Daffodil International University
Department of Computing & Information System
Course Title: Algorithms
Course Code: CIS 132

Quiz-1

Time: 30 minutes

Instruction: Kindly write down your ID/Reg no., Quiz/Class-test no., Session & Date of quiz on the answer sheet.

	Marks
1. What is Algorithm? What are the properties of algorithm?	3
2. Define Best, Worst & Average case complexity.	3
3. Calculate the time complexity of the following codes:	6

a)
```
for (int i = 1; i <= n; i++) {
    for (int j = 1; j <= n; j++) {
        for (int k = 1; k <= i; k++) {
            int value = i * j * k;
            cout << value << std::endl; }
        }
    }
}
```

b)
```
for (int i = 0; i < rows; ++i) {
    for (int j = 0; j < cols; ++j) {
        cout << "Element at position (" << i + 1 << "," << j + 1 << "): ";
        cin >> matrix[i][j];
    }
}
cout << "The matrix is:" << endl;
for (int i = 0; i < rows; ++i) {
    for (int j = 0; j < cols; ++j) {
        cout << matrix[i][j] << " ";
    }
cout << endl;
}
```

c)
```
for (int i = 1; i <= n; i++) {
    for (int j = 1; j <= (log(n)); j++) {
        int sum = i + j;
        cout << sum << endl;
    }
}
```

4. What does it mean by "Algorithm Analysis"? Differentiate between "Priori" & "Posteriori" analysis?   3

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Quiz-2   **Time: 45 minutes**

Instruction: Kindly write down your ID/Reg no., Quiz/Class-test no., Session & Date of quiz on the answer sheet.

	Marks

1. Given the array A = [29, 10, 14, 37, 13], perform one complete iteration of each   **5**
   of the following sorting algorithms and show the array after each step:
   a) Bubble Sort
   b) Insertion Sort $n\log n$ n^2 n^2
2. Explain why Quick Sort is generally faster than Bubble Sort, Selection Sort,   **3**
   and Insertion Sort in terms of time complexity. Include a brief comparison of
   their average-case time complexities.
3. Given the array A = [20, 35, 15, 40, 50, 10, 5], explain the steps of the Merge   **4**
   Sort algorithm in dividing and merging the array. What will the array look like
   after the first full merge phase?
4. Given an array A = [329, 457, 657, 839, 436, 720, 355], illustrate the first two   **3**
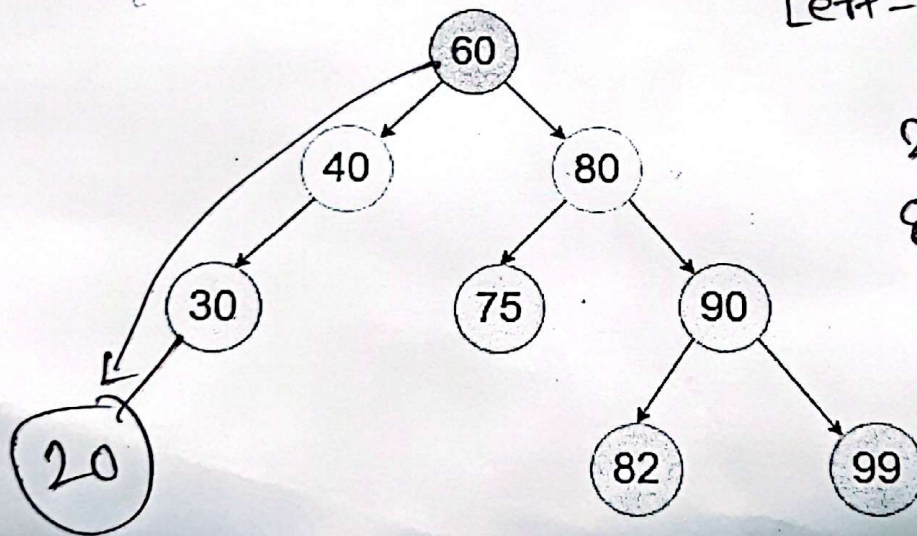   passes of Radix Sort (base 10) as it sorts the array.

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Quiz-3

Time: 45 minutes

Instruction: Kindly write down your ID/Reg no., Quiz/Class-test no., Session & Date of quiz on the answer sheet.

Marks

Left - Right - Root

20, 30, 40, 75,

80, -82, 99, 90,

60,

Figure-1: Binary Search Tree

1. Answer the following questions:
   a. Insert "20" into the above tree.
   b. Print the "Post-order" series of the tree after the completion of the above-mentioned operation.
   c. Delete "75" & "90" from the above tree.
   d. Re-draw the BST after execution of the above-mentioned operations. Check if the tree is AVL or not. If not, execute necessary operations to convert into an "AVL" tree.
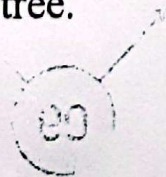
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Quiz-Makeup

Time: 45 minutes

Instruction: Kindly write down your ID/Reg no., Quiz/Class-test no., Session & Date of quiz on the answer sheet.
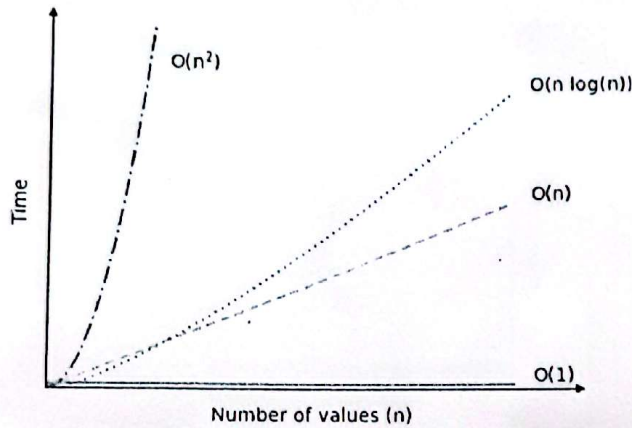
Marks

1. Explain the given graph.   5

Figure 1: Time complexity in Algorithms

2. Given the array A = [78, 56, 34, 90, 21, 47], perform each of the following   5
   sorting algorithms and show the array after each step:
   a) Merge Sort
   b) Selection Sort
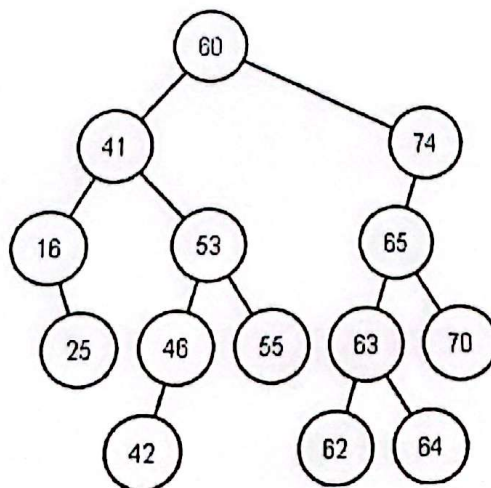
3. Print Pre-order, In-order, Post-order series of the given graph with detail   5
   process

Figure 2: Binary Search Tree