

University of Waterloo

CS240 Fall 2017

Assignment 3 Post Mortem

Problem 1

- a) Done well.
- b) Some students added 29 to an incorrect place in the original tree (before fixing).
After the right rotation on 42, a number of students mistakenly made 29 the left node of 17.
- c) Done well.

Problem 2

- a) Some students drew only one generic AVL-2 tree with m_h nodes.
- b) Some students gave the result as a function of m_{h-1} and h , rather than m_{h-1} and m_{h-3} .
- c) Many students didn't provide enough base cases (less than back steps in part b).
Some students gave incorrect initial conditions, such as ones with negative heights.
- d) Sometimes students mixed up the upper and lower bounds, likely since they are considering the maximum number of nodes for a given height and thinking this gives them the upper bound on h and vice versa.
Some students did not show the lower bound, and just showed the upper bound.

Problem 3

Generally done well, though a few students didn't include all 3 list orderings.

Problem 4

- a) Some students didn't include the number of comparisons required to search for each key.
Many students were one comparison off in their results, probably due to forgetting the extra comparison required to check if the result existed after the search function returns the stack.
- b) i) Many did not mention that the tosses are independent and that the tossing outcome after the first i heads does not affect the probability.

- ii) Many students took a sum from 0 to h , instead of a sum from 0 to ∞ , and as a result, they couldn't get the desired expression.
- iii) Done well.
- iv) Done well.

Problem 5

- a) Some students didn't give any sort of justification for their worst time.
- b) Students chose $k = n/2$ without really justifying why.
Students didn't round the sqrt, or take the floor or ceiling, making their choice of k work only for perfect squares.

Problem 6

- a,c) Done well.
- b,d) A number of students just drew the final tree after all the deletion operations.
- e) Done well.
- f) Some students didn't mention how being a compressed trie affects the height (it doesn't).
Some students didn't show that the right subtree of the trie was full, instead just showing that a single node caused the height to increase. However it's necessary to show that when nodes are added their parent has one less digit so that compression does not affect the height of the trie.