

Tutorial 05: June 19

1. **MSD radix sort** Suppose n strings of length w are generated uniformly at random on an alphabet of size R . What is the expected number of nonempty buckets at depth d of MSD radix sort? Deduce an expression for the expected number of recursive calls (not just the maximum depth of the recursion!) performed by MSD radix sort.

Bonus: Can you find a tight asymptotic bound on your expression?

2. **Modified AVL height** Consider a modified version of an AVL tree called an AVL-2 Tree, where for every node z , we have $|\text{height}(z.\text{left}) - \text{height}(z.\text{right})| \leq 2$. Prove that the height of an AVL-2 tree is in $O(\log n)$.
3. **AVL Operations** Consider the AVL Tree shown below and perform the following operations: insert 61, delete 73, delete 49.

