SC025
Computer Science
Semester II
Session 2024/2025
2 hours

SC025
Sains Komputer
Semester I I
Sesi 2024/2025
2 jam

Name	Matric No											Practicum

(Sila isi maklumat dengan jelas dan lengkap)

KOLEJ MATRIKULASI LABUAN
LABUAN MATRICULATION COLLEGE

PRA-PEPERIKSAAN SEMESTER PROGRAM MATRIKULASI
MATRICULATION PROGRAMME TRIAL EXAMINATION

SAINS KOMPUTER
(SET 2)
2 jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU.
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

Untuk Kegunaan Pemeriksa		
No.	Mark	
	Pemeriksa	KP / KKP
1 (6 M)		
2 (10 M)		
3 (20 M)		
4 (8M)		
5 (11 M)		
6 (15 M)		
70 M		

Kertas soalan ini mengandungi 13 halaman bercetak
This question paper consist of 13 printed pages

1. Programming paradigms define the approach used in writing programs, influencing aspects such as structure, data handling, and execution. Translators play a crucial role in converting high-level language into machine code for execution.

a) Compare **Procedural Programming** and **Object-Oriented Programming** in terms of code reusability.

[2 marks]

Aspect	Procedural Programming	Object-Oriented Programming
Code Reusability		

b) Identify the most appropriate programming language paradigm based on the given scenario and give **one (1)** example of the most suitable programming language for each scenario.

[4 marks]

Scenario	Type of Programming Language Paradigm	Example of Programming Language
Developer X is required to design an online shopping system that tracks user interactions, manages cart items, and processes orders dynamically.		
Developer Y is assigned to create a temperature conversion tool that follows a step-by-step process and calls functions for calculations.		

2. Problem solving is the process of transforming the description of a problem into a solution. Identify Input-Process-Output (IPO) for the scenario below:

a) Due to the ongoing heatwave in Malaysia, households have increased their usage of air conditioners. TNB wants to develop a system to estimate the daily electricity cost of using an air conditioner. The air conditioner consumes **1.5 kWh per hour**, and the electricity rate is **RM0.50 per kWh**. The system will prompt the number of hours the air conditioner is used in a day to calculate and display the total cost for that day.

[4 marks]

Input	
Process	
Output	

b) Petronas plans to implement a system to monitor the gas pressure in its pipeline following a recent fire incident in Putra Heights, Selangor. The system will prompt the user to enter the current gas pressure for each hour of monitoring. The program will continue prompting for pressure readings every 1 hour for 24 hours.

If the pressure exceeds the safe limit of 250 psi, the system will trigger an alert to warn the control center. If the pressure is within the safe range, the program will display a status message indicating normal operation.

[6 marks]

Input	
Process	
Output	

3. An algorithm provides clear instructions that a computer or person can follow to achieve a specific goal ensuring tasks are completed efficiently and accurately. In real life, algorithms are used in things like searching on Google, recommending content on Netflix, and controlling smart devices.

a) Nurha Farm uses a smart farming system that incorporates big data to monitor different crop types and estimate their daily water usage per hectare. The system will then calculate and display the type of crop along with total water usage per day for the selected crop type. Table below shows the water usage per hectare based on the crop type. Write a pseudocode to calculate and display the total water usage for the selected crop.

Crop ID	Crop Type	Water Usage per Hectare (litres)
CC	Corn	800
RC	Rice	1500
WC	Wheat	600

[6 marks]

b) Luna Wardrobe is an online clothing store based in Selangor. The store offers discounts based on the total purchase amount and the customer's membership status, as shown in the following table :

Total Purchase Amount (RM)	Membership Status	Discount (%)
> RM 200	Member	20%
> RM 200	Not a member	15 %
RM200 or less	Member	10 %
RM200 or less	Not a member	No discount

You as the company's app developer are tasked to design a simple system structure that will display the discount price and total payment for the customer. Based on the given scenario, design the algorithm using a flowchart.

[14 marks]

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4. a) i) Determine output for the following Python statements.

```
quiz = 110/20
print(quiz)
total = quiz/2
System.out.println(total)
```

[2 marks]

OUTPUT:

ii) Convert the following for statements to while statements.

```
listStudents = 23;
for i in range(2, listStudents - 1, 2):
    print(i)
```

[2 marks]

b) Write Python statement for the following algebraic equations.

i) $y = 3x^5 + 4x^2 - 9$

[2 marks]

ii)

$$y = \frac{x^2 - 16x + 64}{2x - 16}$$

[2 marks]

5. Control structures are specific commands in imperative programming languages that are used to control the logical flow of the program during its execution. Write a Python segment based on a control structure.

a) Protiga Car Sdn Bhd motivates their salesmen by giving incentives at the end of the year. Each salesman will get a 20% yearly bonus based on their total sales of the current year. Assume that there are 5 salesman in Protiga Car Sdn Bhd, Write a program segment that can calculate and display the total bonus for every salesman based on the total sales inserted.

[6 marks]

b) The following program segment belongs to HiSpeed Sdn Bhd which is a bus company located in Kota Kinabalu. The program segment calculates the total ticket price based on code and quantity of ticket. An additional travel insurance worth 5% of ticket price will be imposed to each passenger. At the end of the program, the total ticket price is displayed as the final result. Complete the program segment below.

Code	Destination	Price (RM)
100	Brunei	60.00
110	Kuching	85.00
111	Labuan	70.00

[5 marks]

6. A store manager wants to calculate the total sales and track the number of transactions for the day. Write a Python program that continuously asks the cashier to enter sale amounts. The program should add each sale to a running total and count the number of transactions. Sale amounts can be positive (profit) or negative (loss/refund). When the cashier enters 0, the program should stop and display the total sales, the number of transactions, and the average sale amount for the day. Use a sentinel-controlled loop where 0 is the sentinel value to end the input process.

   Sample output:

   Enter sale amount (0 to stop): 150

   Enter sale amount (0 to stop): 200

   Enter sale amount (0 to stop): -50

   Enter sale amount (0 to stop): 75

   Enter sale amount (0 to stop): 100

   Enter sale amount (0 to stop): 0

   Total sales: RM 475.0

   Number of transactions: 5

   Average sale: RM 95.0