1 CheatSheet: Leetcode Common Templates & Common Code Problems Languages

- PDF Link: cheatsheet-leetcode-A4.pdf, Category: languages
- Blog URL: `https://cheatsheet.dennyzhang.com/cheatsheet-leetcode-A4`
- Related posts: CheatSheet: System Design For Code Interview, #denny-cheatsheets

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- CheatSheet: 30 Common Code Problems & Follow-ups

1.1 Top 25 Code Templates

Num	Category/Tag	Example
1	#bfs	Leetcode: Binary Tree Level Order Traversal
2	#dfs	Leetcode: Island Perimeter
3	#binarysearch	Leetcode: Search Insert Position
4	#interval, #mergetwolist	Leetcode: Interval List Intersections
5	#twopointer, #array	Leetcode: Reverse Words in a String II
6	#twopointer	Leetcode: Two Sum
7	#backtracking, #subset	Leetcode: Subsets II
8	#linkedlist, #presum	Leetcode: Remove Zero Sum Consecutive Nodes from Linked List
9	#unionfind	Leetcode: Accounts Merge
10	#trie	Leetcode: Longest Word in Dictionary
11	#stack	Leetcode: Valid Parentheses
12	#stack	Leetcode: Reverse Substrings Between Each Pair of Parentheses
13	#heap	Leetcode: Top K Frequent Elements
14	#baseconversion	Leetcode: Base 7
15	#interval	Leetcode: Meeting Rooms II, Leetcode: My Calendar I
16	#monotone	Leetcode: Daily Temperatures
17	#knapsack	Leetcode: Coin Change
18	#sortbyfunction	Leetcode: Relative Sort Array
19	#slidingwindow	Leetcode: Longest Substring Without Repeating Characters
20	#editdistance, #dynamicprogramming	Leetcode: Longest Common Subsequence
21	#twopointer, #mergetwolist	Leetcode: Merge Sorted Array
22	#divideconquer, #recursive	

1.2 Top 20 Graph Problems

Num	Problem	Category/Tag	Summary
1	Graph Connectivity: Count islands in a 2D matrix	#dfs, #unionfind	Leetcode: Numb
2	Get the size of the largest island	#dfs	Leetcode: Max A
3	Cycle detection in an undirected graph		
4	Cycle detection in a directed graph		Leetcode: Redur
5	Whether a graph is a tree	#unionfind, #bfs	Leetcode: Graph
6	Kruskal's algorithm: Minimum spanning tree of a weighted graph	#unionfind	Leetcode: Conne
7	Dijkstra's algorithm: shortest path for two nodes in a weighted graph		
8	Floyd-Warshall algorithm: find shortest paths in a weighted graph	#dfs, #dynamicprogramming	
9	Update a specific region	#dfs	Leetcode: Flood
10	Update regions for a given rule		Leetcode: Surrou
11	Mark levels		Leetcode: 01 Ma
12	Duplicate edges		Leetcode: Recon
13	Find a certain node in a graph	#unionfind	Leetcode: Find t
14	Find a certain path from source to destination in a graph		Leetcode: Path V
15	Find the minimum steps from point1 to point2		Leetcode: Word
16	Find all minimum paths from point1 to point2		Leetcode: Word
17	All Paths from Source Lead to Destination		Leetcode: All Pa

https://cdn.dennyzhang.com/images/brain/denny$_{\text{leetcode.png}}$

1.3 Top 5 Binarysearch Problems

Num	Problem	Category/Tag	Summary
1	Find a first failing version		Leetcode: First Bad Version
2	Search Insert Position		Leetcode: Search Insert Position, Leetcode: Time Based Key-Val
3	Binary search on monotonic function		

1.4 Top 10 Dynamic Programming Problems

Num	Problem	Category/Tag	Summary
1	LCS - Longest Common Subsequence	#editdistance, #lcs	Leetcode: Longest Common Subsequenc
2	LIS - Longest increasing subsequence	#string, #lis	Leetcode: Longest Increasing Subsequer
3	Edit distance of two strings	#editdistance, #dynamicprogramming	Leetcode: Edit Distance
4	Maximum subarray problem	#maxsubarraysum	Leetcode: Maximum Subarray

1.5 Top 10 BinaryTree Problems

Num	Problem	Category/Tag	Summary
1	Binary Tree Level Order Traversal	#bfs	Leetcode: Binary Tree Right Side View
2	Height of binary tree	#dfs	Leetcode: Balanced Binary Tree
3	LCA - Lowest Common Ancestor of a binary Tree	#dfs	Leetcode: Lowest Common Ancestor of a Binary Tr
4	Check whether a binary tree is a full binary tree	#dfs, #bfs	
5	Construct binary tree		Leetcode: Construct Binary Tree from Preorder and
6	Right view of a tree		

1.6 Top 5 String Problems

Num	Problem	Category/Tag	Summary
1	Edit distance of two strings	#editdistance, #dynamicprogramming	Leetcode: Edit Distance
2	Remove duplicate letters	#greedy, #stack	Remove Duplicate Letters

1.7 Top 5 Math Problems

Num	Problem	Category/Tag	Summary
1	Check prime - Sieve of Eratosthenes	#prime	Leetcode: Count Primes
2	Check leap year	#leapyear	Leetcode: Day of the Week
3	Rectangle	#rectangle	
4	gcd	#gcd	

1.8 Top 45 General Problems

Num	Problem	Category/Tag	Example
1	Seperate a list into several groups	#groupelements, #twopointer	Leetcode: Summary Rang
2	Split string	#string	Leetcode: License Key For
3	TopK problem	#heap, #topk	Leetcode: Top K Frequent
4	Sort one array based on another array	#sortbyfunction	Leetcode: Relative Sort A
5	Longest substring with at most K distinct characters	#slidingwindow, #atmostkdistinct	Leetcode: Longest Substri
6	Longest subarray with maximum K 0s	#slidingwindow	Leetcode: Max Consecutiv
7	Next Permutation	#greedy, #nextpermutation	Leetcode: Next Permutati
8	Range update with lazy propagation	#combinedcaculation, #rangesum	Leetcode: Corporate Fligh
9	Monotone stack for consecutive subarrays	#montone	Leetcode: Online Stock Sp
10	Get all possibilities of subsets	#subset, #backtracking	Leetcode: Subsets II, Leet
11	Choose k numbers from a list	#combination, #backtracking	Leetcode: Combination Su
12	Combination from multiple segments	#combination, #backtracking	Leetcode: Letter Combina
13	Remove nodes from linked list	#linkedlist, #presum	Leetcode: Remove Zero Su
14	Check whether a linked list has a loop		
15	Two pointers	#twosum, #twopointer	Leetcode: Two Sum
16	Buy stock for maximum profit list	#array, #greedy, #buystock	Leetcode: Best Time to B
17	Prefix search from a list of strings	#trie	Leetcode: Longest Word i
18	Factor Combinations	#combination, #backtracking	Leetcode: Factor Combina
19	Permutation without duplicates	#permutation, #backtracking	Leetcode: Palindrome Per
20	Int to string or string to int	#bitmanipulation	
21	Convert a number into negative base representation	#bitmanipulation, #baseconversion	Leetcode: Convert to Base
22	Network connectivity	#unionfind	Leetcode: Friend Circles
23	Build relationship among different sets	#unionfind	Leetcode: Accounts Merge
24	Knapsack problem to maximize benefits	#knapsack	Leetcode: Coin Change
25	Find the next greater value	#monotone	Leetcode: Daily Temperat
26	Meeting conflict	#interval	Leetcode: Meeting Rooms
27	Minimum conference rooms	#interval, #overlappinginterval	Leetcode: Meeting Rooms
28	Quick slow pointers	#twopointer	LintCode: Middle of Linke
29	Longest Repeating Character with at most K changes	#slidingwindow	Leetcode: Longest Repeat
30	Count out of boundary paths in a 2D matrix	#outofboundarypath, #bfs	Leetcode: Out of Boundar
31	Coloring graph	#bfs, #dfs	Leetcode: Minesweeper
32	Prefix and Suffix Search	#trie	Leetcode: Prefix and Suffi
33	Remove duplicate letters	#greedy, #string, #stack	Leetcode: Remove Duplica
34	Beautiful array	#divideconquer	Leetcode: Beautiful Array
35	Whether 132 pattern exists in array	#stack	Leetcode: 132 Pattern
36	Detect conflicts of intervals	#interval	Leetcode: Non-overlapping
37	Segment tree: solves range query problems quickly	#segmenttree	Leetcode: Range Sum Que
38			Travelling salesman proble
39			Leetcode: Remove Duplica
40			Leetcode: Min Stack
41		#minmax, #dynamicprogramming	Leetcode: Predict the Win
42	Topological Sort		

1.9 Common Tips For Clean Code

Num	Name	Summary
1	Caculate sum of a range quickly	#presum,Leetcode: Maximum Subarray
2	Move in four directions for a matrix	Leetcode: Sliding Puzzle
3	Split string by multiple seperator	Leetcode: Brace Expansion
4	Add a dummy tailing element to simplify code	Leetcode: Brace Expansion
5	Fast slow pointers	LintCode: Middle of Linked List
6	Deep copy an array	Leetcode: Combination Sum
7	Use arrays instead of hashmaps, if possible	Leetcode: Number of Days in a Month
8	Control the order of dfs	Leetcode: Subsets II
9	Avoid inserting into the head of an array	Leetcode: Path In Zigzag Labelled Binary Tree
10	From right to left, instead of left to right	Leetcode: Merge Sorted Array
11	Think the other way around	`Add Items` vs `Remove Items`, `Increase Counter` vs `De`
12	Avoid uncessary if...else...	res[i] = (diff/2 <= k), Leetcode: Can Make Palindrom
13	To get the case of K, solve: at most K - at most (K-1)	Leetcode: Subarrays with K Different Integers
14	Instead of deleting entry from hashmap, decrease counter	Leetcode: Longest Substring with At Most K Distinct
15	Find the max/min; If not found, return 0	Leetcode: Minimum Area Rectangle
16	With helper function vs without helper function	Leetcode: Longest Repeating Character Replacement
17	Instead of adding a character, try to delete one	Leetcode: Longest String Chain
18	#roudtrippass: from left to right, then right to left	Leetcode: Shortest Distance to a Character
19	Delayed caculation to simplify the code	Leetcode: Interval List Intersections
20	Instead of removing, add padding elements	Leetcode: Duplicate Zeros
21	Initialize array with n+1 length to simplify code	Leetcode: Range Addition
22	Look for off-by-one errors, sometimes use i+1<len(l) vs i<len(l)	Leetcode: Previous Permutation With One Swap
23	Hashmap can reduce caculation, but may complicate things too	Leetcode: Maximum Frequency Stack
24	Avoid unnecessary precheck	
25	One pass instead of two pass	
26	Swiping line algorithm	
27	Add a dummy head node for linked list	
28	Hide details which are irrelevant	
29	Avoid delete element from hashmaps	

1.10 Golang Tips

Name	Summary
Golang return a tuple	`func dfs(root *TreeNode, max *float64) (sum int, cnt int)`, Leetcode:
Use strings.Builder, instead of string	Leetcode: Unique Email Addresses
Variable Conversion	`float64(x_int/y_int)` != `float64(x_int)/float64(y_int)`, Leetcode: Maxi
For a list of objects, pass by value or reference	`f(l []*TreeNode)` vs `f(l *[]*TreeNode)`, Leetcode: Lowest Common Ancesto

1.11 Resource For Code Problems

Name	Summary
Leetcode summary	Link: Top Google Questions, Link: Top 100 Liked Questions, Link: Top Interview Questions
Leetcode summary	GitHub: kdn251/interviews
Leetcoder on YouTube	lee 215, Aoxiang Cui, happygirlzt
Online test websites	spoj.com, Google - codejam, hackerrank.com, hackerrank - hard, codeforces.com, poj.org
Online test websites	acm.hdu.edu.cn, acm.zju.edu.cn, acm.timus.ru, uva.onlinejudge.org
visualgo	visualising data structures and algorithms through animation
Reference	geeksforgeeks.org, Youtube: Abdul Bari - Algorithm

1.12 More Resources

`https://www.cs.princeton.edu/~rs/AlgsDS07/`

`https://www.geeksforgeeks.org/top-10-algorithms-in-interview-questions/`