

Week 0

- Introduction
 - Hello World!
 - Command Line (/topics/command_line)
 - Compiling and Executing (/topics/compiling_and_executing)
 - Redirection to and from Files (/topics/redirection)
- C++ Programming I
 - Operators
 - Conditionals
 - Loops
 - Functions
 - Recursion
 - C++ Primitives (/topics/cpp_primitives)

Week 1

- C++ Programming II
 - Pointers and Memory (/topics/cpp_pointers)
 - Arrays and Pointers (/topics/cpp_arrays)
 - Dynamic Memory Allocation (/topics/cpp_malloc)
 - Strings, Character Arrays, and Encoding (/topics/cpp_strings)
 - Input and Output
- Mathematics I
 - Mathematics and Logic (/topics/math_logic)
 - Sets (/topics/math_sets)
 - Functions (/topics/math_functions)

Week 2

- C++ Programming III
 - C++ Structs (/topics/cpp_structs)
 - Pass by Value and Reference (/topics/cpp_pass_by_value)
 - Classes and Methods (/topics/cpp_methods)
 - Operator Overloading (/topics/cpp_operator_overloading)
 - Stack and Heap Memory (/topics/cpp_memory_types)
 - Constructors and Destructors (/topics/cpp_constructors_and_destructors)
- Mathematics II
 - Proving Statements (/topics/math_proving)
 - Common Proof Types (/topics/math_proof_types)
 - Existence Proofs (/topics/math_existence)
 - Mathematical Induction (/topics/math_induction)

Week 3

- Algorithms I
 - O Notation (/topics/algo_o_notation)
 - Sorting (/topics/algo_sorting)
 - Searching
- Data Structures I
 - Linked Lists (/topics/ds_linked_list)
 - Stacks, Queues, and Deques (/topics/ds_stacks_queues_deques)
 - Dynamic Arrays
 - Binary Heaps (/topics/ds_binary_heap)
 - Binary Search Trees
- Number Theory I
 - Divisibility (/topics/num_divisibility)
 - Primes (/topics/num_primes)
 - Sieves (/topics/num_sieves)
 - Greatest common divisor (/topics/num_gcd)
 - Least common multiple (/topics/num_lcm)

Week 4

- Algorithms II
 - Divide and Conquer
 - Randomized algorithms
 - Greedy algorithms
- C++ Programming IV
 - Mutable and Immutable Types
 - Templates
 - Standard Template Library
 - C++ Algorithm Library
 - Debugging
- Data Structures II
 - Grids (/topics/ds_grids)
 - Self-balancing Binary Search Trees

Week 5

- Graphs I
 - Graph representations (/topics/graph_representations)
 - Breadth-First Search
 - Depth-First Search
- Trees I
 - Trees
 - Tree Representations
 - Tree Traversals
- Algebra I
 - Polynomials (/topics/alg_polynomials)
 - Matrices

- Coordinate Systems

Week 6

- Dynamic Programming I
 - Introduction to DP (/topics/dp_intro)
 - Very Easy DP
- Data Structures III
 - Union Find (/topics/ds_union_find)
 - Tree Maps and Tree Sets
 - Hash Tables

Week 7

- Graphs II
 - Minimum Spanning Tree
 - Shortest Path
- Combinatorics I
 - Counting
 - Factorials
 - Binomial Coefficients
 - Fibonacci numbers
- Algebra II
 - System of Linear Equations

Week 8

- Dynamic Programming II
 - Hidden Variables in DP
 - DP Tips and Tricks (/topics/dp_tips_and_tricks)
 - Easy DP
- Graphs III
 - Directed acyclic graphs
 - Bridges and Articulation Points (/topics/graph_bridges_and_articulation_points)
- Number Theory II
 - Factorization
 - Modular Arithmetic
 - Exponentiation
 - Modular Inverses

Week 9

- Data Structures IV
 - Range Queries (/topics/ds_range_queries)
 - Square Root Decomposition

- Segment Trees
- Geometry I
 - Geometric Objects
 - Distances
 - Trigonometry

Week 10

- Algebra III
 - Sequences
 - Series
 - Matrices
- Algorithms III
 - Amortized Analysis
 - Backtracking
 - Branch and Bound
- Graphs IV
 - Eulerian Paths and Cycles
 - Cycle Finding (/topics/graph_cycle_finding)

Week 11

- Graphs V
 - Strongly Connected Components (/topics/graph_scc)
 - Biconnectivity (/topics/graph_bcc)
 - Path Counting
- C++ Programming V
 - Bitwise Tricks: Operations
 - Bitwise Tricks: Subsets
- Geometry II
 - Computational Geometry
 - Point in Polygon
 - Closest Pair
- Number Theory III
 - Extended Euclidean algorithm
 - Chinese Remainder Theorem

Week 12

- Trees II
 - Tree Center, Centroid
 - Centroid Decomposition
 - Tree-rerooting DP
- Dynamic Programming III
 - Bitmask DP

- Medium DP
- Geometry III
 - Scalars and Vectors
 - Cross and Dot Product

Week 13

- Dynamic Programming IV
 - DP on Structures: Trees and DAGs
 - Advanced DP
- Combinatorics II
 - Cayley's Formula
 - Multinomial Coefficients
 - Stirling Numbers
 - Partition Numbers
- Number Theory IV
 - Complex Numbers
 - Rectilinear and Polar Coordinates
 - Fundamental Theorem of Algebra

Week 14

- Trees III
 - Level Ancestors
 - Lowest Common Ancestors
 - Range Queries on a Tree
- Geometry IV
 - Polygon Area (/topics/geom_polygon_area)
 - Convex Hull
 - 2D Rotation

Week 15

- Data Structures V
 - Fenwick Tree (/topics/ds_fenwick)
 - Advanced Segment Trees
 - Advanced Heaps
- Algebra IV
 - Generating Functions (/topics/alg_generating_functions)

Week 16

- Graphs VI
 - Bipartite Graphs
 - Hall's Marriage Theorem

- Assignment Problem
- Maximum Bipartite Matching
- Geometry V
 - Triangulation
 - Sweep Line
 - Polar Sorting

Week 17

- Trees IV
 - Heavy-Light Decomposition
- Data Structures VI
 - Persistent Data Structures (/topics/ds_persistence)
- Algebra V
 - More Linear Algebra
- Extras
 - Pick's Theorem
 - Planar Graphs

Week 18

- Dynamic Programming V
 - DP Optimizations
 - Really Advanced DP
- Calculus I
 - Limits
 - Derivatives
 - Integrals
- Algebra VI
 - Abstract Algebra
- Algorithms IV
 - Big O: Substitution Method
 - Master Theorem

Week 19

- Graphs VII
 - Maximum Flow (/topics/graph_flow)
- Data Structures VII
 - Advanced uses of Splay Trees and Treaps
- Extras
 - Discrete Logarithm
 - Rotating Calipers
 - Kirchhoff's Matrix-Tree Theorem