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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

00104

June, 2015

BICS-029 : ALGORITHMS AND LOGIC DESIGN

Time : 2 hours *Maximum Marks : 70*

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

1. Choose the correct answer from the four given alternatives :

(a) A sorting algorithm based on binary component requires at least how many comparisons ? *2*

(i) [log n !]

(ii) [log n^2 !]

(iii) [log 2n !]

(iv) [log (n–1)!]

(b) Which sorting algorithm proceeds on the idea of keeping the first part of the list ? *2*

(i) Bubble sort

(ii) Insertion sort

(iii) Quick sort

(iv) Selection sort

(c) The average number of comparisons in bubble sort is 2

(i) n^2

(ii) $\frac{n(n-1)}{2}$

(iii) $\frac{n(n+1)}{2}$

(iv) $\frac{n+1}{2}$

(d) For less amount of data, which one of the following sorting techniques is suitable ? 2

(i) Insertion sort

(ii) Heap sort

(iii) Selection sort

(iv) Bubble sort

(e) The average run time of quick sort is 2

(i) $O(n \log_2 n)$

(ii) $O(n(\log_2 n)^2)$

(iii) $O(n \log n)$

(iv) $O(n^3)$

(f) Which one of the following methods is most efficient, if the successor value of k is kept prime to each other ? 2

(i) Selection sort

(ii) Bucket sort

(iii) Shell sort

(iv) Heap sort

(g) In binary search, the worst case time complexity is 2

(i) O(log n)

(ii) O(n log n)

(iii) $O(n \log n^2)$

(iv) O(n log 2n)

2. (a) What is selection sort ? Differentiate between selection sort and insertion sort. 7

(b) What do you understand by analysis of an algorithm? Write an algorithm for deleting duplicate numbers from a linear array. 7

3. (a) Write and explain the binary search method. Give an example for contiguous versions. 7

(b) Explain all the stages of Program Development Life Cycle. 7

4. (a) Write an algorithm using merge sort that finds time complexity to sort 'n' elements $T(n) = O(n \log_2 n)$. 7

(b) Write an algorithm to sort numbers using bubble sort. 7

5. (a) Draw a flow chart to arrange N-numbers in ascending and descending order. 7

(b) What is complexity ? Write the types of complexity and explain Big-Oh and Big-Omega notations. 7

6. (a) How do you explain analyzing algorithm ? Briefly explain the steps needed to create and test the program. 7

(b) Write pseudo code for selection sort. 7

7. (a) Differentiate between straight sequential search and binary search technique with suitable examples. 7

(b) Describe in brief the garbage collection and compaction. 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Recursive Algorithm

(b) Bucket Sort

(c) Insertion Sort

(d) Quick Sort

(e) Design of Flow Chart

(f) Test a Program