NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SEPTEMBER/OCTOBER 2015 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: **CIT 341**
COURSE TITLE: **DATA STRUCTURES**

INST RUCTION: ***Answer anyfive questions out of Seven***
Time: 3HOURS

1 .

a. Distinguish b etween**linear** and **non-linear** data structures
b. Write a brief note on each of the foll owing:
   Arra y
   List
c. D istinguish between a **queue** and **a stack**. Illustrate your answer.

2 .

a) C onsider the following o perationscarried out on a **queue** Q. Provide the **content** of t he q ueue and th e **returnedvalue,** after each operat on, to comp lete the table.

O peration	Conte nt of Q	Returned Value
I nitialise(Q)		
A dd(A,Q)		
A dd(D,Q)		
A dd(O,Q)		
R emove(Q)		
A dd(T,Q)		
R emove(Q)		

b) U sing a simple example e xplain how a queue is stored in a dynamic data tructure
describing ho w a node ca n be added and removed.
c) B riefly describe two modes of **stackstorage**.

3 .

a) B riefly explain what a hash function is.
b) List the three characteristics of a good hash function.
c) E xplain what a hash table is mentioning an exam ple of its app lication.

4.

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

b) B riefly explain **the recursive nature** of the above definition of a tree.

c) U sing an exampledescrib e the **inverted pictorial representation** of a tree .

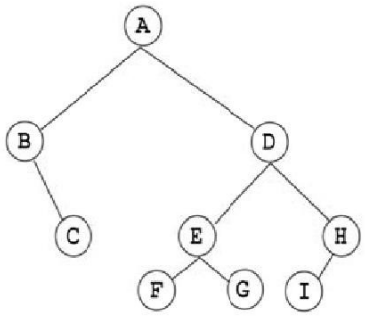
5.

a) B riefly describe what a **search tree** is mentioning its salient p roperties.

b) G ive a concise definition of **a perfect binary tree**.

c) U sing the simple tree shown in the fi gure below a s an example, describe the followin g **traversal** methods:

i. Preorder
ii. Post order
iii. Inorder.



6 .

a) B riefly explain the concept of **garbage** and how it accumulate s in a Java Programme

b) Write short n otes on the following **garbagecolletion**techniques

i. Refeence Counting
ii. Mark -and-Sweep

c) B riefly describe four **Memory Allocation** methods.

7 .

a) E xplain clearly what **greedy algorith** is.

b) D escribefouconstituen t **functions**o f greedy algorithm

c) B riefly describe the three **phases** of the **divide-and-conquer** paradigm