



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION (ONLINE) SEMESTER I SESSION 2020/2021

COURSE NAME : DATA STRUCTURE AND ALGORITHM
COURSE CODE : BIT 10703
PROGRAMME CODE : BIT
EXAMINATION DATE : JANUARY / FEBRUARY 2021
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS
2. PLEASE MAKE SURE TO CLICK "SAVE ANSWER" BUTTON FOR SUBJECTIVE QUESTIONS. OBJECTIVE QUESTIONS ARE SAVED AUTOMATICALLY

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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Q1 Consider the following recursion function in **FIGURE Q1**.

```

int recursion_function(int x, int y)
{
    if (x<y)
        return 0;
    else
        return (x + recursion_function(x-1,y));
}

```

FIGURE Q1

- a) Determine the output when $x=10$ and $y=4$. (2 marks)
- b) Determine the output when $x=4$ and $y=7$. (2 marks)

Q2 **FIGURE Q2** shows a song playlist in Ahmad's iPod. Ahmad decides to add a new song from Guns and Roses with the song title Sweet Child O Mine on the top as his new favourite song. Then, he decides to replace the Elvis Presley's song with My Chemical Romance entitled Helena. Based on the given scenario, write a C program using double linked list. The program should display the latest song playlist in Ahmad's iPod.

Track	Artist	Song title
1	Muse	Time is Running Out
2	Elvis Presley	Cant Help Falling in Love

FIGURE Q2

(25 marks)

Q3 Ah Seng owns a tyre shop located in Batu Pahat. In a month, he receives 10 units of tyre directly from the tyre manufacturer. The tyres that he receives are varies in terms of their manufacturing date. Normally, he will arrange the tyres according to their manufacturing date, starting from the oldest at the bottom, to the newest at the top. However, his shop can only accommodate 6 tyres at a time. Therefore, he stores the remaining tyres in his home. Whenever the 6 tyres are sold, he will restock the tyres from the unit in his home. He will sell tyres with the latest manufacturing date available in his stock. As to date, Ah Seng has managed to sell tyres which manufactured from January to August 2020. **Table 1** shows the list of tyres which Ah Seng currently has. Write a C program to implement stack using array to visualize this situation. The program should display the latest tyre model at the top of the stack.

Table 1: Manufactured and Model data

Manufactured Date	Model
30 August 2020	Good Year Eagle
20 January 2020	Michelin XM2
4 October 2020	Michelin PS4
6 May 2020	Toyo Nano Energy
19 February 2020	Silverstone Kruizer
28 November 2020	Hankook Ventus
9 September 2020	Bridgestone Potenza
25 Desember 2020	Continental Ultra Contact
18 March 2020	Dunlop J5
4 April 2020	Viking PT6

(26 marks)

Q4 Miss Aisyah works as data entry clerk at Sudin’s workshop. Her role is to enter the details of every car that sent to the workshop for servicing or repairing in a day. The details include plate number, car model, subject and the time recorded during the car arrives and leaves as shown in **Table 2**. The A car is considered completed on that particular day if the clock out is recorded. If the service or repair is not completed, the car will be kept at the workshop to be completed on the following day. Therefore, the car will be serviced or repaired based on first come first serve basis. Write a C program to implement queue concept using linked list based on the information of clock in and clock out.

Table 2: Service and Repair data

Plate No	Car Model	Subject	Clock in	Clock out
JUA 54	Proton X50	Service	9.15AM	10.15AM
SYG 8888	Honda City RS	Repair	11.30AM	5.00PM
AJP 6558	Honda FK8R	Repair	11.31AM	-
RAG 101	Nissan Almera Turbo	Repair	10.00AM	5.00PM
U’THM 2015	Mazda 3	Service	8.45AM	9.30AM

(25 marks)

- END OF QUESTIONS -

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