

# Code Jam - Self-Learning Material

- Book: [Competitive Programming 3.pdf](#)

N o.	Knowledge Category	Section	Material (CBL)	Material (Book)	Material (Online)
1	Introduction	Competitive Programming	Hands-On Competitive Programming Introduction of Competitive Programming - Road to Rome	Competitive Programming 3 - Section 1	<a href="https://vnoi.info/wiki/translate/topcoder/The-Importance-of-Algorithm.md">https://vnoi.info/wiki/translate/topcoder/The-Importance-of-Algorithm.md</a>
2	Introduction	LGE Code Jam			<a href="https://vnoi.info/wiki/algo/basic/hoc-tin-the-nao-1.md">https://vnoi.info/wiki/algo/basic/hoc-tin-the-nao-1.md</a> <a href="https://vnoi.info/wiki/algo/basic/hoc-tin-the-nao-2.md">https://vnoi.info/wiki/algo/basic/hoc-tin-the-nao-2.md</a>
3	C++ Build In Data Structure	vector		Competitive Programming 3 - Section 2.2	<a href="http://cplusplus.com/reference/vector/vector/">http://cplusplus.com/reference/vector/vector/</a>
4	C++ Build In Data Structure	bitset		Competitive Programming 3 - Section 2.2	<a href="http://cplusplus.com/reference/bitset/bitset/">http://cplusplus.com/reference/bitset/bitset/</a>
5	C++ Build In Data Structure	stack		Competitive Programming 3 - Section 2.2	<a href="http://cplusplus.com/reference/stack/stack/">http://cplusplus.com/reference/stack/stack/</a> <a href="https://vnoi.info/wiki/algo/data-structures/Stack.md">https://vnoi.info/wiki/algo/data-structures/Stack.md</a>
6	C++ Build In Data Structure	queue		Competitive Programming 3 - Section 2.2	<a href="http://cplusplus.com/reference/queue/queue/">http://cplusplus.com/reference/queue/queue/</a> <a href="https://vnoi.info/wiki/algo/data-structures/deque-min-max.md">https://vnoi.info/wiki/algo/data-structures/deque-min-max.md</a>
7	C++ Build In Data Structure	deque		Competitive Programming 3 - Section 2.2	<a href="http://cplusplus.com/reference/deque/deque/">http://cplusplus.com/reference/deque/deque/</a>
8	C++ Build In Data Structure	map		Competitive Programming 3 - Section 2.3	<a href="http://cplusplus.com/reference/map/map/">http://cplusplus.com/reference/map/map/</a>
9	C++ Build In Data Structure	set		Competitive Programming 3 - Section 2.3	<a href="http://cplusplus.com/reference/set/set/">http://cplusplus.com/reference/set/set/</a>
10	C++ Build In Data Structure	priority_queue		Competitive Programming 3 - Section 2.3	<a href="http://cplusplus.com/reference/queue/priority_queue/">http://cplusplus.com/reference/queue/priority_queue/</a>
11	Data Structure	Segment Tree		Competitive Programming 3 - Section 2.4.3	<a href="https://www.geeksforgeeks.org/segment-tree-efficient-implementation/">https://www.geeksforgeeks.org/segment-tree-efficient-implementation/</a> <a href="https://vnoi.info/wiki/algo/data-structures/segment-tree-extend.md">https://vnoi.info/wiki/algo/data-structures/segment-tree-extend.md</a>
12	Data Structure	Fenwick Tree		Competitive Programming 3 - Section 2.4.4	<a href="https://www.geeksforgeeks.org/binary-indexed-tree-or-fenwick-tree-2/">https://www.geeksforgeeks.org/binary-indexed-tree-or-fenwick-tree-2/</a> <a href="https://vnoi.info/wiki/algo/data-structures/fenwick.md">https://vnoi.info/wiki/algo/data-structures/fenwick.md</a>
13	Data Structure	Heap			<a href="https://www.geeksforgeeks.org/heap-data-structure/">https://www.geeksforgeeks.org/heap-data-structure/</a> <a href="https://vnoi.info/wiki/translate/wcipeg/Binary-Heap.md">https://vnoi.info/wiki/translate/wcipeg/Binary-Heap.md</a>
14	Sorting	Quick Sort			<a href="https://www.geeksforgeeks.org/quick-sort/">https://www.geeksforgeeks.org/quick-sort/</a>
15	Sorting	Merge Sort			<a href="https://www.geeksforgeeks.org/merge-sort/">https://www.geeksforgeeks.org/merge-sort/</a>
16	Searching	Binary Search	Introduction to Sorting and Searching algorithms.		<a href="https://www.geeksforgeeks.org/binary-search/">https://www.geeksforgeeks.org/binary-search/</a> <a href="https://vnoi.info/wiki/algo/basic/binary-search.md">https://vnoi.info/wiki/algo/basic/binary-search.md</a>
17	String Processing	Knuth-Morris-Pratt's (KMP) Algorithm		Competitive Programming 3 - Section 6.4.2	<a href="https://www.geeksforgeeks.org/kmp-algorithm-for-pattern-searching/">https://www.geeksforgeeks.org/kmp-algorithm-for-pattern-searching/</a> <a href="https://vnoi.info/wiki/translate/wcipeg/kmp.md">https://vnoi.info/wiki/translate/wcipeg/kmp.md</a>
18	String Processing	String Processing with Dynamic Programming		Competitive Programming 3 - Section 6.5	
19	String Processing	String Alignment (Edit Distance)		Competitive Programming 3 - Section 6.5.1	
20	String Processing	Longest Common Subsequence		Competitive Programming 3 - Section 6.5.2	
21	String Processing	Suffix Trie and Applications		Competitive Programming 3 - Section 6.6.1	<a href="https://vnoi.info/wiki/algo/data-structures/trie.md">https://vnoi.info/wiki/algo/data-structures/trie.md</a>
22	String Processing	Suffix Tree		Competitive Programming 3 - Section 6.6.2	<a href="https://drive.google.com/file/d/0BwcTB8a10LBwYUwwNVYzbnZiZnM/view?resourcekey=0-TyQK7KSoZJW-fVpHquw6NQ">https://drive.google.com/file/d/0BwcTB8a10LBwYUwwNVYzbnZiZnM/view?resourcekey=0-TyQK7KSoZJW-fVpHquw6NQ</a>
23	String Processing	Suffix Array		Competitive Programming 3 - Section 6.6.4	<a href="https://vnoi.info/wiki/algo/data-structures/suffix-array.md">https://vnoi.info/wiki/algo/data-structures/suffix-array.md</a>

24	Graph Traversal	DFS/BFS/Connected Component/Flood Fill		Competitive Programming 3 From Section 4.2.1 to Section 4.2.4	<a href="https://www.geeksforgeeks.org/breadth-first-search-or-bfs-for-a-graph/">https://www.geeksforgeeks.org/breadth-first-search-or-bfs-for-a-graph/</a> <a href="https://www.geeksforgeeks.org/flood-fill-algorithm/">https://www.geeksforgeeks.org/flood-fill-algorithm/</a> <a href="https://www.geeksforgeeks.org/depth-first-search-or-dfs-for-a-graph/">https://www.geeksforgeeks.org/depth-first-search-or-dfs-for-a-graph/</a>
25	Graph Traversal	Topological Sort		Competitive Programming 3 - Section 4.2.5	-
26	Graph Traversal	Bipartite Graph Check		Competitive Programming 3 - Section 4.2.6	
27	Graph Traversal	Articulation Points and Bridges (Undirected Graph)		Competitive Programming 3 - Section 4.2.8	
28	Graph Traversal	Strongly Connected Components (Directed Graph)		Competitive Programming 3 - Section 4.2.9	
29	Minimum Spanning Tree	Kruskal's Algorithm		Competitive Programming 3 - Section 4.3.2	<a href="https://www.geeksforgeeks.org/kruskals-minimum-spanning-tree-algorithm-greedy-algo-2/">https://www.geeksforgeeks.org/kruskals-minimum-spanning-tree-algorithm-greedy-algo-2/</a>
30	Minimum Spanning Tree	Prim's Algorithm		Competitive Programming 3 - Section 4.3.3	<a href="https://www.geeksforgeeks.org/prims-minimum-spanning-tree-mst-greedy-algo-5/">https://www.geeksforgeeks.org/prims-minimum-spanning-tree-mst-greedy-algo-5/</a>
31	Single-Source Shortest Paths	SSSP on Unweighted Graph		Competitive Programming 3 - Section 4.4.2	<a href="https://www.geeksforgeeks.org/dijkstras-algorithm-for-adjacency-list-representation-greedy-algo-8/">https://www.geeksforgeeks.org/dijkstras-algorithm-for-adjacency-list-representation-greedy-algo-8/</a>
32	Single-Source Shortest Paths	SSSP on Weighted Graph		Competitive Programming 3 - Section 4.4.3	
33	Single-Source Shortest Paths	SSSP on Graph with Negative Weight Cycle		Competitive Programming 3 - Section 4.4.4	
34	All-Pairs Shortest Paths	Floyd Warshall's DP Solution		Competitive Programming 3 - Section 4.5.2	<a href="https://www.geeksforgeeks.org/floyd-warshall-algorithm-dp-16/">https://www.geeksforgeeks.org/floyd-warshall-algorithm-dp-16/</a>
35	Network Flow	Ford Fulkerson's Method		Competitive Programming 3 - Section 4.6.2	<a href="https://www.geeksforgeeks.org/ford-fulkerson-algorithm-for-maximum-flow-problem/">https://www.geeksforgeeks.org/ford-fulkerson-algorithm-for-maximum-flow-problem/</a>
36	Network Flow	Edmonds Karp's Algorithm		Competitive Programming 3 - Section 4.6.3	<a href="https://www.geeksforgeeks.org/hopcroft-karp-algorithm-for-maximum-matching-set-2-implementation/">https://www.geeksforgeeks.org/hopcroft-karp-algorithm-for-maximum-matching-set-2-implementation/</a>
37	Special Graphs	Directed Acyclic Graph		Competitive Programming 3 - Section 4.7.1	
38	Special Graphs	Tree		Competitive Programming 3 - Section 4.7.2	
39	Special Graphs	Eulerian Graph		Competitive Programming 3 - Section 4.7.3	
40	Special Graphs	Bipartite Graph		Competitive Programming 3 - Section 4.7.4	
41	Combinatorics	Fibonacci Numbers		Competitive Programming 3 - Section 5.4.1	
42	Combinatorics	Binomial Coefficients		Competitive Programming 3 - Section 5.4.2	
43	Combinatorics	Catalan Numbers		Competitive Programming 3 - Section 5.4.3	
44	Number Theory	Prime Numbers		Competitive Programming 3 - Section 5.5.1	
45	Number Theory	Greatest Common Divisor & Least Common Multiple		Competitive Programming 3 - Section 5.5.2	
46	Number Theory	Factorial		Competitive Programming 3 - Section 5.5.3	

47	Number Theory	Modulo Arithmetic		Competitive Programming 3 - Section 5.5.8	<a href="https://vnoi.info/wiki/translate/he/So-hoc-Phan-1-Modulo-gcd.md">https://vnoi.info/wiki/translate/he/So-hoc-Phan-1-Modulo-gcd.md</a>
48	Number Theory	Probability Theory		Competitive Programming 3 - Section 5.6	<a href="https://vnoi.info/wiki/translate/topcoder/Hieu-ve-xac-suat.md">https://vnoi.info/wiki/translate/topcoder/Hieu-ve-xac-suat.md</a>
49	Game Theory	Decision Tree		Competitive Programming 3 - Section 5.8.1	
50	Game Theory	Nim Game		Competitive Programming 3 - Section 5.8.3	
51	Advanced Topics	Dinic's Algorithm		Competitive Programming 3 - Section 9.7	<a href="https://www.geeksforgeeks.org/dinics-algorithm-maximum-flow/">https://www.geeksforgeeks.org/dinics-algorithm-maximum-flow/</a>
52	Advanced Topics	Josephus Problem		Competitive Programming 3 - Section 9.15	<a href="https://www.geeksforgeeks.org/josephus-problem-set-1-a-on-solution/">https://www.geeksforgeeks.org/josephus-problem-set-1-a-on-solution/</a>
53	Advanced Topics	Lowest Common Ancestor		Competitive Programming 3 - Section 9.18	<a href="https://www.geeksforgeeks.org/lca-for-general-or-n-ary-trees-sparse-matrix-dp-approach-onlogn-ologn/">https://www.geeksforgeeks.org/lca-for-general-or-n-ary-trees-sparse-matrix-dp-approach-onlogn-ologn/</a> <a href="https://vnoi.info/wiki/algo/data-structures/lca.md">https://vnoi.info/wiki/algo/data-structures/lca.md</a> <a href="https://vnoi.info/wiki/translate/topcoder/Range-Minimum-Query-and-Lowest-Common-Ancestor.md">https://vnoi.info/wiki/translate/topcoder/Range-Minimum-Query-and-Lowest-Common-Ancestor.md</a>
54	Best Practice	TBD			
55	Best Practice	TBD			
56	Best Practice	TBD			
57	Strategy	Strategy for Code Jam	Experience & Best Practice for Competitive Programming		<a href="https://vnoi.info/wiki/algo/skill/Ki-nang-thi-cu.md">https://vnoi.info/wiki/algo/skill/Ki-nang-thi-cu.md</a>
58	Strategy	TBD			
59	Practice Site	VNOI			<a href="https://vnoi.info/problems/list/">https://vnoi.info/problems/list/</a>
60	Practice Site	USA Computing Olympiad (USACO)			<a href="http://www.usaco.org">http://www.usaco.org</a>
61		Top Coder			<a href="https://www.topcoder.com">https://www.topcoder.com</a>
		Google's Coding Competitions			<a href="https://codingcompetitions.withgoogle.com/past-competitions">https://codingcompetitions.withgoogle.com/past-competitions</a>