



RAMCO INSTITUTE OF TECHNOLOGY

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Course code/Title AD3251 - Data Structure Design

INDIVIDUAL ASSIGNMENT- 1

27-04-2022

Write the python basic program for below and also the screenshot of output to be attached in the assignment-post in Canvas in assignment page.

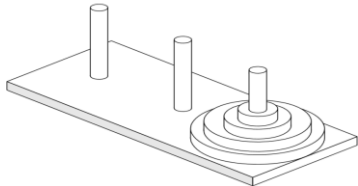
- Date of assignment posted in canva: 27.04.2022
- Last Date of Submission: 13-05-2022
- Semester /Branch: II Semester/ B. Tech. Artificial Intelligence and Data Science

Faculty In charge: Dr.M.Kaliappan, Professor and Head
Dr.S.Vimal, Associate Professor

Sl. No	Roll Number	Name of the Student	Individual Programs
1	953621243001	ABARNA S	Write a Python class, Flower, that has three instance variables of type str, int, and float, that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type. Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
2	953621243002	ABIMANISH R	Python allows negative integers to be used as indices into a sequence, such as a string. If string s has length n, and expression s[k] is used for index $-n \leq k < 0$, what is the equivalent index $j \geq 0$ such that s[j] references the same element? Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
3	953621243003	ABINAYA P	Demonstrate how to use Python's list comprehension syntax to produce the list [a , b , c , ..., z], but without having to type all 26 such characters literally
4	953621243004	ABIRAMI R	Write a short Python program that takes two arrays a and b of

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			<p>length n storing int values, and returns the dot product of a and b. That is, it returns an array c of length n such that $c[i] = a[i] \cdot b[i]$, for $i = 0, \dots, n-1$.</p> <p>Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
5	953621243005	ABISHEK P	<p>Write a Python program that simulates a handheld calculator. Your program should process input from the Python console representing buttons that are “pushed,” and then output the contents of the screen after each operation is performed. Minimally, your calculator should be able to process the basic arithmetic operations and a reset/clear operation.</p> <p>Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
6	953621243006	ALAGESHWARAN M D	<p>Mini Project: Write a Python program to simulate an ecosystem containing two types of creatures, bears and fish. The ecosystem consists of a river, which is modeled as a relatively large list. Each element of the list should be a Bear object, a Fish object, or None. In each time step, based on a random process, each animal either attempts to move into an adjacent list location or stay where it is. If two animals of the same type are about to collide in the same cell, then they stay where they are, but they create a new instance of that type of animal, which is placed in a random empty (i.e., previously None) location in the list. If a bear and a fish collide, however, then the fish dies (i.e., it disappears)</p> <p>Online Data structure problem solving platform: choose Amazon problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
7	953621243007	ANIRUDH SRINIVAS J P	<p>Write a short Python function, is multiple(n, m), that takes two integer values and returns True if n is a multiple of m, that is, $n = mi$ for some integer i, and False otherwise</p>
8	953621243008	ARCHANA V	<p>Give a short fragment of Python code that uses the progression classes from Section 2.4.2 to find the 8th value of a Fibonacci progression that starts with 2 and 2 as its first two values (Refer Page:88 in Softcopy text Book for section 2.4.2)</p>
9	953621243009	ARUL PRAKASH N	<p>Graph the functions $8n, 4n \log n, 2n^2, n^3$, and 2^n using a logarithmic scale for the x- and y-axes; that is, if the function value $f(n)$ is y, plot this as a point with x-coordinate at $\log n$ and y-coordinate at $\log y$.</p> <p>Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions</p>

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			Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
10	953621243010	ASHISH JEFFERY J	The number of operations executed by algorithms A and B is $8n \log n$ and $2n^2$, respectively. Determine n_0 such that A is better than B for $n \geq n_0$
11	953621243011	BALA SUBRAMANI A	The number of operations executed by algorithms A and B are $40n^2$ and $2n^3$, respectively. Determine n_0 such that A is better than B for all $n > n_0$
12	953621243012	DHIVYA LAKSHMI G	When using the Arithmetic Progression class of Section 2.4.2 with an increment of 128 and a start of 0, how many calls to next can we make before we reach an integer of 263 or larger? (Refer Page:88 in Softcopy text Book for section 2.4.2) Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
13	953621243013	DIWAN AJROON NISATH H	Order the following functions by asymptotic growth rate. $4n \log n + 2n \cdot 2^{10 \log n} \cdot 3n + 100 \log n \cdot 4n \cdot 2^n \cdot n^2 + 10n \cdot n^3 \cdot n \log n$
14	953621243014	GANESA PERUMAL S	What is the sum of all the even numbers from 0 to $2n$ for any positive integer n ? Use induction to prove your answer Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
15	953621243015	GEETHA A	Write a short recursive Python function that finds the minimum and maximum values in a sequence without using any loops
16	953621243016	G NITHYALAKSHMI	Write a recursive function that will output all the subsets of a set of n elements (without repeating any subsets) Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
17	953621243017	GOKULAN G	Use recursion to write a Python function for determining if a string s has more vowels than consonants
18	953621243018	HARIHARASUDHAN V	Describe a recursive algorithm to compute the integer part of the base-two logarithm of n using only addition and integer division. Hint : The idea here is to recursively call the function while dividing the number by 2. Returning 0 if the number is less than 2 or return 1 if the number is equal to 2.
19	953621243019	HARSHAVA RDHINI A S	Write a short recursive Python function that rearranges a sequence of integer values so that all the even values appear before all the odd values. Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs

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20	953621243020	HINDUJA J	<p>Write a Python program for Given an array A[], also write a function that segregates even and odd numbers. The functions should put all even numbers first, and then odd numbers.</p> <p>Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
21	953621243021	INIYAN K	<p>Mini Project: In the Towers of Hanoi puzzle, we are given a platform with three pegs, a, b, and c, sticking out of it. On peg a is a stack of n disks, each larger than the next, so that the smallest is on the top and the largest is on the bottom. The puzzle is to move all the disks from peg a to peg c, moving one disk at a time, so that we never place a larger disk on top of a smaller one. See Figure 4.15 for an example of the case n = 4. Describe a recursive algorithm for solving the Towers of Hanoi puzzle for arbitrary n. (Hint: Consider first the subproblem of moving all but the nth disk from peg a to another peg using the third as “temporary storage.”)</p>  <p>Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
22	953621243022	JEGADEESH G	<p>a. Write a python program to remove the array element with maximum frequency b. Write a python program to store high score for a game using array based sequence.</p>
23	953621243023	JERITA D	<p>Mini Project: Write a Python program for a matrix class that can add and multiply two dimensional arrays of numbers, assuming the dimensions agree appropriately for the operation.</p> <p>Online Data structure problem solving platforms : Choose Amazon problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
24	953621243024	JEYASRI P	<p>Let A be an array of size $n \geq 2$ containing integers from 1 to $n-1$, inclusive, with exactly one repeated. Describe a fast algorithm for finding the integer in A that is repeated.</p>
25	953621243025	KARTHEESWARAN V	<p>Write a python code to demonstrate a 3D array of size $2 \times 3 \times 2$.</p>
26	953621243026	LAVANYA M	<p>Write a program that can perform the Caesar cipher for English messages that include both upper- and lowercase characters.</p>

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			Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
27	953621243027	M ABITHA	Write a Python program for a matrix class that can add and multiply two dimensional arrays of numbers, assuming the dimensions agree appropriately for the operation.
28	953621243028	MAGESH R	a. Write a Python program to copy the elements of array A to array B b. Write a python program for algorithm disjoint to test three any disjointness.
29	953621243029	MAHIL P LAL	Write a Python function that takes two three-dimensional numeric data sets and adds them component wise
30	953621243030	MANIKAND A PRAVEEN M	Write a Python program to find the frequency in each element in array A
31	953621243031	MANORANJAN C I	a. Write a python program to remove all the occurrences of duplicate array elements. b. Write a python program to compute the integer part of the base two algorithms of n using only addition and integer division.
32	953621243032	MAREESWARAN M	Write a Python program to remove the array element present immediately to the right of the element entered by the user
33	953621243033	MEGHA G	Implement a function, with calling syntax max(L), that returns the maximum element from a Positional List instance L containing comparable elements. Online Data structure problem solving platforms: Choose Flipkart https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
34	953621243034	MUKESH SUNDAR P	a. Write a python program to create a list of prime elements b. Write a python program to estimate the GCD of a number Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
35	953621243035	MUTHULAKSHMI M	Write a python program to convert a 2D matrix in to a sparse matrix
36	953621243036	MUTHURAJ M	a. Write a python program to sort the array elements in increasing order of their frequencies b. What is the sum of all even numbers from 0 to 2n, for any positive integer n?
37	953621243037	MUTHUVEL S	Write a simple text editor that stores and displays a string of characters using the positional list ADT, together with a cursor object that highlights a position in this string. A simple interface is to print the string and then to use a second line of output to underline the position of the cursor. Your editor should support the following operations:

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			<ul style="list-style-type: none"> • left: Move cursor left one character (do nothing if at beginning). • right: Move cursor right one character (do nothing if at end). • insert c: Insert the character c just after the cursor. • delete: Delete the character just after the cursor (do nothing at end). <p>Online Data structure problem solving platforms :Choose Adobe problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
38	953621243038	NISHANTHIN I S	<p>Write a python program to show an algorithm for matching delimiters in an arithmetic expression.</p> <p>Online Data structure problem solving platforms: Choose Microsoft https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
39	953621243039	NITHISH S	<p>MiniProject: Implement a class, Substitution Cipher, with a constructor that takes a string with the 26 uppercase letters in an arbitrary order and uses that for the forward mapping for encryption (akin to the self. forward string in our Caesar Cipher class of Code Fragment 5.11). You should derive the backward mapping from the forward version Hint: refer Page number 226 in Text Book.</p> <p>Online Data structure problem solving platforms: Choose Amazon Problems: https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
40	953621243040	N K S JEYAA	<p>a. Write a python program to evaluate an infix expression entered by a user. b. Write a program that implements a recursive function to count the number of nodes in a singly linked list.</p> <p>Online Data structure problem solving platforms: Choose Microsoft problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
41	953621243041	PABINTHA A	<p>a. Write a python program that converts an infix expression to its corresponding prefix and postfix expressions. b. Write a program to reverse a singly linked list</p> <p>Online Data structure problem solving platforms: Choose Microsoft problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>

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43	953621243042	PONJOSES I	<p>a. Write a python program that evaluates a prefix expression entered in the form of a text string.</p> <p>b. Write a python program that concatenates the two singly linked lists, given the references to the first element in each linked list.</p> <p>Online Data structure problem solving platforms: Choose Amazon problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
44	953621243043	POORNA SIVA V	<p>a. Write a python program that reverses a string entered by a user using stacks.</p> <p>b. Give an element N, Write a program to insert an element entered by the user before the position of N in a singly linked list</p>
45	953621243044	PRITHIBA A	Write a python program to convert a decimal number to its binary form using a stack
46	953621243045	SACHIN S	<p>a. Develop a python program to reverse the elements of a given queue.</p> <p>b. Write a program to print the Fibonacci series of a number entered by the user using the recursive function</p>
47	953621243046	SANDEEP KUMAR M	<p>a. Write a python program to implement a queue using two stacks</p> <p>b. Write a program that uses a recursive function to demonstrate the Ackermann function with a pair of numbers entered by the user.</p>
48	953621243047	SANKARI MALATHI P	<p>a. Design a program that implements a circular queue using a linked list</p> <p>b. Given an array arr[] of n integers, find the maximum that maximizes the sum of the value of $i \cdot \text{arr}[i]$ where i varies from 0 to n-1</p>
49	953621243048	SANTHIYA M	<p>a. Given an array of elements find the sum of consecutive pair that has the least sum value.</p> <p>b. Given a linked list and two keys in it, swap nodes for two given keys. Nodes should be swapped by changing links. Swapping data of nodes may be expensive in many situations when data contains many fields.</p>
50	953621243049	SATHISH RAJENDRAN P	<p>Implement a function that counts the number of nodes in a circularly linked list.</p> <p>Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs</p>
51	953621243050	SELVAPRIYA K	Write a function that moves the last element to the front in a given Singly Linked List. For example, if the given Linked List is 1->2->3->4->5, then the function should change the list to 5->1->2->3->4.
52	953621243051	SHANMUGA VEL B	Give a recursive implementation of a singly linked list class, such that an instance of a nonempty list stores its first element and a reference to a list of remaining elements. Write a python

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			code for it Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
53	953621243052	SHESHAN N	Mini Project: Implement a function with signature transfer(S, T) that transfers all elements from stack S onto stack T, so that the element that starts at the top of S is the first to be inserted onto T, and the element at the bottom of S ends up at the top of T. Online Data structure problem solving platforms: Choose Amazon problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
54	953621243053	SIDDARTH A	Design a forward list ADT that abstracts the operations on a singly linked list, much as the positional list ADT abstracts the use of a doubly linked list. Implement a Forward List class that supports such an ADT. Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
55	953621243054	SIVALAKSHMI P	Design a circular positional list ADT that abstracts a circularly linked list in the same way that the positional list ADT abstracts a doubly linked list, with a notion of a designated “cursor” position within the list. Online Data structure problem solving platforms: Choose Amazon https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
56	953621243055	SUBHEKSHANA THILAGAM	MiniProject: Alice has two queues, Q and R, which can store integers. Bob gives Alice 50 odd integers and 50 even integers and insists that she store all 100 integers in Q and R. They then play a game where Bob picks Q or R at random and then applies the round-robin scheduler, described in the chapter, to the chosen queue a random number of times. If the last number to be processed at the end of this game was odd, Bob wins. Otherwise, Alice wins. How can Alice allocate integers to queues to optimize her chances of winning? What is her chance of winning? Online Data structure problem solving platforms: Choose Microsoft problems https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
57	953621243056	THIRUNIRAI	Implement a function that accepts a PositionalList L of n integers

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		SELVI M	sorted in non decreasing order, and another value V, and determines in O(n) time if there are two elements of L that sum precisely to V. The function should return a pair of positions of such elements, if found, or None otherwise
58	953621243057	UMADEVI M	Develop a program that concatenates two doubly linked lists L and M, with header and trailer sentinel nodes in to a single list X. Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
59	953621243058	VEERASHEL UCK V P	Write a program that counts the number of nodes in a circular linked list. Online Data structure problem solving platforms https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs
60	953621243059	VISHAKAN N	a. Write a program for finding by link hopping, the middle node of a doubly linked list with header and trailer sentinels given. b. Write a program to delete a node in a doubly linked list containing the value entered by the user. Online Data structure problem solving platforms: Choose Flipkart problems: Choose Flipkart: https://practice.geeksforgeeks.org/explore?page=1&company[]=Amazon&category[]=Arrays&sortBy=submissions Any 4 programs

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Top 50 Array Problems

Kadane's Algorithm

Arrays Dynamic Programming +1 more 24*7 Innovation Labs Accolite +22 more

Solve Problem

Medium 51.0% Success

Missing number in array

Arrays Bit Magic +1 more Accolite Adobe +11 more

Solve Problem

Easy 42.51% Success

Kth smallest element

Arrays Searching +1 more ABCD Accolite +8 more

Solve Problem

Medium 46.66% Success

Find duplicates in an array

Arrays Amazon D-E-Shaw +4 more

Solve Problem

Easy 20.69% Success

Sort an array of 0s, 1s and 2s

Arrays Sorting Adobe Amazon +15 more

Solve Problem

Easy 51.36% Success

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14:01 27-04-2022

Rubrics for Assignment/Miniproject

	Satisfactory 40-60%	Good 60-80%	Excellent 90-100%
Delivery	<ul style="list-style-type: none"> Completed between 40-60% of the requirements. The code was more than 2 days overdue. and in correct format 	<ul style="list-style-type: none"> Completed between 60-90% of the requirements. The program was delivered within a day of the due date, and in correct format 	<ul style="list-style-type: none"> Completed between 90-100% of the requirements. Delivered on time, and in correct format
Coding Standards	Little or no attempt to use proper: modularization, use of syntax (e.g. if vs. select case), loops (for vs. while), variable names, function names, declaration, indentation, initialization, type casting	The program exhibits less than 20% to 69% of the list shown (to the left)	<ul style="list-style-type: none"> Proper use of: modularization, use of syntax (e.g. if vs. select case), loops (for vs. while), variable names, function names, declaration, indentation, initialization, type casting, parameter
Documentation	The documentation is simply Comments embedded in the code and do not help the reader understand the code.	The documentation is simply comments embedded in the code with some simple header Comments separating routines.	Clearly and effectively documented including descriptions of all variables. Specific purpose is noted for each function, control Structure, input requirements, and output results.
Runtime & Time complexity	Executes without errors. User prompts contain little information, poor design. Some testing has been completed. Without time includes Time complexity	Executes without Errors. User prompts are Understandable, minimum use of symbols or spacing in output. Thorough testing has been completed. Included Time complexity	Executes without errors excellent user prompts, good use of symbols, spacing in output. Thorough and organized testing has been completed and output from test cases is included.. Time complexity