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Analysis Portion:

1. What is the runtime if an unsorted vector of words is used to maintain the dictionary? Please explain

with detail.

Answer: The runtime would be O(n\*m), because you need to search the entire unsorted vector dictionary which takes O(n). You then have to do this for every word in the file which is m amount of words. This means that the resulting time complexity is O(n\*m)

2. What is the runtime if a sorted vector of words is used to maintain the dictionary? Please explain with

Detail.

Answer: The runtime would be O(m\*log(n)), because for a sorted vector we can use binary search which takes O(log(n)) time, and we have to do this m amount of times, which results in an O(m\*log(n)) time complexity.

3. What is the runtime if an unordered map of words is used to maintain the dictionary? Please explain

with detail.

Answer: The runtime would be O(m), because a hash table has a constant time complexity and we have to do this an m amount of times. This results in an O(m) time complexity.

4. What is the runtime if an AVL tree of words is used to maintain the dictionary? Please explain with

Detail

Answer: The runtime would be O(m\*log(n)), because the time complexity of using an AVL tree would always be O(log(n)), and we would do this an m amount of times. This results in an O(m\*log(n)) time complexity.