

CSE 373: Final Exam Topics List

Exam Tue, June 6th, 2:30 - 4:20 PM, SMI 120

The exam will be closed book, closed notes and will be 1:50 in length. Expect between 10 and 14 questions. Items that are indicated in bold have very high likelihood of being on the exam and deserve special attention

Important Definitions

- ADT
- Data Structure
- Implementation

Stacks and Queues

- ADT Behavior
- Linked List v. Array Implementation
- Runtimes and Edge-cases

Heaps and Priority Queues

- Priority Queue ADT behavior
- Array implementation
- Limitations and constraints
- Runtimes - including buildHeap()

Algorithm Analysis

- bigO notation, bigOmega and bigTheta
- Asymptotic behavior
- Memory usage
- **Recursion and recurrences**
- Common summations

Dictionaries

- ADT behavior (key, value)
- LL v Array
- Sorted v. Unsorted
- Runtimes and common implementations

Binary Search Trees

- Runtimes, best and worst cases
- Traversals
- Memory usage

AVL Trees

- AVL property
- **Rotations and insertions**
- Runtimes and restrictions

Hashtables

- Constraints
- Runtimes
- Load factor
- Linear/Quadratic probing
- Secondary hashing
- Separate Chaining
- Resizing

Graphs

- Representation $G(V,E)$
- Traversals
- Topological sorts
- **Dijkstra's Algorithm and shortest path**
- **Prim's, Kruskal's and the minimum spanning tree**

Union find

- Implementation, uptrees
- Problem and solution types
- Path compression and union weighting

Sorting

- Insertion and Selection
- Merge, Heap and **Quick Sort**
- Bucket and Radix Sort
- Stability
- In-place
- Interruptability
- Runtimes and memory analysis

Generic Algorithm Design

- Guess and Check
- Linear work
- Divide and Conquer
- Randomization techniques (no analysis)

Assorted Topics

- **Testing**
- Iterators
- Caching and Pages