SOFE 3950U / CSCI 3020U: Operating Systems

TUTORIAL #8: Signals and Data Structures Part II

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Conceptual Questions

1. What is an Abstract Data Type (ADT)?
    - An abstract data type is for objects that are defined by a set of values and set of operations
2. Explain the difference between a queue (FIFO) and a stack (LIFO).
    - A queue is ordered in chronological order and a stack is ordered in reverse chronological order.
3. Name and briefly explain three types of data structures.
    - Arrays are fixed size and holds elements of the same data type
    - Linked lists are sequential with a sequence of elements ordered linearly and linked to each other, can be singly, doubly or circularly linked
    - Hash tables store values that have keys associated with them, very efficient for inserting and searching
4. Explain what a binary tree is, what are some common operations of a binary tree?
    - A binary tree is a non linear tree that each element can have at max 2 children(left and right).
    - Search, insert and delete are the main operations of a binary tree
    - Search is used to search for an element in the tree
    - Insert is used to add an element from the tree
    - Delete is used to remove an element from the tree
5. Explain what a hash table (dictionary) is, what are common operations of a hash table?
    - A hash table is a table that stores values and has a key associated with them, the keys are used to retrieve values from the table. This key is run through a hash function to get a value for the table. If two keys result in the same value, the collisions can be handled in different ways including chaining.
    - Some common operations are insert, delete and search. Internally, hash tables often also have an operation for changing their size as the number of key-value pairs increases.