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18CS32/16CS35

Third Semester B.E. Makeup Examination, January 2020

DATA STRUCTURES WITH C

Time: 3 Hours Max. Marks: 100

Instructions: *1. Answer one full question from each of the units.*

			L	CO	PO	M
		UNIT - I				
1	a.	What is Enumerated Types? Explain operations on Enumerated Types.	(2)	(1)	(1)	(08)

	b.	Write the output of the following program
		#include<stdio.h>
		main()
		{
		int a[5]={2,4,6,8,22};
		int *p;
		p=&a[2];
		printf("%d%d\n",a[0],p[-1]);
		printf("%d%d\n",a[1],p[-2]);
		printf("%d%d\n",a[2],p[2]);
		}
			(3)	(1)	(1)	(06)

	c.	What is structure? Explain different ways to declare structure.	(2)	(1)	(1)	(06)
		OR				
2	a.	Explain the importance of dynamic memory allocation with the help of memory allocation functions.	(2)	(1)	(1)	(08)
	b.	Differentiate between union and structure.	(2)	(1)	(2)	(05)
	c.	Write a C program to store information of 5 students using structure.	(3)	(2)	(2)	(07)
		UNIT – II	L	CO	PO	M
3	a.	List and explain different file handling functions.	(2)	(1)	(1)	(08)
	b.	List and explain basic list operations.	(2)	(1)	(1)	(06)
	c.	Explain head structure and data node structure of a List.	(2)	(2)	(1)	(06)
		OR				
4	a.	Write an algorithm to insert node in to the List.	(3)	(3)	(2)	(06)
	b.	Write an algorithm to insert element into doubly linked list.	(3)	(3)	(2)	(06)
	c.	Write the C function i) to create a List ii)to destroy a List()	(3)	(3)	(2)	(08)
		UNIT – III	L	CO	PO	M
5	a.	Write a C program to implement stack using an array.	(3)	(3)	(2)	(08)
	b.	Write a C program to implement queue as a linked list.	(3)	(3)	(2)	(06)

Note: L (Level),CO (Course Outcome), PO (Programme Outcome), M (Marks)

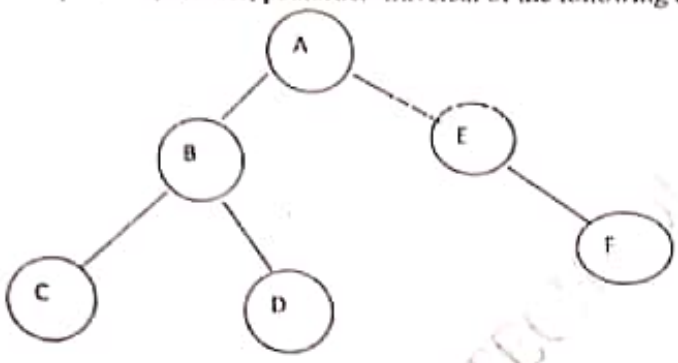
	c.	Write a C function to evaluate the postfix expression.	(3)	(3)	(2)	(06)	

OR

6	a.	Convert the following infix expressions to postfix form in tabular format i. a+b*c-d/e*f ii.(a+ b)*(c+d-e)*f	(3)	(2)	(2)	(06)	
	b.	Write a C program to convert an infix expression to its postfix expression.	(3)	(3)	(2)	(08)	
	c.	Write a C program to implement queue as a circular linked list.	(3)	(3)	(2)	(06)	

UNIT – IV

			L	CO	PO	M	
7	a.	What is tree? Explain attributes of the tree.	(2)	(1)	(1)	(08)	
	b.	Write the preorder, inorder, postorder traversal of the following tree					



	c.	Explain head structure and data node structure of a BST.0	(3)	(2)	(1)	(06)	

OR

8	a.	Write the algorithm to find i) smallest node in s BST ii) largest node in a binary tree.	(2)	(1)	(1)	(06)	
	b.	Write the C function to insert node into BST.	(3)	(3)	(2)	(08)	
	c.	What is AVL tree? List the cases that require for balancing the AVL tree.	(3)	(3)	(2)	(06)	

UNIT –V

			L	CO	PO	M	
9	a.	Explain the properties of heap.	(1)	(1)	(1)	(06)	
	b.	Write the algorithm to i)insert data into heap .ii) delete data from heap.	(2)	(1)	(1)	(06)	
	c.	Write the function _reheapUp()	(3)	(3)	(2)	(08)	

OR

10	a.	Explain the hashing methods i) direct hashing ii) modulo-division method.	(3)	(3)	(2)	(06)	
	b.	Explain the collision resolution methods i)quadratic probe ii)linear probe	(2)	(1)	(1)	(10)	
			(2)	(1)	(1)	(10)	

Note: L (Level),CO (Course Outcome), PO (Programme Outcome), M (Marks)

Library - 10/12/2019 - 09.30 to 12.30.

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18CS32/18IS32/16CS35

3rd Sem ICBCS - 3 set

Third Semester B.E. Semester End Examination, Dec./Jan. 2019-20

DATA STRUCTURES WITH C

Time: 3 Hours. Max. Marks: 100

Instructions: 1. *Answer any five (5) questions from the following units by choosing one full question from each unit.*

UNIT – I

			L	CO	PO	M
1	a.	Define pointers? Explain the concept of pointers to functions with an example.	(1)	(1)	(1)	(08)
	b.	Differentiate between structures and functions.	(1)	(1)	(1)	(06)
	c.	Explain the different dynamic memory allocation functions with an example for each.	(2)	(1)	(1)	(06)

OR

2	a.	Write a C program using structure to print the details of the book. Access the members of the structure using pointer to structure concept.	(3)	(1)	(1)	(10)
	b.	Explain the concept of pointers to functions and using this concept, write a C program to sort n integers.	(3)	(1)	(1)	(10)

UNIT – II

			L	CO	PO	M
3	a.	Define fread(), fseek(), fwrite(), fopen() and fclose(). Write a C Program to read content from one file and copy the content into another file.	(3)	(2)	(2)	(10)
	b.	What are the advantages of linked list over arrays?	(1)	(2)	(2)	(05)
	c.	Write a C function to insert a node at frontend using doubly liked list.	(3)	(2)	(2)	(05)

OR

4	a.	Write the following C functions at the front end of the circular liked list i) insert node ii) delete node	(3)	(2)	(2)	(10)
	b.	i) Differentiate between singly linked list and doubly linked list. ii) Write a short note on List ADT.	(1)	(2)	(2)	(10)

UNIT - III

			L	CO	PO	M
5	a.	What is stack? Explain basic stack operations.	(2)	(1)	(1)	(06)
	b.	Write the C function i) to push element in to the stack ii) to pop element from the stack.	(3)	(3)	(2)	(08)
	c.	Write a C program to reverse a given a string and check whether it is palindrome or not using stack.	(3)	(4)	(2)	(06)

OR

6	a.	What is queue? Explain queue operations.	(2)	(1)	(1)	(08)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

b Write the algorithm to insert element in to queue.

(3) (3) (2) (06)

c. Write the function to delete element from the queue.

(3) (3) (2) (06)

L CO PO M

UNIT – IV

7 a. Explain in brief AVL trees.
Explain the various basic concepts of AVL trees.

(2) (2) (1) (08)

b. Define the following terms
i) height of a tree ii) depth of a tree iii) level of a tree
iv) strictly binary tree v) complete binary tree vi) Almost complete binary tree.

(1) (3) (1) (06)

c. Define Binary Search Tree (BST).Construct BST for the following list of 13 nodes.
3,4,12,14,10,5,1,8,2,7,9,11,6.

(1) (3) (2) (06)

OR

8 a. Prove the following
i) The maximum number of nodes on level i of a binary tree=2^i for i>=0.
ii) The maximum number of nodes in a binary tree of depth k=2^k-1.

(3) (3) (2) (10)

b Write a C program to count the no. of nodes in a tree and also the function to count the leaves or terminal nodes in a tree.
Write a C program
i) to count the no. of nodes in a tree
ii) function to count the leaves or terminal nodes in a tree

(3) (3) (2) (10)

L CO PO M

UNIT –V

9 a. What is heap? Construct the min heap and max heap for the following list of elements.
35 , 33, 42, 10, 14, 19, 27, 44, 26, 31.

(3) (3) (2) (08)

b. Explain the different types of hashing methods.

(2) (3) (1) (06)

c Sort the give set of elements using heap sort and construct as per the algorithm
25 67 56 32 12 96 82 44

(3) (3) (2) (06)

OR

10 a. Write the following algorithms
i) min heap construction ii) max heap construction.

(3) (3) (2) (10)

b. What is hashing? Explain collision and its detection with an example.

(1) (3) (2) (10)

3rd sem CS

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

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16CS/IS35

Third Semester B.E. Semester End Examination, DEC/JAN 2018-19

DATA STRUCTURES USING C

Time: 3 Hours

Max. Marks: 100

Instructions:
1. *UNIT I and UNIT II are compulsory.*
2. *Answer any one full question from remaining units.*
3. *Write assumptions for the programs if any.*
4. *Write comments and sample input/output where ever required.*

UNIT - I

			L	CO	PO	M
1	a.	Illustrate the use of pointer to pointer with program example.	(2)	(2)	(3)	(05)
	b.	List out the differences between Structures and Unions	(2)	(3)	(1)	(06)
	c.	Write a C program to read and print the student records.Name, USN,sem,marks of 3 subjects are read from the user. Calculate the average and print the result with appropriate headings. Calculate for 'n' number of students. Use appropriate data structure.	(3)	(1)	(3)	(09)

UNIT – II

			L	CO	PO	M
2	a.	Differentiate between stack and queue.	(2)	(1)	(1)	(04)
	b.	What are the limitations of linear queue? Give alternate approach to overcome these limitations of linear queue with the help of code for insert and delete operations.	(2)	(2)	(2)	(06)
	c.	i. Convert the following infix expression to its postfix forms, show the conversion steps using tabulation method ((A+B)/C-((D*(E-F))/G))*Y ii. Evaluate the following postfix expression, show the evaluation steps using tabulation method and also write a final value of expression. 6 8 4 * 3 + 6 / - 9 + 3 - 4 +	(3)	(1)	(2)	(10)

UNIT - III

			L	CO	PO	M
3	a.	Write a C function for the following – (i) Insert a node at the front end of the singly linked list. (ii) Delete a node from the rear end of the singly linked list. (iii) Display the contents of the singly linked list	(3)	(1)	(2)	(09)
	b.	Explain the following with help of C code and example diagram- (i) Concatenate two singly linked lists. (ii) Reverse the given list without creating new node.	(3)	(2)	(2)	(06)
	c.	Write a C code for the following operation on circular singly linked list- (i) Insert a node at the front end. (ii) Deletion of a node at the rear end.	(3)	(2)	(2)	(05)

OR

4	a.	List out the differences between singly linked list and doubly linked list.	(2)	(3)	(1)	(03)
	b.	Illustrate the following using Doubly Linked list with C-Code. (i) Insert a node at front end. (ii) Insert a node at rear end. (iii) Delete a node from rear end. (iv) Delete a node from front end.	(2)	(2)	(3)	(08)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

c. Consider a scenario where singly linked list contains the nodes **10,15,25,30,45,50.** Insert node with data **12** at the front end. Insert node with data 55 at the front end. Delete a node from the rear end. Explain the insertion and deletion process step by step using appropriate code and diagram.

(3) (1) (3) (09)

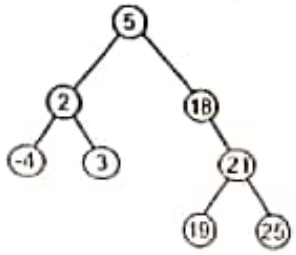
UNIT - IV

L CO PO M

5 a. Write a function in C to insert a node at proper position in a sorted list of integer numbers in ascending order implemented using doubly linked list.

(3) (2) (3) (06)

b. Write recursive functions for tree traversals and trace the functions using following tree:



(3) (4) (3) (08)

c. What is heap? Construct a max heap for the following set of numbers and show all the steps of construction: **56,34,78,44,22,38,74,89,100,99,200.**

(3) (4) (3) (06)

OR

6 a. Prove the following properties of Binary Tree:
i. The maximum number of nodes on level "i"of a binary tree is 2^{i-1}, $i \geq 1$.
ii. The maximum number of nodes in a binary tree of depth "k" is 2^k-1, $k \geq 1$.

(3) (4) (1) (06)

b. How binary tree can be stored in array? Explain with the help of example.

(2) (4) (1) (06)

c. Write a function in C to insert a node in a binary search tree and trace the function for the following set of inputs **56,34,78,44,22,38,74,89,100,99,200.**

(3) (3) (3) (08)

UNIT -V

L CO PO M

7 a. Define Graph. With example discuss how the graph is represented using adjacency matrix.

(2) (3) (3) (08)

b. Write a C function which illustrates Depth First Search Concept.

(2) (3) (3) (06)

c. Define spanning tree. Explain in detail with simple example.

(2) (1) (1) (06)

OR

8 a. Write a C program which illustrates Breadth First Concept.

(2) (3) (3) (08)

b. Explain in detail DFS with example.

(3) (2) (2) (06)

c. What is minimum cost spanning tree? Explain in detail with simple example.

(2) (4) (2) (06)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

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16CS/IS35

Third Semester B.E. Makeup Examination, January 2019

DATA STRUCTURES USING C

Time: 3 Hours

Max. Marks: 100

Instructions:
1. *UNIT-I and UNIT-II are compulsory.*
2. *Answer any one question from remaining units.*
3. *Write comments in the program wherever necessary.*
4. *Draw necessary diagrams wherever necessary.*

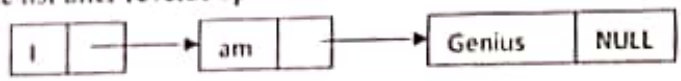
UNIT - I

			L	CO	PO	M
1	a.	What is pointer in C? Explain the concept of Null pointer and dangling pointer?	(2)	(2)	(1)	(06)
	b.	What is structure in C? How it is different from union? Exemplify different ways of declaring structures and unions in C.	(1)	(1)	(1)	(06)
	c.	Consider an application in which data related to set of "N" people applying for ration card is captured in an array of structures which includes name, age, aadhar number and annual income. Write a function in C which receives this array as argument and return the memory address of the structure containing information of a person whose annual income is minimum among all people.	(3)	(2)	(3)	(08)

UNIT – II

			L	CO	PO	M
2	a.	Explain the conceptof stack using dynamic arrays. Write C function for Push and Pop operations for the same..	(2)	(2)	(1)	(06)
	b.	Convert the following infix expression to postfix expression form using tabular method (i) (A + B – (C*(A+B)/D)) (ii) ((2+3)*5)-(8/2)	(3)	(1)	(1)	(08)
	c.	Write C functions for the various operations that are performed on the stack.	(2)	(1)	(3)	(06)

UNIT - III

			L	CO	PO	M
3	a.	Discuss the disadvantages of arrays. How they are overcome using linked list?	(2)	(2)	(1)	(06)
	b.	Write a function in C to find duplicate nodes in a linked list and delete them assuming the linked list is already created, it has minimum of 2 nodes and the nodes are arranged in ascending order.	(3)	(2)	(3)	(06)
	c.	Write a function in C to reverse the linked list which contains string as information. Display contents of the list after reverse operation. Example :  Output: Genius am I	(3)	(2)	(3)	(08)

OR

			L	CO	PO	M
4	a.	Insertion and deletion operations on linked list are efficient compared to arrays. Justify the above statement.	(2)	(2)	(2)	(04)
	b.	Explain how polynomials are stored using linked list. With the help of example show the addition of two polynomials using linked list.	(2)	(2)	(2)	(08)

c. Write a functions in C to perform following operation with singly linked list:
   i. Insert a node at front
   ii Insert a node at rear
   iii. Delete a node with specific key element.
   iv. Display the contents of list.

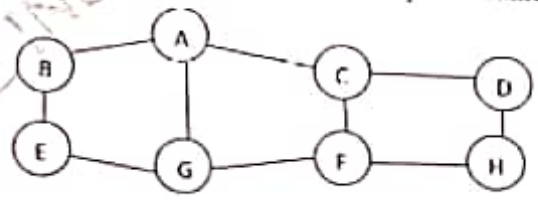
(3) (2) (3) (08)

UNIT – IV

		L	CO	PO	M
5 a.	Write a C functions for different tree traversal techniques.	(3)	(1)	(3)	(09)
b.	Construct a Binary search tree for the following data explaining each step- (i) 100,50,60,125,69,110,101,59,68 (ii) 210,56,200,220,226,229,98,75,80	(2)	(3)	(2)	(06)
c.	What are heaps? Build a max heap for the following set of numbers 75,90,30,25,50,95. Show all intermediate steps for the heap construction.	(3)	(4)	(1)	(05)
	OR				
6 a.	Explain the following terms with respect to binary tree with example- (i) Siblings (ii) Ancestors (iii) Level (iv) Leaf node (v) Root (vi) Degree.	(2)	(1)	(3)	(06)
b.	Construct the Binary search tree for the given traversals INORDER-WSXQYTZPURV PREORDER-PQSWXTYZRUV	(2)	(3)	(2)	(06)
c.	Explain min-heap in detail with example.	(3)	(2)	(2)	(08)

UNIT –V

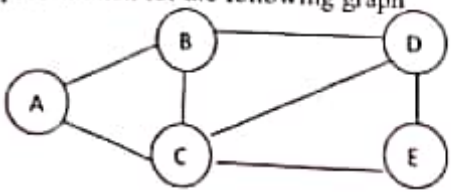
		L	CO	PO	M
7 a.	Explain any two methods of representation of graph with example	(2)	(4)	(1)	(06)
b.	Write BSF algorithm and trace the same for one input graph.	(2)	(4)	(3)	(06)
c.	Traverse the graph given below using DFS technique. Assume A as a source node.	(3)	(4)	(2)	(08)



OR

8 a. What is spanning tree? Discuss with example and also give its applications. (2) (3) (1) (06)

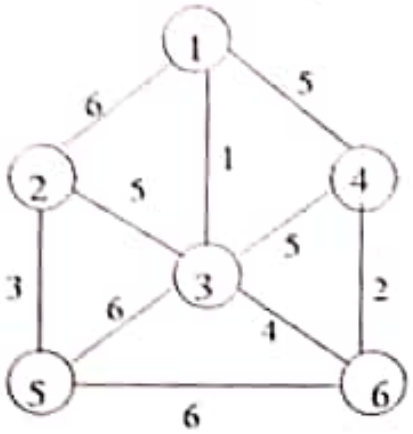
b. Give adjacency list representation for the following graph



(3) (4) (2) (06)

Note: L (Level),CO (Course Outcome), PO (Programme Outcome), M (Marks)

e. Find the minimum cost spanning tree for the following graph:



(3) (3) (3) (08)

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CS/IS35/16CS/IS35

Third Semester B.E. Semester End Examination, Dec/Jan 2017-18

DATA STRUCTURES USING C

Time: 3 Hours **Max. Marks: 100**

Instructions: 1. *UNIT-I and UNIT- II are Compulsory.*
2. *Answer any one question from remaining units.*
3. *Write comments in the programs where ever necessary.*
4. *Write sample input/output for the program where ever necessary.*

UNIT - I

1 a. Define the word data structures and discuss its importance for computer science. **04 M**
(Level [2], CO [3], PO [1])

b. Write a C program to demonstrate the use of stack for a CD/DVD case of capacity 10 such that, we should not insert more than 10 discs, should not remove disc from empty case and display no. of discs at any point of time. **10 M**
(Level [3], CO [3], PO [1])

c. Demonstrate along with code snippets insertion and deletion operation of circular queue using arrays. **06 M**
(Level [2], CO [3], PO [1])

UNIT – II

2 a. Differentiate between arrays and linked lists. Write a function to create a linked list by adding nodes at rear of list. **08 M**
(Level[4], CO[2], PO[8])

b. Write functions for the following: **06 M**
i. to reverse the list
ii. to display odd and even node elements on two different lines.
(Level[3], CO[2], PO[12])

c. Discuss how the polynomials are represented using circular linked list? With example and block diagram explain addition of two polynomials using the circular list. **06 M**
(Level[3], CO[2], PO[2])

UNIT III

3 a. Illustrate the working of Doubly linked list for insertion and deletion of element from a given position in the program **10 M**
(Level [2], CO [2], PO [3])

b. Explain with code the working of inorder, preorder and post order traversals in binary trees. Illustrate with examples. **10 M**
(Level [2], CO [3], PO [1,3])

OR

4 a. Demonstrate with a sample code the method of inserting an element into a binary search tree. **10 M**
(Level [2], CO [3], PO [3])

b. Build a max heap and min heap for set of numbers 10,8,6,7,12,14 **10 M**
(Level [3], CO [4], PO [1])

UNIT IV

5 a. What is AVL tree? Explain with example. **06 M**
(Level[2], CO[3], PO[2])

b. Illustrate how collision occurs and explain any two methods to resolve it. **10 M**
(Level[2], CO[4], PO[2])

c. Explain open addressing method for overflow handling. **04 M**
(Level[2], CO[4], PO[12])

OR

6 a. Discuss any two hash functions. 06 M

(Level[2], CO[4], PO[8])

b. Compare quadratic probing and pseudo random collision resolution methods. 06 M

(Level[4], CO[4], PO[2])

c. Explain liner probing method of overflow handling with the help of example. 08 M

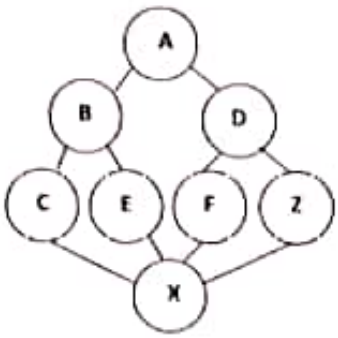
(Level[2], CO[4], PO[2])

UNIT - V

7 a. Define graph. With example discuss how the graph is represented using Adjacency Matrix 06 M

(Level[2],CO[4],PO[8])

b. Draw an adjacency list for a given graph: 06 M



(Level[2], CO[4], PO[8])

c. Write recursive function for depth first search operation on graph. 08 M

(Level[3], CO[4], PO[12])

OR

8 a. What is spanning tree? Explain with example 06 M

(Level[2],CO[4],PO[12])

b. Draw Depth-first and breadth-first spanning trees for the graph given in 7b. 06 M

(Level[2], CO[4], PO[12])

c. Write function for breadth first search operation on graph. 08 M

(Level[3], CO[4], PO[12])