs, such as online or batch.

D. It is a model of how the system will be implemented.

Question 2

Which statement below about User Interface (UI) design is **FALSE**?

A. UI is crucial for usability and improving user-friendliness.

B. UI includes screens, menus, functions, and features that enable two-way communication between the user and the computer.

C. UI encompasses all the hardware and software components that facilitate user-computer interaction.

D. UI primarily focuses on aesthetics more than usability.

Question 3

What is the function of a data couple in a structure chart?

A. Show data from a subordinate module to the control module.

B. Show indicators that one or more modules are repeated.

C. Show parameters from a subordinate module to the control module.

D. Show parameters from the control modules to a subordinate module.

Question 4

Which statement about decision tables is **FALSE**?

A. Decision tables effectively avoid misinterpretation by end users.

B. Decision tables effectively avoid contradictions.

C. Decision tables effectively avoid impossible situations.

D. Decision tables effectively avoid redundancies.

Question 5

Consider the transaction below:

1. Transaction 1: Adding a new staff member.

2. Transaction 2: Modifying the venue of an event.

3. Transaction 3: Updating a customer's phone number.

4. Transaction 4: Displaying a list of events that occurred in the year 2023.

5. Transaction 5: Changing a staff member's bank account number.

Which of the following CRUD matrix will represent the above transaction?

Activity	CUSTOMER	EVENT	STAFF
Transaction 1			C
Transaction 2		C	
Transaction 3	C		
Transaction 4			R
Transaction 5			D

A.

Activity	CUSTOMER	EVENT	STAFF
Transaction 1			C
Transaction 2		U	
Transaction 3	U		
Transaction 4		R	
Transaction 5			U

B.

Activity	CUSTOMER	EVENT	STAFF
Transaction 1			C
Transaction 2		C	
Transaction 3	U		
Transaction 4		R	R
Transaction 5			D

C.

Activity	CUSTOMER	EVENT	STAFF
Transaction 1			C
Transaction 2		U	
Transaction 3	C		
Transaction 4		R	
Transaction 5			D

D.

Question 6

Which of the following statements about the purpose of system implementation is **FALSE**?

A. To offer assistance and support to both current and future users.

B. To alter a system to rectify errors, enhance performance, or adapt to a modified environment or changing requirements.

C. To transform final physical system specifications into functional and dependable software.

D. To record the tasks that have been accomplished.

Question 7

Which one of these is considered a form of electronic output?

A. Report

B. Brochure

C. Invoice Receipt

D. E-book

Question 8

"X is use when there are many repetitious actions"

Based on the statement above, what does X represent?

A. Structured Tree

B. Decision Tree

C. Structured English

D. Decision Table

Question 9

OneSolution company want to revised their computer supply business discount policy. The revised discounting policy is as follows: If the amount of the order for computer supplies is greater than $1,000, subtract 4 percent for the order; If the amount is between $500 and $1,000, subtract a 2 percent discount; If the amount is less than $500, do not apply any discount; All the discounts will only applicable if payments are made within seven days of order.

Which one of the decision trees below is **TRUE** to represent the above scenario?

A.
```
IF order amount is greater than RM1000.
        THEN 4 percent discount.
ELSE IF the order amount is between RM500 and RM1000.
        THEN 2 percent discount.
ELSE IF the order amount is less than RM500.
        THEN No discount
ENDIF
```

B.
```
IF payments are made within seven days.
        THEN IF order amount is greater than RM1000.
                THEN 4 percent discount.
        ELSE IF the order amount is between RM500 and RM1000.
                THEN 2 percent discount.
ELSE No discount.
ENDIF
```

C.
```
IF payments are made more than seven days.
        THEN IF order amount is greater than RM1000.
                THEN 4 percent discount.
        ELSE IF the order amount is between RM1000 and below.
                THEN 2 percent discount.
        ELSE IF the order amount is less than RM500.
                THEN No discount
ELSE No discount.
ENDIF
```

D.
```
IF payments are made within seven days.
        THEN IF order amount is greater than RM1000.
                THEN 4 percent discount.
        ELSE IF the order amount is between RM500 and RM1000.
                THEN 2 percent discount.
        ELSE IF the order amount is less than RM500.
                THEN No discount
ELSE No discount.
ENDIF
```

Question 10

A small retail store is upgrading its point-of-sale (POS) system. The current POS system is outdated, and they are replacing it with a new system. The store owner believes that the POS system is not too critical for the operation of small retail stores. They want the transition to be cost efficient as they have limited budget, with swift transition to the new system.

Based on this scenario, the **MOST** appropriate installation strategy is:

A. Single-location Installation

B. Phased Installation

C. Direct Installation

D. Parallel Installation

Question	Answer
1	B
2	D
3	A
4	A
5	B
6	B
7	D
8	C
9	D
10	C

Question 1 [15 Marks]

Johor Science, Technology and Mathematics Education (STEM) Association organizes monthly gatherings and hosts breakout sessions catering to various interests within the STEM community, including the mathematics olympiad, science fair, teacher workshops, and general community education events. At these events, a laptop computer is employed to facilitate manually the enrolment of new members into the association. Your project team has completed collecting the requirements from the related stakeholders for the new project development of the association registration system. Suppose you were assigned to develop a logical model of the registration system. Figure 1 shows the Logical data flow diagram (DFD) Level 1 for the *Add New Member* process in the association registration system.

Figure 1: As-Is Logical DFD Level 1 for Add New Member Process (Manual)

Your next task is to create the physical data DFD for the *Add New Member* process (Figure 2) that depicts the detailed flows so the development team can start to code the program of the new online system.
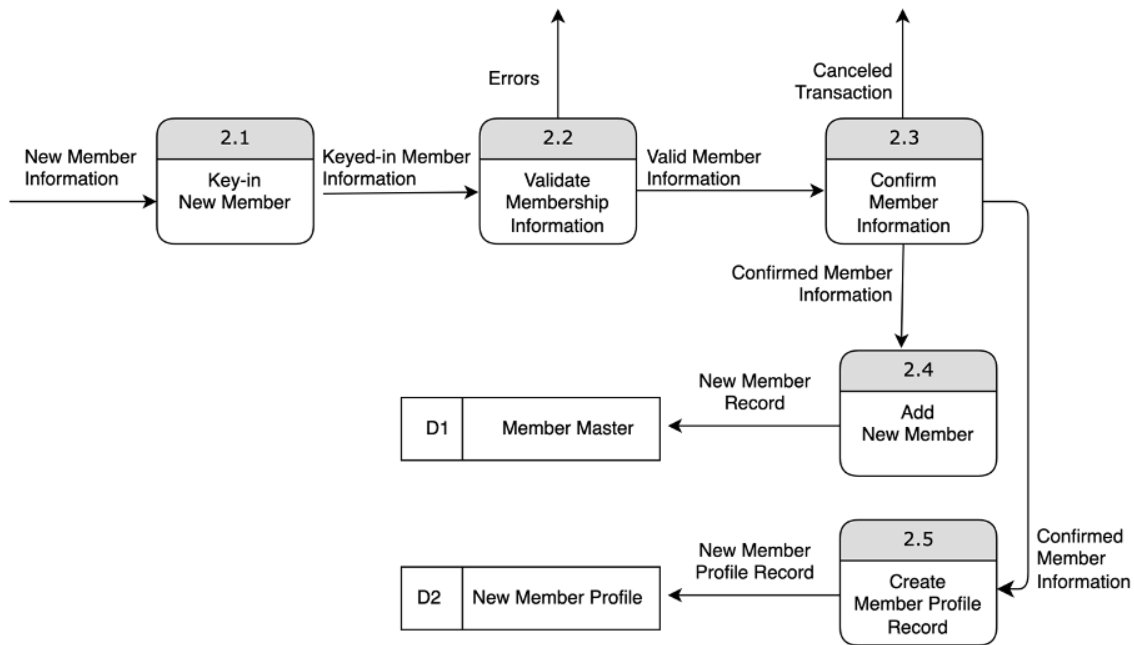
Figure 2: To-Be Physical DFD Level 1 for Add New Member Process (Online)

1. Explain **TWO (2)** the benefits of developing logical DFD during the system analysis phase. (4 Marks)
   - Represent how the business operates and include the related processes of registration.
   - Better communication with users. They are familiar with how the business operates.
   - More stable systems, because the design is based on a business framework.
   - Increased understanding of the business by analysts.
   - The system will have increased flexibility and be easier to maintain.
   - Elimination of redundancy.

2. How do we address the issue of unbalanced decomposition when exploding a DFD? (2 Marks)
   - Unbalanced decomposition between a parent process and a child diagram. The data flow in and out of a parent process must be present on the child diagram.

3. Analyse **THREE (3)** unique characteristics of a physical DFD (as in Figure 2) that are not present in a logical DFD (as in Figure 1). (9 marks)

- Clarifying which processes are performed by humans (manual) and which are automated - Fig. 1 missing confirmation and validation processes that appear in Fig. 2 as part of automated tasks/processes. These control measurements to ensure accuracy and completeness.

- Describing processes in greater detail - Fig. 1 has fewer processes than Fig. 2 which depicts more processes with specific step-by-step automated processes in sequence order to be executed

- Temporary data stores and transaction files - appear in Fig. 1 for F1 Member File as a file in the laptop, while more actual records appear in Fig. 2 in storing specific records of related data with specific and different record names

Question 2 [15 Marks]

1. Process or mini specifications are created for primitive processes and some higher-level processes on a data flow diagram. Identify **TWO (2)** goals for producing the mini specification during the system analysis phase. (4 Marks)

   - Reduce process ambiguity
   - Obtain a precise description of what is accomplished
   - Validate the system design, including data flow diagrams and the data dictionary

Figure 3 presents the decision tree diagram outlining the approval process for non-cash purchases at a department store.
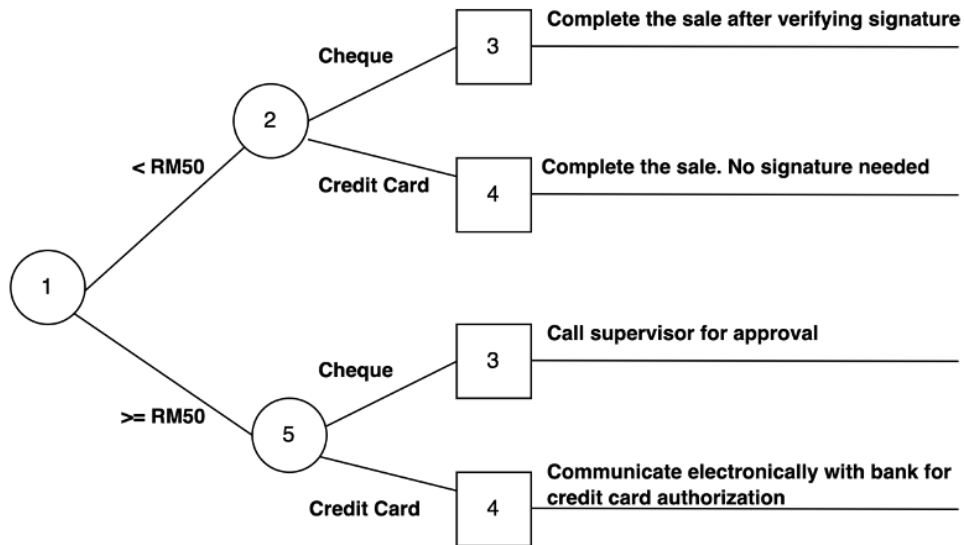
Figure 3: Decision tree for non-cash purchases approval process

2. Discuss **THREE (3)** main advantages a decision tree has over a decision table to visualize the structured decision in Figure 3. (6 Marks)
   · Order of checking conditions and executing actions is immediately noticeable.
   · Conditions and actions of decision trees are found on some branches but not on others, unlike decision tables where they are all part of the same table.
   · Compared to decision tables, decision trees are more readily understood by others in the organization.

3. Examine the conditions in system analysis where employing structured English and decision tables is most beneficial. (5 Marks)
   · Use structured English when there are many repetitious actions or when communication to end users is important
   · Use decision tables when complex combinations of conditions, actions, and rules are found, or you require a method that effectively avoids impossible situations, redundancies, and contradictions.

Question 3. [15 marks]

A grocery shop called Eco Shop, is revamping its manual business towards online business. Your team is assigned to specifically focus on improving the user interface and the input and output design of the reports related to the Eco Shop. Based on the current implementation in EcoShop, manual reports involved are Monthly Sales Performance Report to provide detailed insights into Eco Shop's sales performance, Customer Purchase Receipt to provide customers with a detailed and clear summary of their purchases, Customer Feedback and Return Form to collect customer feedback on products and services, and to facilitate the return process if necessary.

1. List out and explain briefly **THREE (3)** types of output classifications suitable to be implemented for EcoShop System. (6 Marks)

Internal Output - Monthly Sales Performance Report

External Output - Customer Purchase Receipt

Turnaround Document - Customer Feedback and Return Form

Figure 4: User Interface for Shopping Cart Management

2. Identify **TWO (2)** suitable output reports that can be generated by the user interface in Figure 4, and justify why the printed output reports are needed. (3 Marks)

Detail reports:

Produce one or more lines of output for each item in the inventory.

Exception reports:

Display only those records that meet specific conditions of searching the items in inventory. Useful when the user wants specific information

Summary reports:

Reports that provide comprehesive information. Summary of sales made.

3. Analyze Figure 4, and list **THREE (3)** User Interface Design Guideline which have not been followed by the interface in Figure 4. Explain your answer. (6 Marks)

1.   Clearly label all controls, buttons, and icons - no label on the button

2.   Select only those images that a user can understand easily - the images for the buttons are unfamiliar and do not relate to the system menu

3.   Show all commands in a list of menu items - Not enough functionality in the menu

4.   Make it easy to navigate or or add items to the shopping cart

Question 4 [15 Marks]

MedHealth, a large hospital, plans to switch from its current patient record management system to a more advanced, AI-driven system. This new system offers enhanced data analysis capabilities and real-time patient monitoring. The hospital aims to implement the new system in stages, or modules because they are aware of the challenges in the potential temporary disruption to patient data access during the switch. MedHealth Hospital IT management team decided on implementing direct installation strategy for their company. During the implementation phase, detailed specifications for understanding the full scope and technical aspects of the new system is needed. A comprehensive guide that provides step-by-step instructions for the installation and configuration of the new system is crucial and also a comprehensive user manual is also crucial, to cover all features and functionalities of the new system.

1. Discuss the importance of system implementation phase in the context of MedHealth Hospital. (2 Marks)

Any ONE answer is acceptable

To convert final physical system specifications into working and reliable software

To document work that has been done

To provide help for current and future users

2. As a consultant you have to identify **TWO (2)** suitable system implementation phase documentation for MedHealth Patient AI-driven Record Management System. (3 Marks)

Any 2 suitable documentation (1.5 marks each)

detailed specification of technical system

plan for transitioning/installation guide

user manual and support manual

3. Suggest **TWO (2)** important acceptance testing suitable to be implemented for MedHealth AI-driven Patient Record Management System. (2 Marks)

Any TWO answers are acceptable

user acceptance testing

operational acceptance testing

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4. As an appointed consultant for MedHealth Hospital, you disagree on MedHealth Hospital IT management team decision on implementing direct installation strategy. Give reason why you disagree and propose a suitable installation strategy. You also have to give **TWO (2)** advantages of your strategy. (5 Marks).

5. Suggest **THREE (3)** training methods suitable for MedHealth Hospital system user. (3 marks).

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SECTION C   :   **CASE STUDY**

                           30 MARKS

INSTRUCTION   :   **ANSWER ALL QUESTIONS.**

                           Please write your answer in the answer sheets.

a) A system development team is tasked with creating an online shopping platform, "JomShopping," that allows users to browse, select, and purchase products from various categories. The scope of the system is described below:

- **User Registration**: Users can create an account by providing personal details such as name, email, and password and log in to the platform.
- **Product Catalogue**: Display a wide range of products with detailed descriptions, prices, and images.
- **Shopping Cart Management**: Allow users to add/remove products, update quantities, and proceed to checkout.
- **Checkout and Payment**: Enable secure payment processing with multiple payment options.
- **Order Tracking**: Provide order tracking functionality for users to monitor delivery status.

i. Project Requirements for the **Checkout and Payment Process**:

- User reviews the products in the cart and selects "Checkout."
- User enters a shipping address and chooses a payment method (Credit/Debit Cards, eWallet or Bank Transfers).
- System validates the information entered.

    - If valid, payment processed; order confirmation displayed.

    - If invalid, error message prompts the user to correct the information.

- System updates payment details.
- System generates detailed receipts or invoices for each transaction.

Based on the project requirements for the Checkout process above, develop a Structured English to show the process of Checkout on the "JomShopping" platform. (6 Marks)

Answer:
START
    GET Order details from user
     BEGIN IF
            IF user selects "Checkout" Then
                Enter shipping address
                Select payment method (Credit/Debit Cards, eWallet, or Bank Transfers).
                    IF payment method is valid Then
                        Process payment
                        Display order confirmation
                        Update payment details
                        Generate detailed receipts/invoices
                    ELSE
                        Display "Invalid payment" message
                    End IF
            ELSE
   End Checkout process
            END IF
    END

ii.   The online shopping platform "JomShopping" users can be categorised by their membership status: Silver, Gold or Platinum. After the user finishes shopping online and decides to buy the item they choose, they can go to the "Checkout and Payment" process. This process starts with the user selecting " Checkout " to their cart. Then, the checkout pop-up menu will be shown, asking the user to enter the shipping address. Then, users can choose how they will pay for the item. They can pay using Credit cards, eWallet or Bank transfers based on their membership status. If the user holds the membership status Platinum, they can use their credit card to pay for the purchase. If not, they are not entitled to pay for the item using a credit card.

However, the payment type is still determined based on the purchase total value. The user can pay using all three payment types if the purchase total value is less than or equal to RM100. If the purchase value is more than RM100 and less than or equal to RM5000, the user can pay using a Credit card or Bank Transfer. After that, the system will validate the information. If the information is valid where the Payment has been processed successfully, the confirmation order will be displayed. However, if the information is invalid, the error message prompts the user to make the correction. If everything is okay, the system will update the payment details. The system will generate detailed receipts or invoices for all successful payments for each transaction.

Draw a decision tree based on the condition given. (6 Marks)

Answer:
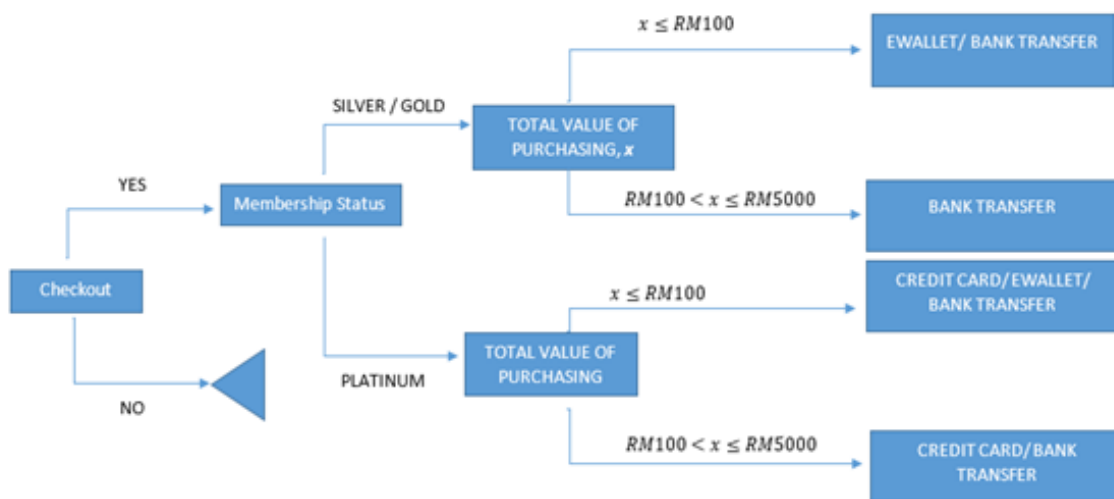
iii. "JomShopping" introduces loyalty memberships for its loyal customers. The company uses the following business rules to set discounts as part of the loyalty membership.

● A customer with an e-coupon earns a 3% discount.

● A returning customer with a frequent order record (at least 5 orders in the last 3 months) earns a 4% discount.

● A customer who spent more than RM750 earns a 10% discount.

● A customer who meets all three conditions (with an e-coupon and has a frequent order record, and has spent more than RM750) earns an additional bonus discount of 5%.

Draw a decision table that shows the discount rules for the "JomShopping" loyalty membership platform. (8 Marks)

Answer:

Condition(s)	Rules							
	1	2	3	4	5	6	7	8
E-Coupon	Y	Y	Y	Y	N	N	N	N
Frequent order record	Y	Y	N	N	Y	Y	N	N
Total Spending > RM750	Y	N	Y	N	Y	N	Y	N
Action(s)								
Earns 3% discount	x	x	x	x				
Earns 4% discount	x	x			x	x		
Earns 10% discount	x		x		x		x	
Additional bonus discount (5%)	x							

b)   Figure 5 illustrates an example of the user interface of the User Registration Form for an online shopping platform.

Figure 5: The user interface of the User Registration Form.

Based on the weaknesses that can be identified in Figure 5 user interface, redraw a new interface that will increase the usability of the User Registration Form. (10 Marks)

Answer:

(1 mark for ANY suitable answer – example below, max 5 marks)

- Build an interface that is easy to learn and use
    - o Label clearly all controls, buttons, and icons
    - o Select only those images that a user can understand easily
    - o Show all commands in a list of menu items
    - o Make it easy to navigate or return to any level in the menu structure.

- Provide features that promote efficiency:

    o Organize tasks, commands, and functions in groups that resemble actual business operations

    o Create alphabetical menu lists

    o Provide shortcuts so experienced users can avoid multiple menu levels

    o Use default values if the majority of values in a field are the same.

- Minimize input data problems:

    o Provide data validation checks

    o Display event-driven messages and reminders

    o Establish a list of predefined values that users can click to select

    o Build in rules that enforce data integrity

    o Use input masks.

- Provide feedback to users:

    o Display messages at a logical place on the screen

    o Alert users to lengthy processing times or delays

    o Allow messages to remain on the screen long enough for users to read them

    o Let the user know whether the task or operation was successful or not.

- Create an attractive layout and design:

    o Use appropriate colors to highlight different areas of the screen

    o Use special effects sparingly

    o Use hyperlinks that allow users to jump to related topics

    o Group related objects and information.

- Use familiar terms and images:

    o Provide a keystroke alternative for each menu command

    o Use familiar commands

    o Provide a Windows look and feel in your interface design if users are familiar with Windows-based applications