**CSCE 146 Exam 2 Review**

Part 6 – Searching, Sorting, Asymptotics

1. Sort these Big O times in bounding order. IE One given can be bounded by the next one, then the next one, etc.

O(n)

O(n2)

O(nlg(n))

O(n3)

O(1)

O(n!)

O(nn)

O(lg(n))

O(2n)

1. For each algorithm what are its worst runtimes in Big O notation?

Binary search

Merge Sort

Quick Sort

Insertion Sort

Bubble Sort

Selection Sort

Binary Search Tree Insertion

Tower of Hanoi

Travelling Sales Person

1. Write a binary search method for a given array (via a parameter). You can either do iterative or recursive.

Part 7 – Binary Search Trees

1. Remove 16 into this binary search tree. Show the end result. Showing your work is a good idea.
2. What is the pre-order traversal for this tree?
3. Write the insert method for a linked version of a Binary Search Tree of integers. You may assume that there is a Node object which has the attributes: data(int), leftChild(Node), rightChild(Node). In the event of a tie, treat it as if it was greater than the value.

Part 8 – Heaps

1. Insert 17 into this max heap. Show the end result. Showing your work is a good idea.
2. Given this array representation of a max heap, write the array after the remove method is called

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Index | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Value | 20 | 16 | 6 | 8 | 11 | 4 | 5 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Index | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Value |  |  |  |  |  |  |  |

1. Assuming this is a max heap, write a method that prints the heap sort. You may use methods such as peek(), remove(), insert() as needed.

Part 9 – Graphs

1. Fill out the adjacency matrix for this graph. Row to Colum is From to To.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | V1 | V2 | V3 | V4 | V5 | V6 | V7 |
| V1 |  |  |  |  |  |  |  |
| V2 |  |  |  |  |  |  |  |
| V3 |  |  |  |  |  |  |  |
| V4 |  |  |  |  |  |  |  |
| V5 |  |  |  |  |  |  |  |
| V6 |  |  |  |  |  |  |  |
| V7 |  |  |  |  |  |  |  |

1. Give the DFS traversal of this graph starting from node v1.
2. Is this graph a tree and why?