

Course Title: Data Structures & Algorithms Analysis  
Date: 03/06/2017  
No. of Questions: 3 Questions  
Time: 2 hours  
Using Calculator (No)

University of Palestine



Final Exam  
2<sup>nd</sup> semester 2016/2017  
Total Grade: 50

Instructor Name: Eng. EmanAlajrami  
Student No.: \_\_\_\_\_  
Student Name: \_\_\_\_\_  
College Name: IT  
Dep. / Specialist: \_\_\_\_\_  
Using Dictionary (No)

First Question

No. of Branches (1)

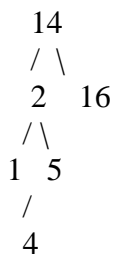
(10 marks)

**Q1 B1**

Choose the best Answer:

1. If the characters 'D', 'C', 'B', 'A' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed?  
A. ABCD  
B. ABDC  
C. DCAB  
D. DCBA
2. In the linked list implementation of the queue class, where does the insert method place the new entry on the linked list?  
A. At the head  
B. At the tail  
C. After all other entries that are greater than the new entry.  
D. After all other entries that are smaller than the new entry.

3. Consider this binary search tree:



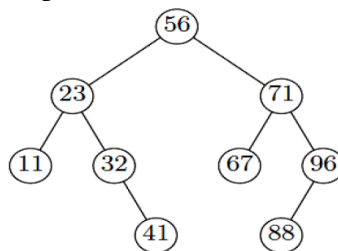
Suppose we remove the root, replacing it with something from the left subtree. What will be the new root?

A. 2B. 4C. 5D. 16

4. Select the one true statement.  
A. Every binary tree is either complete or full.  
B. Every complete binary tree is also a full binary tree.  
C. Every full binary tree is also a complete binary tree.  
D. No binary tree is both complete and full.

5. What is label of the 5th node in the preorder traversal of the tree shown below?

- A. 96  
B. 88  
C. 67  
D. 41



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**Second Question**

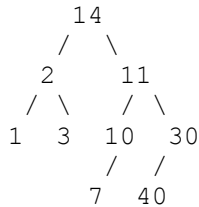
**No. of Branches (2)**

**( 10 marks)**

**Q2 B1**

**(6 marks)**

Here is a small binary tree:



Write the order of the nodes visited in:

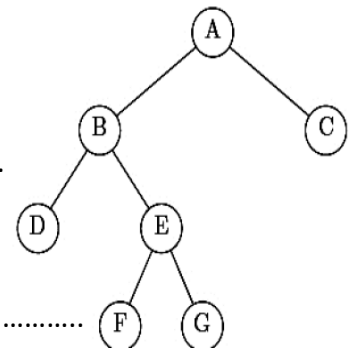
- A. An in-order traversal: .....
- B. A pre-order traversal: .....
- C. A post-order traversal: .....

**Q2 B2**

**( 4 marks)**

Given the following Binary Tree, Solve the following Questions?

- a) What are the ancestors of node E? .....
- b) What are the descendants of node B? .....
- c) What is the height of the tree? .....
- d) What is the maximum possible number of nodes at the level of node G? .....



**Third Question**

**No. of Branches (3)**

**(30 marks)**

**Q3 B1**

Write the algorithm for preorder traverse of a binary tree.

**(5 marks)**

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**Q3 B2**

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**Using Dictionary (No)**

**Given the following data draw a binary search tree for it. (5 marks)**

**15, 3, 20, 17, 25, 19, 78, 18, 22, 10, 17, 55, 73**

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**Q3 B3: (5 marks)**

**Write the pop method of a stack that is implemented using single linked list.**

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**Q3 B4: Implement find (binary search) method in the binary search tree class.(5 marks)**

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**Using Dictionary (No)**

**Q3 B5:**

**Implement the insert method in the queue that implemented using an array? (5 marks)**

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**Q3 B6:**

**(2 marks)**

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int f (int v)
{
    if ((v == 1) || (v == 0))
        return 1;
    else if ((v%2) == 0)
        return f(v/2) + 2;
    else
        return f(v-1) + 3;
}
```

**What will be the return value if we call f(7);**

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