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BICS-029

DIPLOMA – VIEP – COMPUTER SCIENCE AND ENGINEERING (DCSVI) / ADVANCED LEVEL CERTIFICATE COURSE IN COMPUTER SCIENCE AND ENGINEERING (ACCSVI)

Term-End Examination

00486

June, 2016

BICS-029 : ALGORITHMS AND LOGIC DESIGN

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Question number **1** is **compulsory** which has multiple choice questions. Each question carries equal marks.*

1. Choose the correct answer from the given four alternatives : *7×2=14*

(a) Two main measures for the efficiency of an algorithm are

(i) Processor and memory

(ii) Complexity and capacity

(iii) Time and space

(iv) Data and space

(b) Which of the following case does ***not*** exist in complexity theory ?

(i) Best case

(ii) Worst case

(iii) Average case

(iv) Null case

(c) The complexity of linear search algorithm is

(i) O(n)

(ii) O(log n)

(iii) $O(n^2)$

(iv) O(n log n)

(d) Which of the following is ***not*** a linear data structure ?

(i) Array

(ii) Linked List

(iii) Both the above

(iv) None of the above

(e) Which of the following sorting algorithms is of divide and conquer type ?

(i) Bubble sort

(ii) Insertion sort

(iii) Quick sort

(iv) All the above

(f) An algorithm that calls itself directly or indirectly is known as

(i) Sub algorithm

(ii) Recursion

(iii) Polish notation

(iv) Traversal algorithm

(g) When new data are to be inserted into a data structure but there is no available space, this situation is usually called

(i) Underflow

(ii) Overflow

(iii) Houseful

(iv) Saturated

2. (a) Define algorithm. Explain the characteristics of an algorithm. 7

(b) Write an algorithm and draw a flow chart to find the largest of N numbers. 7

3. (a) Differentiate between priori analysis and posteriori analysis. 7

(b) What are the different mathematical notations used for algorithm analysis ? 7

4. (a) Give the partition algorithm for Quicksort. 7

(b) Show that $n^3 \log n$ is $\Omega(n^3)$. 7

5. (a) Write the non-recursive algorithm for finding the Fibonacci sequence and derive its time complexity. 7

(b) Explain about the Approximation and Randomized algorithm in brief. 7

6. (a) How does merge sort algorithm sort the following sequence of keys in ascending order ?

12, 22, 48, 33, 56, 44, 57, 76, 84, 65

Explain with a neat diagram representing sequence of recursion calls. *7*

(b) Discuss the time complexity of merge sort. *7*

7. (a) Determine the frequency count for all statements in the following two algorithm segments : *10*

(i)
```
for i := 1 to n do
for j := 1 to i do
for k := 1 to j do
    x := x + 1;
```

(ii)
```
i := 1
while (i < = n) do
{
   x := x + 1;
   i = i + 1;
}
```

(b) Explain about the branch and bound in detail. *4*

8. Explain the following : $4 \times 3\frac{1}{2} = 14$

(a) Program Development Cycle

(b) Bucket Sort

(c) Components of flow chart

(d) Shell Sort