Data Structures Learning Objectives

Week 1

* List the basic data structures
* Analyze operations with data structures
* Choose appropriate basic data structure for a task at hand
* Apply basic data structures in programming challenges
* Develop a program that simulates network packet processing

Week 2

* Describe how dynamic arrays work
* Calculate amortized running time of operations
* List the methods for amortized analysis

Week 3

* Describe how heaps and priority queues work
* Describe how disjoint set union data structure works
* Analyze the running time of operations with heaps
* List the heuristics that speedup disjoint set union
* Apply priority queues to schedule jobs on processors
* Apply disjoint set union to merge tables in a database

Week 4

* List applications of hashing
* Apply direct addressing to retrieve names by phone numbers
* Develop a hash table based on chaining scheme
* Apply hashing to find patterns in text
* Describe how Dropbox, Google Drive and Yandex Disk save space
* Describe the principles on which distributed hash tables are built

Week 5

* Describe how balanced binary search trees work
* Analyze the running time of operations with binary search trees
* List the capabilities of binary search trees
* Compare balanced binary search trees with arrays and lists

Week 6

* Describe how to implement advanced operations using balanced binary search trees
* Describe how splay trees work
* Analyze the running time of operations with splay trees
* Apply amortized analysis to splay trees
* Apply binary search trees in programming challenges
* Develop a balanced binary search tree