

1) (10 pts) ANL (Algorithm Analysis)

What is the worst case run-time of each of the following algorithms/operations? Please give your answers in Big-Oh form, using the appropriate variables in each question.

- (a) Inserting 1 item into a binary search tree storing n items. $O(n)$
- (b) Inserting 1 item into an AVL Tree storing n items. $O(\lg n)$
- (c) Printing out each number in base b with exactly k digits. Assume printing one digit takes $O(1)$ time. $O(k \cdot b^k)$
- (d) Creating a heap using the most efficient algorithm out of n unsorted values. $O(n)$
- (e) Deleting the third item in a linked list (of more than 3 items) and returning a pointer to the front of the adjusted list. $O(1)$
- (f) Determining the number of integers that are included in both of two separate lists of n sorted integers, using the most efficient algorithm. $O(n)$
- (g) Executing p consecutive pop operations on a stack that initially had n elements. (Note: $p < n$.) $O(p)$
- (h) Sorting n unsorted items via Heap Sort. $O(n \lg n)$
- (i) Converting a positive integer n expressed in decimal into binary. $O(\lg n)$
- (j) Adding a c digit integer to a d digit integer, where the integers are stored in arrays, digit by digit. $O(\max(c,d))$ or $O(c+d)$

Grading: 1 pt for each, all or nothing