Lectures

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> **Algorithms, Part I**

∨ **Week 1: Union-Find**

✓　　　Dynamic Connectivity (10:22)　✐ Quiz Attempted

✓　　　Quick Find (10:18)　✐ Quiz Attempted

✓　　　Quick Union (7:50)　✐ Quiz Attempted

✓　　　Quick-Union Improvements (13:02)　✐ Quiz Attempted

✓　　　Union-Find Applications (9:22)　✐ Quiz Attempted

∨ **Week 1: Analysis of Algorithms**

✓　　　Analysis of Algorithms Introduction (8:14)　✐ Quiz Attempted

✓　　　Observations (10:05)　✐ Quiz Attempted

✓　　　Mathematical Models (12:48)　✐ Quiz Attempted

✓　　　Order-of-Growth Classifications (14:39)　✐ Quiz Attempted

✓　　　Theory of Algorithms (11:35)　✐ Quiz Attempted

Memory (8:11) ✐ Quiz Attempted

Week 2: Stacks and Queues

Stacks (16:24)

Resizing Arrays (9:56)

Queues (4:33)

Generics (9:26)

Iterators (7:16)

Stack and Queue Applications (13:25) (optional)

Week 2: Elementary Sorts

Sorting Introduction (14:43)

Selection Sort (6:59)

Insertion Sort (9:28)

Shellsort (10:48)

Shuffling (7:39)

Convex Hull (13:50)

⌄ Week 3: Mergesort

✔   Mergesort (23:54)

✔   Bottom-up Mergesort (3:20)

✔   Sorting Complexity (9:05)

✔   Comparators (6:43)

✔   Stability (5:39)

⌄ Week 3: Quicksort

✔   Quicksort (19:33)

✔   Selection (7:08)

         Duplicate Keys (11:25)

         System Sorts (11:50)

⌄ Week 4: Priority Queues

         APIs and Elementary Implementations (12:52)

         Binary Heaps (23:36)

         Heapsort (14:29)

Event-Driven Simulation (22:38) (optional)

Week 4: Elementary Symbol Tables

Symbol Table API (21:30)

Elementary Implementations (9:03)

Ordered Operations (6:26)

Binary Search Trees (19:56)

Ordered Operations in BSTs (10:31)

Deletion in BSTs (9:52)

Week 5: Balanced Search Trees

2-3 Search Trees (16:55)

Red-Black BSTs (35:30)

B-Trees (10:36)

Week 5: Geometric Applications of BSTs

1d Range Search (8:51)

Line Segment Intersection (5:46)

Kd-Trees (29:07)

Interval Search Trees (13:47)

Rectangle Intersection (8:10)

❯ Week 6: Hash Tables

Hash Functions (18:13)

Separate Chaining (7:28)

Linear Probing (14:37)

Hash Table Context (10:09)

Symbol Table Applications: Sets (5:04) (optional)

Symbol Table Applications: Dictionary Clients (5:40) (optional)

Symbol Table Applications: Indexing Clients (8:57) (optional)

Symbol Table Applications: Sparse Vectors (7:41) (optional)