NATIONAL OPEN UNIVERSITY OF NIGERIA
91 CADASTRAL ZONE NNAMDI AZIKWE EXPRESSWAY
JABI, ABUJA
Faculty of Sciences
Department of Computer Science
July 2017

Course Code: CIT 341 ***Time:*** 3hrs

Course Title: Data Structures ***Course Credit Unit:*** 3

Instruction: Answer Question One (1) and any **four (4)** questions

QUESTIONS

1(a) State 4 properties of the following Lists

(i) Array List (ii) Link Lists (4marks each)

1(b) State the outcome of the primitive operations

(i) IsEmpty (ii) IsFull (iii) Initialise (½ mark each = 1½marks)

1 (c) Distinguish between **linear** and **non-linear** data structures (4marks)

1 (d) Write a brief note on each of the following:.

i. Array ii. List (1½ marks each = 3marks)

1 (e) Briefly explain what a hash function is. (3 ½ marks)

1 (f) List the three characteristics of a good hash function. (2 marks)

[Total = 22 marks]

2(a) Write down the mathematical definition of a **tree** mentioning the required properties.

2(b) Briefly explain **the recursive nature** of the above definition of a tree.

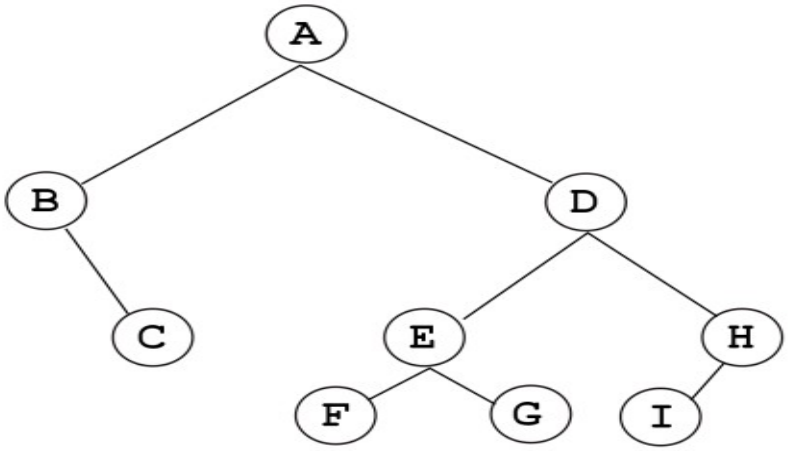
2(c) Using an example describe the **inverted pictorial representation** of a tree.

3(a) Briefly describe what a **search tree** is mentioning its salient properties.

3(b) Give a concise definition of **a perfect binary tree**.

3(c) Using the simple tree shown in the figure below as an example, describe the following **traversal** methods:

(i). Preorder (ii). Postorder (iii). Inorder



4(a) Explain clearly what greedy algorithm is.

4(b) Describe four functions of greedy algorithm

4(c) Briefly describe the three phases of the divide-and-conquer paradigm. (4marks each)

[Total = 12 marks]

5(a) Consider the following operations carried out on a queue Q. Provide the content of the queue and the returned value, after each operation, to complete the table. (5marks)

Operation	Content of Q	Returned Value
Initialise(Q)		
Add(D,Q)		
Add(A,Q)		
Add(O,Q)		
Remove(Q)		
Add(T,Q)		
Remove(Q)		

5(b) Using a simple example explain the process of storing a queue in a dynamic data structure illustrating how a node can be added and removed.

(7marks)
[Total = 12 marks]

6 Write short notes on the following:

(i) Date Types and their importance in Computer Programme

(ii) Abstract Data Type, giving relevant examples.

(iii) Data Structure, indicating examples where possible

[Total = 12 marks]