

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Computer Science & Engineering
B. Tech. (CSE) Minor -I Examination (Even/Winter) 2018-19

Entry No:

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Date: 4-02-2019

Total/Number of Pages: [02]

Total Number of Questions: [4]

Course Title: Data Structure Using C

Course Code: CSL 2031

Time Allowed: 1.5 Hours

Max Marks: [20]

Instructions

- Attempt All Questions.
- Support your answer with neat algorithms/flowcharts or block diagrams, wherever appropriate.
- Assume an appropriate data / information, wherever necessary / missing.

Section - A			
Q1.	Let A be a two-dimensional array declared as follows: A: array [1 10] [1 15] of integer; Assuming that each integer takes one memory location, the array is stored in row-major order and the first element of the array is stored at location 100, what is the address of the element A[i][j]? (a) $15i + j + 84$ (b) $15j + i + 84$ (c) $10i + j + 89$ (d) $10j + i + 89$	[01]	CO1
(b)	Number of comparisons required for an unsuccessful search of an element in a sequential search, organized, fixed length, symbol table of length L is a) L b) $L/2$ c) $(L+1)/2$ d) $2L$	[01]	CO1
(c)	What will be the Output of the following program void main() { int arr[10] = {1,2,3,4,5}; printf("%d", arr[5]); }	[01]	CO1
(d)	Which of the following operations is not O(1) for an array of sorted data. You may assume that array elements are distinct. (A) Find the ith largest element (B) Delete an element (C) Find the ith smallest element (D) All of the above	[01]	CO2
(e)	Suppose there are 11 items in sorted order in an array. How many searches are required on the average, if binary search is employed and all searches are successful in finding the item? a) 3 b) 3.46 c) 4.8 d) 2	[01]	CO2

Q2.	Suppose you are given a two dimensional array $a[r,c]$. The base address is $base[a]$, the size of each element is w , the lower limit of the row subscript is lbr and the lower limit of the column is lbc . Find the address of the element $a[k1,k2]$ if the array is stored in i) row major order and 2) column major order	[02]	CO1
Q3. (a)	Write a program to delete multiple occurrences of a given string entered by the user from the main string	[04]	CO1
Q3. (b)	Given a sorted array of integers, find the number of occurrences of a given target value. Your algorithm's runtime complexity must be in the order of $O(\log n)$.	[04]	CO2
Q4.	Do the dry run of sorting the elements using insertion sort for the following numbers 9,3, 1, 8, 2, 7, 5	[05]	CO2

Course Outcomes

CO1. To impart the basic concepts of data structures and algorithms.

CO2. To understand concepts about searching and sorting techniques.

CO3. To understand basic concepts about stacks, queues, lists, trees and graphs.

CO4. To understand writing algorithms and step by step approach in solving problems with the help of fundamental data structures

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(a), (b), (c), Q2, Q3(a)	9	84
CO2	Q1(d),1(e),3(b),Q(4)	11	84

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Computer Science & Engineering
B. Tech. (CSE) Minor -II Examination (Even/Winter) 2018-19

Entry No:

1	8	B	C	S	0	6	4
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Date: 16-03-2019

Total Number of Pages: [02]

Total Number of Questions: [5]

Course Title: Data Structure Using C

Course Code: CSL 2031

Max Marks: [20]

Time Allowed: 1.5 Hours

Instructions

- Attempt All Questions.
- Support your answer with neat algorithms/flowcharts or block diagrams, wherever appropriate.
- Assume an appropriate data / information, wherever necessary / missing.

Section - A			
Q1. <u>(a)</u>	Which of the following is true about merge sort? a) Merge Sort works better than quick sort if data is accessed from slow sequential memory. b) Merge Sort is divisive sort by nature c) Merge sort is better compared to bubble sort when huge data is applied in practical situations. d) All of the above	[01]	CO2
(b)	Which of the following is not true about Quicksort? a) in-place algorithm b) pivot position can be changed c) adaptive sorting algorithm d) can be implemented as a stable sort	[01]	CO2
(c)	A single array A[1..MAXSIZE] is used to implement two stacks. The two stacks grow from opposite ends of the array. Variables top1 and top2 (top1 < top 2) point to the location of the topmost element in each of the stacks. If the space is to be used efficiently, the condition for "stack full" is a) (top1 = MAXSIZE/2) and (top2 = MAXSIZE/2+1) b) top1 + top2 = MAXSIZE c) (top1= MAXSIZE/2) or (top2 = MAXSIZE) d) top1= top2 -1	[01]	CO3
(d)	The result evaluating the postfix expression $10\ 5\ +\ 60\ 6\ /\ *\ 8\ -$ is a) 284 b) 213 c) 142 d) 71	[01]	CO3
(e)	Consider the following operation performed on a stack of size 5. Push(1); Pop(); Push(2); Push(3); Pop(); Push(4); Pop(); Push(5); After the completion of all operation, the no of element present on stack are a) 1 b) 2 c) 3 d) 4	[01]	CO3
Q2.	Apply Quick sort algorithm on the following inputs stored in an array. Show the swapping of elements and swapping of pivot in each pass. The array size is a[7] and the elements are 1,7,6,4,5,3,2	[04]	CO2

Q3.	Write a C Program to check for balanced parentheses in an expression Sample input 1): [0]{ }{[0]0} 2): { [0] } Sample output1): The input given is balanced 2):The input given is not balanced	[04]	CO3
Q4	Convert the given infix notation to postfix notation using stack. A - B - C * (D + E / F - G) - H	[03]	CO3
Q5.	You have two piles of graded papers from the same class and both are alphabetized. You have to make it one pile. You don't have to start all over again, you can use the work that's already been down alphabetizing them separately. For example The first paper on the final pile has to be either the top paper from pile #1 or the top from pile #2. You can take that paper and put it on a new pile face down. You can make the comparison between the new two papers on top of the piles and put it face down on the new pile, again and again, until all the papers are on the new pile face down. Once one of the original pile is depleted, there are no more comparisons to be made and you can put the rest of the remaining face down on top of the new pile, turn it back face up and it is completely sorted. Write a C program for the above scenario.	[04]	CO2

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CO4. To understand writing algorithms and step by step approach in solving problems with the help of fundamental data structures

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO2	Q1(a), 1(b), Q2	10	90
CO3	Q1(c), Q1(d), Q1(e), Q(3), Q(4)	10	90

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Computer Science & Engineering
B. Tech.(CSE) Major Examination (Even/Winter) 2018-19

Entry No: 18BCS064
Date: 5-05-2019

Total Number of Pages:[02]

Total Number of Questions: [6]

Course Title: Data Structure Using C

Course Code: CSL 2031

Max Marks: [50]

Time Allowed: 3Hours

Instructions

- Attempt All Questions.
- Support your answer with neat algorithms/flowcharts or block diagrams, wherever appropriate.
- Assume an appropriate data / information, wherever necessary / missing.

Section - A			
Q1	Which of these best describes an array? a) A data structure that shows a hierarchical behavior b) Container of objects of similar types c) Container of objects of mixed types d) All of the mentioned	[01]	CO1
(a)			
(b)	What differentiates a circular linked list from a normal linked list? a) You cannot have the 'next' pointer point to null in a circular linked list b) It is faster to traverse the circular linked list c) You may or may not have the 'next' pointer point to null in a circular linked list d) All of the mentioned	[01]	CO1
(c)			
(d)	What is the time complexity of searching for an element in a circular linked list? a) O(n) b) O(nlogn) c) O(1) d) None of the mentioned	[01]	CO1
(e)	Which of the following is false about a doubly linked list? a) We can navigate in both the directions b) It requires more space than a singly linked list c) The insertion and deletion of a node take a bit longer d) None of the mentioned	[01]	CO3
(f)	Which of the following applications may use a stack? a) A parentheses balancing program b) Tracking of local variables at run time c) Compiler Syntax Analyzer d) All of the mentioned	[01]	CO2
(g)	If the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed? a) ABCD b) DCBA c) DCAB d) ABDC	[01]	CO3
Q2.	What would be the Prefix notation for the given equation? $A^B^C^D$ a) $^{AAA}ABCD$ b) $^A^B^C^D$ c) $ABCDA^{AA}$ d) AB^C^D	[01]	CO2
(a)	Construct binary search tree for the input data set 40, 60, 50, 33, 55, 11. Write a C program to implement the same.	[06]	CO3

(b)	Explain different traversals methods using an example in Binary search trees	[04]	CO3
Q3. (a) (b)	List the advantages of doubly linked list with singly linked list. Write a C program to find the frequency of a given element using doubly linked list	[04]	CO1
Q4 (a)	Explain the working of Radix sort with the following input data set 27,59,49,39,15,95,88,37	[07] [05]	CO3 CO2
(b)	Consider the following code snippet: p = (int *)malloc(sizeof(int)); q = &p; r = &q; Write the data types of p, q, and r.	[03]	CO2
Q5 (a)	Data are pushed to (PUSH operation) and popped from (POP operation) a stack in the following order: PUSH 3; TOP; PUSH 7; TOP; PUSH 6; PUSH 9; TOP; POP; POP; TOP; where the PUSH, POP and TOP operations of stack behave as discussed in the class. Write the values returned by TOP for the sequence of operations above.	[04]	CO2
(b)	Explain Double Ended Queue with an Example? Write a C program to show the insertion and deletion operation in Dequeue	[05]	CO4
Q6	Write an algorithm to convert infix expression to postfix expression. Trace the algorithm using one example and show the contents of the stack	[05]	CO4

Course Outcomes

- CO1. To impart the basic concepts of data structures and algorithms.
 CO2. To understand concepts about searching and sorting techniques.
 CO3. To understand basic concepts about stacks, queues, lists, trees and graphs.
 CO4. To understand writing algorithms and step by step approach in solving problems with the help of fundamental data structures

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(a),1(b),1(c)3(a)	7	84
CO2	Q1(e),1(g),4(a),4(b),5(a)	14	84
CO3	Q1(d), 1(f),2(a),2(b),3(b)	19	84
CO4	Q5(b),Q6	10	84

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics and Communication Engineering
B. Tech. ECE Major Examination (Odd) 2019-20

Entry No: 18BEC066**Total Number of Pages:** [03]**Date:** 09-12-2019**Total Number of Questions:** [05]**Course Title:** Data Structures Using C**Course Code:** CSL 2031**Time Allowed: 3 Hours****Max Marks: [50]****Instructions / NOTE**

- i. Attempt All Questions. Use bullet points to provide theoretical answers.
- ii. Assume an appropriate data / information, wherever necessary / missing.

Section – A

- Q1. a) How can a source file access a global variable defined in another source file given both files are part of a same program? Explain with an example. [02]
- b) Can two source files of a same program define a global variable with same name? Justify the answer with a suitable example. [02]
- c) Which of these is an invalid assignment? Justify the answer with reasonable argument. [01]
1. char a = 038; 2. short b = 'A'; 3. int c = 0xfd3b;
- Q2. a) Given the need to store 5 variables; data type of whose are given below. Suggest two types or ordering of these variables in a structure so that one type takes the least amount of memory and the other one takes the maximum amount of memory. {char a; short b; long double e; long c; long long d;} [03]
- b) Provide the size of both structures created above and explain the reason behind their respective sizes. [02]
- c) Calculate the new size of both structures if #pragma pack(2) is defined at the top of the source file. Explain the change in the sizes of the structure [03]

Section – B

- Q3. a) An online shopping site intends to open a limited quantity sale whereby the quantity of a particular product is limited say N. At the moment of the start of sale, M no. of users could access the site to grab hold of the same product where $M >> N$. The site owner doesn't want his site to crash and is looking for some solution. Also, the owner intends to accommodate a set of late comers who are trying to buy the product at the end of the sale.
WAP in C which emulates the solution that could be used by the site owner? [15]

WAP in C to implement the following tasks to be performed on a Circular List.

- Q4. 1. Creation of the list.
 2. Insertion in the list.
 3. Removal from the list.
 4. Insertion at a given position from the current position of the access pointer.
 5. Deletion at a given position from the current position of the access pointer.
 6. Printing the contents of the whole list. [12]

- Q5. WAP in C to demonstrate the working of a binary tree given the need to store a random sequence of alphabet characters coming from some source. The idea is to use tree in such a fashion that whenever it is read after the insertion / storing of data is complete, all characters are printed in an ascending order. [10]

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics and Communication Engineering
B. Tech. ECE Major Examination (Odd) 2019-20

Course Outcomes

- CO1. To learn the elemental concepts of C language such as using compiler and header files, dynamic memory management, data types, scope and lifetime.
- CO2. Understand structure sizing, packing, self-referencing and bit-fields required to build data structures
- CO3. Understand and describe how arrays, linked lists, stacks, and queues are represented in memory.
- CO4. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(a), 1(b), 1(c)	5	75
CO2	2(a), 2(b), 2(c)	8	75
CO3	3	15	75
CO4	4,5	22	75