SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN TEKNOLOGI MAKLUMAT DAN KOMUNIKASI

PEPERIKSAAN AKHIR

SESI I : 2024/2025

DFC30233 : DATA STRUCTURES

TARIKH : 4 DISEMBER 2024
MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas ini mengandungi **DUA PULUH LAPAN (28)** halaman bercetak.
Bahagian A: Objektif (30 soalan)
Bahagian B: Struktur (2 soalan)
Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SECTION B : 55 MARKS
BAHAGIAN B : 55 MARKAH

INSTRUCTION:
This section consists of **TWO (2)** structured questions. Answer ALL questions.

ARAHAN :
*Bahagian ini mengandungi **DUA (2)** soalan berstruktur. Jawab semua soalan.*

QUESTION 1(a)
SOALAN 1(a)

CLO1

i. Define data structure.
Definisikan struktur data.

[2 Marks]
[*2 Markah*]

CLO1

ii. Show the appropriate structure declaration based on the information in Table B1(a)(ii).
Tunjukkan perisytiharan struktur yang sesuai berdasarkan maklumat dalam Jadual B1(a)(ii).

Table B1(a)(ii)/ *Jadual B1(a)(ii)*

Type	Name	Data Type
Structure name	ReservationPlatform	
Member 1	guest_name	50 characters
Member 2	room_type	15 characters
Member 3	total_amount	Floating point
Variable structure - 1	Trivago	Until 25 records
Variable structure - 2	bookingCom	Until 50 records

[4 Marks]
[*4 Markah*]

QUESTION 1(b)
SOALAN 1(b)

CLO1

i. List **TWO (2)** types of Linked List.
*Senaraikan **DUA (2)** jenis Senarai Berpaut.*

[2 Marks]
[*2 Markah*]

CLO1

ii. Illustrate a Circular Linked List diagram with two nodes which are 'M' and 'Z.
Ilustrasikan gambarajah Senarai Berpaut Bulat dengan dua nod iaitu ''M' dan 'Z.

[4 Marks]
[*4 Markah*]

QUESTION 1(c)
SOALAN 1(c)

CLO1

i. State **TWO (2)** common operations in Stack implementation.
*Nyatakan **DUA (2)** operasi umum dalam implementasi Tindanan.*

[2 Marks]
[*2 Markah*]

CLO1

ii. Two potential problems that can occur in a stack are **underflow** and **overflow**. Explain the concept of **overflow** in a stack, and provide a diagram illustrating this problem.
*Dua masalah yang mungkin berlaku dalam timbunan (stack) ialah **underflow** dan **overflow**. Terangkan konsep **overflow** dalam timbunan, dan sertakan satu rajah yang menggambarkan masalah tersebut.*

[3Marks]
[*3 Markah*]

CLO1

iii. Figure B1(c)(iii) represents a stack where each index holds the name of a coffee brand. Convert this array into a single linked list structure.
Rajah B1(c)(iii) mewakili tindanan di mana setiap indeks memegang nama jenama kopi. Tukar tatasusunan ini kepada struktur senarai berpaut tunggal.

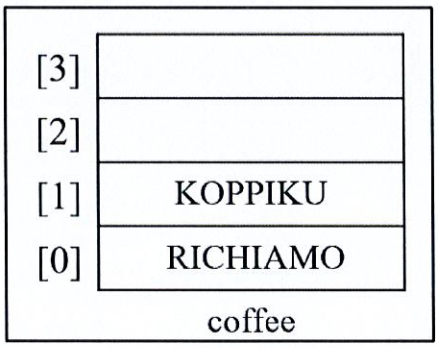

Figure B1(c)(iii) / *Rajah B1(c)(iii)*

[3 Marks]
[*3 Markah*]

QUESTION 2(a)

SOALAN 2(a)

CLO1

i. Define Queue with **TWO (2)** examples of Queue in real life.
*Definisikan Baris Gilir berserta **DUA (2)** contoh Baris Gilir dalam kehidupan sebenar.*

[4 Marks]
[*4 Markah*]

CLO1

ii. Illustrate an appropriate Circular Queue named "ArrNum" for each of the statement below including the value for front, rear and count on relevant diagram.
Gambarkan Baris Gilir Bulat yang sesuai bernama "ArrNum" untuk setiap pernyataan di bawah termasuk nilai untuk depan, belakang dan kiraan pada rajah yang berkaitan.

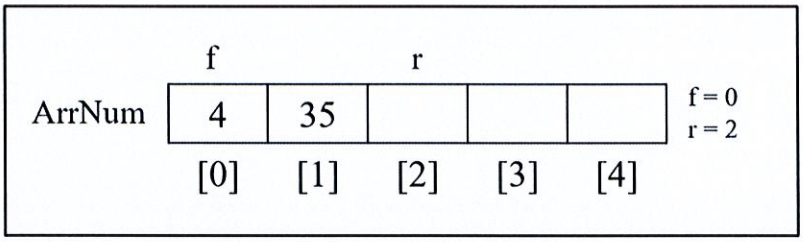

Figure B2(a)(ii) / *Rajah B2(a)(ii)*

a) Enqueue(6, ArrNum);
b) Dequeue(ArrNum);
c) Enqueue(42, ArrNum);

[6 Marks]
[*6 Markah*]

QUESTION 2 (b)
SOALAN 2 (b)

CLO1

i. Identify root node, parent node, child node and leaf node based on Figure B2(b)(i).
Kenal pasti nod 'root', nod 'parent', nod 'child' dan nod 'leaf' berdasarkan Rajah B2(b)(i).

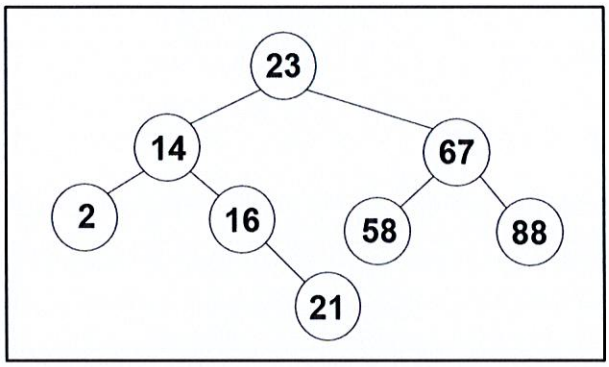

Figure B2(b)(i) / *Rajah B2(b)(i)*

[4 Marks]
[*4 Markah*]

CLO1

ii. Sketch the Binary Search Tree based on Figure B2(b)(ii).
Lakarkan Pepohon Carian Dedua berdasarkan Rajah B2(b)(ii).

pink, green, yellow, grey, blue, red

Figure B2(b)(ii) / *Rajah B2(b)(ii)*

[6 Marks]
[*6 Markah*]

CLO1

iii. Write the node sequence of Inorder, Preorder and Postorder traversal based on Binary Tree in Figure B2(b)(iii).
Tulis urutan nod bagi traversal Inorder, Preorder dan Postorder berdasarkan Pepohon Dedua dalam Rajah B2(b)(iii).

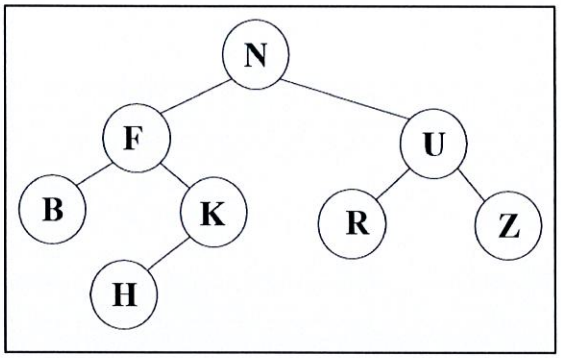

Figure B2(b)(iii) / *Rajah B2(b)(iii)*

[6 Marks]
[*6 Markah*]

QUESTION 2(c)
SOALAN 2(c)

CLO1

i. Explain **TWO (2)** differences between Linear Search and Binary Search.
*Terangkan **DUA (2)** perbezaan antara Carian Linear dan Carian Binari.*

[4 Marks]
[*4 Markah*]

CLO1

ii. Illustrate the steps to find number 100 in Figure B2(c)(ii) by using **Binary Search Method.**
*Lakarkan langkah-langkah untuk mencari nombor 100 dalam Rajah B2(c)(ii) menggunakan **Kaedah Carian Binari**.*

20	40	60	80	100	120
[0]	[1]	[2]	[3]	[4]	[5]

Figure B2(c)(ii) / *Rajah B2(c)(ii)*

[5 Marks]
[*5 Markah*]

END OF QUESTIONS
SOALAN TAMAT