Topics

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APSC 160 topics

- arrays
- 2d arrays
- file openining, reading, writing
- scanf, fscanf, sscanf, FILE *fp file pointers, fopen, fprintf, buffers
- LAB 1
    - lines of file read and copied one at a time to internal buffer with fgets
    - after lien copied to buffer, scanned for integers using sscanf until end of line reached
    - at end of line, discovered values added to array, adjust vars
- fgets reads entire line until null \0
- sscanf reads until white space

C Strings

- string comparison
- string searching
- string concatenation
- string copying
- strcmp, strstr
- strlen
- strncat
- strncpy

Structures

- structures initialization
- array of structures
- nested structures
- Dynamic arrays fo structures, malloc, assigning and freeing memory
- LAB 2
    - strncat, strdup, strlen, strncmp, strncpy, strstr

Asymptotic Analysis

- complexities
- O notation, Omega, Theta

Linked Lists

- initializing
- inserting item, removing item
- traversal
- doubly linked list
- removal
- circular linked lists, double linked
- LAB 3 linked lists nodes
- Complexity

Stack ADT

- push, pop, peek, isEmpty
- stack implementation
- initialize, check if empty, check if full

- Complexity

Queue
- Enqueue, Dequeue, Peek, isEmpty
- Queue Implementation
- Array Queue resizing, linked list

Recursion
- fibonacci, chocolate bar breaking
- stack overflow
- Complexity

Trees
- defining tree and nodes
- Measuring trees, height, completeness
- binary tree traversal (inOrder, preOrder,postOrder,Level-Order)
- Binary search trees
- search, insert
- find min, find max
- BST removal
    - node removed has no children, node removed has one child, node removed has two children
    - predecessor, successor
    - height of a BST
    - BST efficiency
    - Operations (create, destroy, insert, removeMin (removeMax), isEmpty
- Complexity

Binary Heap
- heap implementation
- referencing nodes
- heap insertion, removing priority item
- sorting with heaps
- Complexity

Basic Sorting
- Selection Sort
- Insertion sort
- Merge sort
- Complexity

Quicksort
- Quicksort algorithm
- Merge vs Quicksort
- Complexity

Hash Tables
- Dictionary
- Collisions
    - Open Addressing
        - Linear Probing
        - Quadratic probing
        - Double hashing

    - Separate Chaining
- Hash functions

EXAM Contents:

- MCs
- Complexity (cases traversal, binary trees, linked lists, etc.)
- Linked Lists
- Stacks and Queues
- Recursion
- Trees
- Heaps
- Sorting
- Hash Tables