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Assignment 4 Writeup

Part 3

A. The overall performance to create our hash table will be O(n) since each insertion will take approximately O(1) work. A binary search tree would be O(nlogn). Our hash table takes 0.065 seconds to create the table.

$$\frac{n}{0.065} = \frac{n \log n}{t}$$

$$t = 0.065 \cdot \frac{n \log n}{n} = 0.065 \cdot \log n$$

$$t = 0.065 \cdot \log(170{,}600)$$

Algebra gets us that the new time would be 0.065log(170600 or that the time for our binary search tree would be 0.34 seconds, substantially longer.

B. Insertion performance for an array/vector is amortized to O(1), the same as our hash table, so it would be about 0.065 seconds for an array/vector.