2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203

(Data Structure Using C)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. Answer the following questions :

(a) What is dynamic memory allocation? How does it differ from static memory allocation? 1+4=5

(b) Explain the concept of pointer and function with an example. 5

Or

(c) Explain linear and non-linear data structure. 5

(d) Explain the concept of pointer and array with an example. 5

2. *(a)* Write a C program code for implementing a binary search technique. 5

(b) Write a C program code for sorting from a list of numbers using bubble sort. 5

Or

(c) Write a C program for implementation of linear search. 5

(d) Write a C program code for sorting from a list of numbers using insertion sort. 5

3. *(a)* What is stack? Write the C function code for push() and pop() operation using linked list. 1+4=5

(b) Convert the infix expression A + B * C + (D * E + F) * G to postfix form using stack. 5

Or

(c) Evaluate the given postfix expression

6 2 3 + – 3 8 2 / + * 2 ^ 3 +

using stack. 5

(d) What is queue? Write the C functions code for insert() and delete() operation using array. 1+4=5

4. *(a)* Write the C function of inserting a node at intermediate position of circular linked list. 4

(b) Write the C functions code for inserting and deleting a node at last of single linked list. 3+3=6

Or

(c) Write the applications of stacks. 4

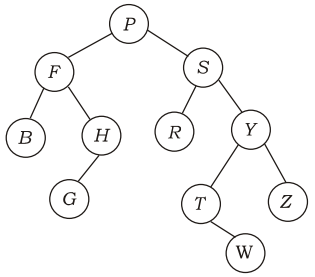
(d) Write the C functions code for insert and delete operations of circular queue. 3+3=6

5. *(a)* Construct a binary tree from the given pre-order and in-order sequence : 4

Pre-order : ABDGCEHIF

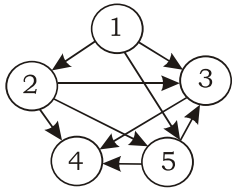
In-order : DGBAHEICF

(b) Traverse the following binary tree in pre-order, in-order, and post-order : 6

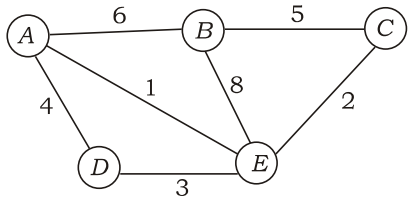


Or

(c) Find the adjacency matrix and adjacency list for the graph shown below : 4



(d) Find a minimal spanning tree (MST) for the graph shown below starting with the vertex A : 6



★★★

Subject Code : II/BCA/203

Booklet No. A

Date Stamp .....

.....

To be filled in by the Candidate

DEGREE 2nd Semester
(Arts / Science / Commerce / .....) Exam., **2017**

Subject .....
Paper .....

INSTRUCTIONS TO CANDIDATES

1. **The Booklet No. of this script should be quoted in the answer script meant for descriptive type questions and vice versa.**
2. **This paper should be ANSWERED FIRST and submitted within 1 (one) Hour of the commencement of the Examination.**
3. **While answering the questions of this booklet, any cutting, erasing, over-writing or furnishing more than one answer is prohibited. Any rough work, if required, should be done only on the main Answer Book. Instructions given in each question should be followed for answering that question only.**

To be filled in by the Candidate

DEGREE 2nd Semester
(Arts / Science / Commerce / .....) Exam., **2017**

Roll No. .....
Regn. No. .....

Subject .....
Paper .....

Descriptive Type
Booklet No. B .....

Signature of Scrutiniser(s)

Signature of Examiner(s)

Signature of Invigilator(s)

/461

2 0 1 7

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203

(Data Structure Using C)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 10)

1. Tick (✓) the correct answer in the brackets provided : 1×10=10

(a) Every algorithm must satisfy which of the following criteria?

(i) Effectiveness ( )

(ii) Definiteness ( )

(iii) Finiteness ( )

(iv) All of the above ( )

(b) Which of the following functions can be used to resize the allocated memory space?

(i) Malloc ( )

(ii) Calloc ( )

(iii) Realloc ( )

(iv) Free ( )

(c) In which searching technique, elements are eliminated by half in each pass?

(i) Linear search ( )

(ii) Binary search ( )

(iii) Both *(i)* and *(ii)* ( )

(iv) None of the above ( )

(d) The postfix expression to infix form A – B / (C * D) is

(i) AB * CD – / ( )

(ii) ABCDE * / – ( )

(iii) / – DC * BA ( )

(iv) – / * ABCD ( )

(e) What is the worst-case time for quick sort to sort an array of *n* elements?

(i) $O(n^2)$ ( )

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

(iii) $O(n)$ ( )

(iv) $O(\log n)$ ( )

(f) In a linked list, the link field in a node contains

(i) data of next node ( )

(ii) address of next node ( )

(iii) data of previous node ( )

(iv) data of current node ( )

(g) An adjacency matrix representation of a graph cannot contain

(i) nodes ( )

(ii) direction of edges ( )

(iii) edges ( )

(iv) parallel edges ( )

(h) Heap is a good data structure to implement

(i) priority queue ( )

(ii) normal queue ( )

(iii) dequeue ( )

(iv) circular queue ( )

(i) The maximum number of nodes at any level in a binary tree is

(i) n ( )

(ii) $2n$ ( )

(iii) $n+1$ ( )

(iv) 2^n ( )

(j) The depth-first search traversal in a graph is analogous to tree traversal

(i) in-order ( )

(ii) post-order ( )

(iii) pre-order ( )

(iv) level-order ( )

2. State whether the following statements are *True (T)* or *False (F)* by a Tick (✓) mark : 1×5=5

(a) A pointer with a NULL address is an empty pointer that points to nowhere in the memory.

(T / F)

(b) In a linked list, searching a particular element is easy and save time.

(T / F)

(c) While evaluating the postfix expression the priority of the operator is no longer relevant.

(T / F)

(d) Breadth-first search uses a stack data structure to find an element from a graph.

(T / F)

(e) A tree traversal is a method of visiting particular node in the tree.

(T / F)

SECTION—II

(*Marks* : 10)

3. Answer the following questions : 2×5=10

(a) What do you mean by space and time complexity of the algorithm?

(b) Differentiate internal sorting and external sorting.

(c) Write a short note on depth-first search (DFS).

(d) What is input restricted in a dequeue?

(e) Differentiate spanning tree and binary tree.

★★★