



CIP UPGRADE PLAN

Take a look at how the updated sections of the course would look like:

DATA STRUCTURE (basic) and DATA STRUCTURE (advanced) will be reshuffled to make the problems and videos fall into its respective category. The LIBRARIES (c++ stl and Java Collections) will contain fresh addition of new content to make the course more holistic and efficient. The new topics are highlighted in YELLOW.

Categories	Sub Categories	Tracks	Content
Data Structure (Basics)		Analysis of Algorithms	Growth of functions
			Asymptotic Notations Omega, Theta,
			Recursion Tree Method
			Space Complexity
		Arrays	Insertion, Deletion, Updation, Shifting
			Reversal, Sort Check, Maximum, Minimum
		Recursion	Introduction to Recursion
			Tail Recursion
			Natural Number Check Using Recursion
			Palindrome Check Using Recursion
			Sum of Digits, Rod Cutting and Subsets
			Tower of Hanoi



Categories	Sub Categories	Tracks	Content
Data Structure (Basics)		Hashing	Introduction to Hashing
			Direct Address Table
			Collision Handling
			Chaining
			Open Addressing
			Double Hashing
			Chaining Vs Open Addressing
		String	Introduction to String
		Searching	Linear Search
			Binary Search (Iterative and Recursive)
		Sorting	Stability in Sorting Algorithm
			Bubble Sort
			Selection Sort
			Insertion Sort
			Quick Sort
			Different Partition Schemes in QuickSort
			Merge Sort
			Lomuto Partition
			Hoare Partition
			Heap Sort
Counting Sort			



Categories	Sub Categories	Tracks	Content
Data Structure (Basics)		Sorting	Radix Sort
			Bucket Sort
		Linked List	Drawback of Arrays
			Introduction to Linked List and Implementation
			Traversal, Insertion and Deletion
			Sorted Insertion in Linked List
			Reversal of Linked List (Iterative and Recursive)
			Finding Middle
			Remove Duplicate from Sorted Linked List
			Circular Linked List
		Insertion (Head, End)	
		Deletion (Head, Kth Node)	
		Doubly Linked List	Traversal
			Insertion (Head, End)
			Deletion (Head, End)
			Reversal
			Circular Doubly Linked List
		Stack	Introduction to Stack Data Structure
			Implement using array



Categories	Sub Categories	Tracks	Content
Data Structure (Basics)		Stack	Implementation using Linked List
			Stack Applications
		Queue	Introduction to Queue Data Structure
			Implementation using array
			Implementation using Linked List.
		Deque	Introduction to Deque Data Structure.
			Implementations using Array
			Implementation using Linked List
		Tree	Implementation
			Traversals: preorder, postorder, inorder, level order (Iterative & Recursive)
			Binary Tree: Height, Size, Maximum
			Print Nodes at K Distance
		BST	Implementation
			Search
			Insertion
			Deletion
			Floor and Ceil in BST in CPP and Java
			Self Balancing BST



Categories	Sub Categories	Tracks	Content
Data Structure (Basics)		BST	AVL Tree (Introduction and applications)
			Red-Black Tree (Introduction and applications)
			Applications of BST
		Heap	Implementation
			Insert
			Heapify and Extract in Heap
			Decrease Key, Delete and Build Heap
Libraries	C++ STL	Introduction to STL	Introduction and Application
			Iterators
			Templates
			Function Templates
			Class Templates
		Pairs in CPP STL	Introduction
			Problem (With Video Solutions): Sorting an array according to another array
			Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Vectors in CPP STL	Introduction
			Vector Declaration
			More functions of Vectors
			Time Complexities of different operations and passing Vectors to function
			Internal Working of Vectors
			Problems (With Video Solutions): Vector and Vector of Pairs Keeping track of previous indexes after sorting a Vector
		Forward_list and list	Forward List in C++ STL
			List in C++ STL
			Problems (With Video Solutions): Josephus Problem using List in STL Design a Data Structure with Insert/Replace/Print operations
			Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Deque	Introduction
			Problems (With Video Solutions): Sliding Window Maximum Design a Data Structure with Min/Max operations in O(1) time
			Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.
		Stack	Introduction and Various Operations push() pop() top() size() empty() Problem (With Video Solutions): Reverse items using Stack Balanced Parenthesis Stock Span Problem Previous Greater Elements Next Greater Elements



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Stack	Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.
		Queue	Introduction and Various Operations push() pop() front() back() empty() size()
			Problems (With Video Solutions): Reverse first K items in a Queue
		Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.	
Priority Queue	Introduction and Various Operations push() pop() top() empty() size() Creating Min Heap based Priority Queue		



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Priority Queue	<p>Practice Problems (With Video Solutions):</p> <ul style="list-style-type: none">Sort an array using Priority QueueK Largest Elements in an arrayBuy maximum items with given moneyFind K most frequent elements
			<p>Practice Problems</p> <p>This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.</p>
		Set & MultiSet	<p>Set in C++ STL</p> <p>Introduction and Implementation</p> <ul style="list-style-type: none">insert()begin()end()rbegin()rend()erase()clear()find() <p>Internal Working</p> <p>Time Complexities</p>



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Set & MultiSet	<p>Practice Problems (With Video Solutions): Design a Data Structure that supports the below operations:</p> <ul style="list-style-type: none">insert()delete()search()getFloor()getCeiling() <p>Multiset in C++ STL with few operations</p> <p>Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.</p>
		Map and MultiMap	<p>Introduction to Map</p> <ul style="list-style-type: none">insert()operator()size()empty()clear()begin()end() <p>Internal Working Time Complexities</p>



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Map and MultiMap	<p>Problem: Design a data structure for item prices. The operations are add(), find(), findGreater(), findSmaller() and printSorted() Count greater elements for every array element.</p>
			<p>Multimap in C++ STL with few functional operations</p>
			<p>Practice Problems (With Video Solutions): Design a Data Structure for prices with duplicates allowed. The operations are add(), find(), findGreater(), findSmaller() and printSorted</p>
			<p>Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.</p>



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Unordered_set	Introduction to Set insert() begin() size() end() clear() find() Internal Working Time Complexities
			Practice Problems (With Video Solutions): Print Unique Elements of Array Print duplicate elements of the array
			Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.
		Unordered_Map	Introduction
			Practice Problems (With Video Solutions): Design a DS for storing user balance Find Winner of Election
			Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Non Mutating STL Algorithms	Explanation along with Time Complexities of max_element() min_element() accumulate() count() find() binary_search() lower_bound() upper_bound() rotate() fill() is_permutation() rand()
		Mutating STL Algorithm	Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned. Explanation along with Time Complexities of sort() reverse() next_permutation() prev_permutation() make_heap() merge()



Categories	Sub Categories	Tracks	Content
Libraries	C++ STL	Mutating STL Algorithm	Practice Problems (With Video Solutions): The Thief problem Fractional knapsack problem Chocolate Distribution problem Sort array elements by frequency
			Practice Problems This track contains many practice problems for the users which are considered important and must-do as far as Data Structure and Algorithm is concerned.
	Java Collections	Collections Overview	Introduction to Java Collections Framework
			Collections hierarchy
			Generics
			Wildcards
			toArray() Methods
			Collections Interface
			Iterators
			Collections Bulk operations
			Iterating through Collections
			Java Lambda Expressions
Introduction to Method References and examples			



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	Java Lambda Expressions	Syntax of Lambda Expressions
			Practice Problems Practice problems on Lambda Expressions
		Java Streams	Introduction to Streams in Java
			Various Applications of Streams
			The Stream hierarchy and methods
			Examples on Streams
			Practice Problems Practice problems on Streams
		ArrayList	Introduction to List Interface
			Using List Iterator
			Introduction to ArrayLists
			Implementation
			ArrayList Methods
			Traversal
			Problems with video explanation List of smaller elements
			Practice Problems Practice problems on implementation, iterator, methods, and using ArrayList to solve dsa problems



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	Linked List	Introduction and implementation of LinkedList in Java
			Problems with video explanation Josephus Problem using LinkedList Design a DS for remove and prin
			Practice Problems Practice problems on implementation, traversal, and use of LinkedList
		Stack	Introduction to Stack
			Implementation
			Methods
			Traversal
			Problems with video explanation Reverse order of items Check for balanced parentheses Stock span Previous greater element Next greater element
			Practice Problems Practice problems on implementation, methods, and using Stacks to solve dsa problems
			Queue



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	Queue	Implementation and usage
			Methods
			Traversal
			Problems with video explanation Reverse first k items
			Practice Problems Practice problems on implementation, methods, and using Queue to solve dsa problems
		Deque	Introduction to Deque
			Implementation and usage
			ArrayDeque
			Methods
			Traversal
			Practice Problems Practice problems on implementation, methods, and using Queue to solve dsa problems
		PriorityQueue	Introduction to PriorityQueue
			Implementation and usage
			Methods
			Traversal



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	PriorityQueue	Problems with video explanation Purchasing maximum items K largest elements Find k most frequent Find k most frequent in Linear time
			Practice Problems Practice problems on implementation, methods, and using PriorityQueue to solve dsa problem
		HashSet and LinkedHashSet	Introduction to HashSet
			Introduction to LinkedHashSet
			Implementation and usage
			Methods
			Traversal
			Problems with video explanation Print distinct elements Print repeating element
			Practice Problems Practice problems on implementation, methods, and using HashSet to solve dsa problems
		TreeSet	Introduction to TreeSet
			Implementation and usage



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	TreeSet	Methods
			Traversal
			Problems with video explanation Ceiling on right Count greater element
			Practice Problems Practice problems on implementation, methods, and using TreeSet to solve dsa problems
		HashMap and LinkedHashMap	Introduction to HashMap
			Introduction to LinkedHashMap
			Implementation and usage
			Methods
			Traversal
			Problems with video explanation DS for balance Print frequencies in order
			Practice Problems Practice problems on implementation, methods, and using HashMap to solve dsa problems
		TreeMap	Introduction to TreeMap
			Implementation and usage



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	TreeMap	Problems with video explanation Design a data structure for item prices Design a data structure for item prices with duplicates allowed
			Practice Problems Practice problems on implementation, methods, and using TreeMap to solve dsa problem
		String	Introduction to Strings
			Introduction to StringBuilder and StringBuffer
			Implementation and usage
			Methods
			Traversal
			Problems with video explanation Pangram checking Pattern searching Find one extra character
			Practice Problems Practice problems on implementation, methods, and using Strings to solve dsa problems
			Comparator and Comparable
		Introduction to Comparator Interface	



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	Comparator and Comparable	Methods of Comparator Interface and Examples on it
			Practice Problems Practice problems on using Comparator to sort effectively
		Arrays Class	Introduction to Arrays and the Arrays Class
			Implementation and usage
			Methods liket fill() BinarySearch() equals() mismatch() compare() asList() toString()
			Traversal
			Practice Problems Practice problems on implementation and method
		Collections Class	Introduction to Collections Class
			Methods like fill(), reverse(), binarySearch(), max(), min(), frequency()
			Practice Problems Practice problems on methods



Categories	Sub Categories	Tracks	Content
Libraries	Java Collections	Sorting	Introduction to sorting in Java
			Arrays.sort()
			Collections.sort()
			Comparable Interface
			Problems with video explanation The thief problem Chocolate distribution problem Keep indices after sorting Sort an array according to other Sort students by marks Sort elements by frequency Sort elements by frequency in Linear Time
			Practice problems on various sorting algorithms, and comparator sort
	Mathematics	Count Digits	
		Palindrome Numbers	
		Factorial of Numbers	
		GCD of Two Numbers	
		LCM of Two Numbers	
		Check for Prime	
		Prime Factors	
Sieve of Eratosthenes			



Categories	Sub Categories	Tracks	Content
Libraries		Mathematics	Computing Power
		Recursion	Josephus Problem
			Subset Sum Problem
		Arrays	Kadane's Algorithm
			Shuffling Algorithms
			Sliding Window
			Prefix Sum Technique
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Matrix	Multidimensional Array in CPP and Java
			Search, Transpose and Rotate
			Pattern Traversal: Snake, Spiral, Boundary
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Searching	Two Pointer Approach
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Sorting	Union And Intersection of Sorted Arrays



Categories	Sub Categories	Tracks	Content
Libraries		Sorting	Inversions Count
			Tail Call elimination Quick Sort
			Cycle Sort
			Merge of Overlapping Intervals
			Overview of Sorting Algorithms
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Hashing	Double Hashing
			Find frequencies of array
			Count Distinct element in Every Window
			Intersection and Union via Hashing
			Frequencies of Array Elements
			Distinct Elements in Window
			Counting Occurrences
			Check for a Pair with given Sum
			Longest Consecutive Subsequence
			Subsequence Problems
			Subarray Problems



Categories	Sub Categories	Tracks	Content	
Libraries		Hashing	Video Solutions for some standard and complex problems	
			More Problems for Practice.	
		Strings	Creation, Updation	
			Reverse, Pangram, Case conversion	
			Validation, Length	
			Palindrome Check	
			Overview of Pattern Searching	
			Pattern Matching Algorithms: Rabin Karp Algorithm KMP Algorithm	
			Rotations Check of two Strings	
			Anagram	
			Video Solutions for some standard and complex problems	
			More Problems for Practice.	
			Linked List	Doubly Linked List
				Circular Linked List
		Loop in Linked List (Detection and Removal)		
		Loop Detection Algorithms		



Categories	Sub Categories	Tracks	Content
Libraries		Linked List	Union and Intersection of LinkedLists
			Reverse in Groups
			LRU Cache Design
			Palindrome LinkedList
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Stack	Infix, Postfix, Prefix (Introduction)
			Infix to PostFi (Simple Solution)
			Infix to PostFix (Efficient Solution)
			Evaluation of Postfix
			Infix to PostFi (Simple Solution)
			Infix to PostFix (Efficient Solution)
			Evaluation of Postfix
			Implementing Two Stacks in Single Array
			Implementing K stacks in Single Array
			Largest Rectangular Area in Histogram
			Design a Stack that supports getMin() operation



Categories	Sub Categories	Tracks	Content	
Libraries		Stack	Video Solutions for some standard and complex problems	
			More Problems for Practice.	
		Tree	Line By Line Level Order Traversal	
			Printing Left, Right, Top and Bottom Views	
			Binary Tree to Doubly Linked List	
			Binary Tree from Inorder and Postorder Traversal	
			Maximum Width	
			Child Sum Property	
			Convert Binary Tree to Doubly LinkedList	
			Burning a Tree from Leaf	
			Diameter	
			LCA	
			Serialize and Deserialize	
			Count Nodes in Complete Binary Tree	
			Video Solutions for some standard and complex problems	
			More Problems for Practice.	
			Binary Search Tree	Top View



Categories	Sub Categories	Tracks	Content
Libraries		Binary Search Tree	Bottom View
			Vertical Sum
			Vertical Traversal
			Fix BST With Two Nodes Swapped
			Check For BST
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Heap	Heap Sort
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Graph	Graph Representation: Adjacency List
			Adjacency List Implementation in CPP
			Adjacency List Implementation in Java
			Adjacency List and Matrix Comparison
			Breadth First Search and application
			Depth First Search and application
			Detect Cycle in Undirected Graph



Categories	Sub Categories	Tracks	Content
Libraries		Graph	Detect Cycle in Directed Graph
			Topological Sorting
			Shortest Path Problems
			Prim's Algorithm Introduction and Implementation in CPP and Java
			Dijkstra's Algorithm Introduction and Implementation in CPP and Java
			Bellman Ford Algorithm
			Kosaraju's Algorithm
			Articulation Point
			Bridges in Graph
			Tarjan's Algorithm
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Greedy Algorithm	Introduction
			Activity Selection Problem in CPP and Java
			Fractional Knapsack in CPP and Java
			Job Sequencing Problem



Categories	Sub Categories	Tracks	Content
Libraries		Greedy Algorithm	Video Solutions for some standard and complex problems
			More Problems for Practice.
		BackTracking	Concept of Backtracking
			Problems: Rat In Maze, N Queen, Sudoku
			More Problems for Practice.
		Dynamic Programming	Introduction
			Memoization
			Tabulation
			LCS and its variations
			Coin Change
			KnapSack
			LIS and its variations
			Egg Drop Puzzle
			Subset Sum
			Matrix Chain Multiplication
			Palindrome Partitioning
			Video Solutions for some standard and complex problems
		More Problems for Practice.	



Categories	Sub Categories	Tracks	Content
Libraries		Trie	Introduction
			Insert, Search, Delete
			Video Solutions for some standard and complex problems
			More Problems for Practice.
		Segment Tree	Introduction
			Construction
			Range and Update Query
			More Problems for Practice.
		Disjoint-Set	Introduction
			Union-Find
			Union By Rank
			Path Compression
			Kruskal's Algorithm
			More Problems for Practice.