1 Comparison of results

1.1 Graph Description

The graph depicted in Figure 1 illustrates the relationship between the height of the BST (y-axis) and the time taken for insertion operations (x-axis).

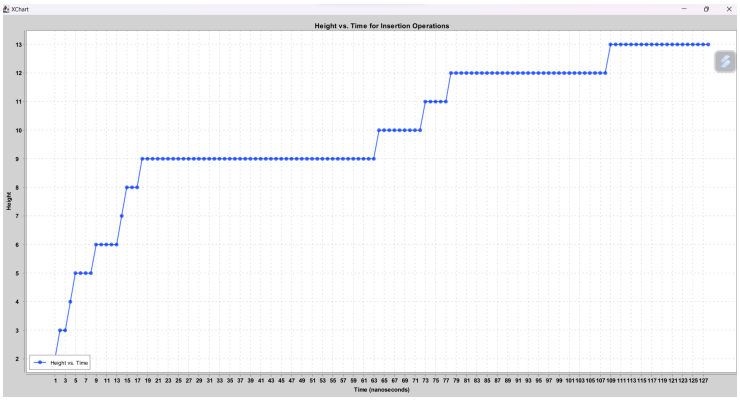

Figure 1: Scatter Plot of Height vs. Time for Insertion Operations

1.2 Experimental Results

The experimental results exhibit fluctuations in insertion time and tree height due to the random nature of input data and the internal balancing mechanisms of the BST. Despite these variations, an overall logarithmic trend is observed in the relationship between insertion time and tree height. As insertion operations progress, the height of the BST tends to increase, aligning with the expectations of the big-O notation for BST insertion.

1.3 Big-O Notation

The big-O notation for BST insertion indicates an average-case time complexity of $O(\log n)$, where n is the number of elements in the tree. This theoretical expectation suggests that as the number of elements increases, the height of the tree should grow logarithmically rather than linearly.

1.4 Comparison

The experimental results corroborate the theoretical expectations based on big-O notation for BST insertion. While there are deviations and outliers attributed to factors such as random data generation and specific tree configurations, the overall trend aligns with the logarithmic growth predicted by the big-O notation.