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