

**FINAL
ALTERNATIVE ASSESSMENT**

(COVER PAGE)

Session : April 2020

Programme : Diploma In Information And Communication Technology (DICTN)
Diploma In Information Technology (DITN)

Course : **ICT2102: Introduction To Data Structure**

Date of Examination : August 7, 2020 (Friday)

Time : 4.00pm – 6.00pm Reading Time : Nil

Duration : 2 Hours

Special Instructions :

Answer **ALL** questions

Materials permitted : Non-programmable calculator

Materials provided : Nil

Examiner(s) : **Siti Hajar Khairuddin** and Chern Huey Rong

Moderator : Lusiana

This paper consists of 4 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY
PROGRAMME (DICTN)
DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
ICT2102: INTRODUCTION TO DATA STRUCTURE
FINAL ALTERNATIVE ASSESSMENT: APRIL 2020 SESSION

Instruction: This paper consists of **SIX (6)** questions in **Section A**, and **ONE (1)** question in **Section B**. Answer **ALL** questions.

SECTION A: (75 marks)

Question 1

(a) In your own words, provide **THREE (3)** descriptions of Data Structure.

(6 marks)

(b) Explain **THREE (3)** scenarios that need the application of Data Structure for its efficiency.

(9 marks)

(Total: 15 marks)

Question 2

Write a program to display the values and addresses of variables you create through the descriptions below:

- (i) Declare two variables of type `int`.
- (ii) Assign any integer values to each variable in (a)
- (iii) Declare two pointers of type `int`. Each pointer points to address for each variable in (a).
- (iv) Re-assign the second pointer to make it point to what the first pointer is following.
- (v) Display the values of both variables. Use dereference for one of them.
- (vi) Display the address of both variables.
- (vii) Display the address of both pointers.

(15 marks)

Question 3

Structures are used to represent a record.

- (i) Create a structure with appropriate name and **3 (THREE)** attributes to represent your name, ID and a subject you are taking this semester.
- (ii) Create one variable to access the attributes.
- (iii) Prompt the user to key in the values for each attributes.
- (iv) Display all attributes of the structures.

(15 marks)

Question 4

Assume that you are given an ADT that stores the of subjects offer in a semester.

- (i) State **FIVE (5)** operations that can be performed on the ADT. (5 marks)
- (ii) State **FIVE (5)** types of data structure to store the data in the list. (5 marks)
- (Total: 10 marks)**

Question 5

Implement a linked list to store the records of the residents in a community. The community needs to record the resident's information: house number, street, and maintenance fees.

- (a) Declare a linked list class `communityClass` with the following:
- (i) First private member `communityNode` is a structure contains the members for the resident's information and a link that points to the next item.
 - (ii) Second private member `NODEPTR` is a pointer of `communityNode`. Declare third private member `head` with `NODEPTR`.
 - (iii) First public member is the default constructor.
 - (iv) Second public member is an associate operation `addNode()` that inserts a new record of resident's information to the beginning of the linked list.
- (8 marks)
- (b) Define the associate operation `addNode()` . (7 marks)
- (Total: 15 marks)**

Question 6

Briefly explain double-ended queue or deque. Assist your explanation with a drawing of an array that shows the location to perform insertion and deletion.

(5 marks)

SECTION B: Answer **ALL** questions. (25 marks)

Question 1

Currently there is an outbreak of covid-19 in Malaysia. You are required to develop a system to help Ministry of Health to address this issue. Your system is expected to help our medical care facilities. Your system can aim to help to address this issue by applying any of these strategies: tracking, isolating, curing the patients. It can also be a combination of the strategies. In this scenario, parties involved can be doctor, patient, medication, hospitals, government, and etc.

You must design your codes using Classes. You do not need to write full codes for the functions (pseudocode is sufficient). You must fulfill all **THREE (3)** requirements below for your system.

- (a) Design and define at least **ONE (1)** base classes, and define **FOUR (4)** private variables for this base class. (5 marks)
 - (b) This base class must contain at least **THREE (3)** functions. (10 marks)
 - (c) Design and define at least **TWO (2)** child class that inherit from base class above. The child class must contain at least **TWO (2)** variables and **TWO (2)** functions. (10 marks)
- (Total: 25 marks)**

~ **The End** ~

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