Module 6-2: Project One

Scot C. Batton

CS-300 Analysis and Design

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**Worst-Case Running Time**

**Vector**

**Hash Table**

**Tree**

Based on the advisor’s requirements and analysis of vector, hash table, and tree data structures, there are advantages and disadvantages of each structure. A vector has the advantage of being able to be accessed directly which makes for efficient accessing and modification. The disadvantage of using a vector is that it has a fixed size. If there needs to be any additions or subtractions to a vector, this can become costly and time consuming. A hash table has the advantage of being efficient at addiction, subtraction, and retrieval. A hash table can also handle large amounts of data and the ability to locate information quickly. Hash tables have the disadvantage of requiring additional memory and this will cause an increase in the usage of memory. A binary search tree has the advantage of being very efficient and can provide elements in a specific order which allows for queries. The disadvantage of using a binary search tree is that they require additional memory, have costly addition and subtraction which can result in higher memory usage and slower speed.

The three data structures above all serve a purpose and are all useful choices. The choice whether to use one depends heavily on the requirements of the client and what type of problem is trying to be solved. Based on the problem needing to be solved and the requirements of the client I have chosen the hash table as the proper choice. I recommend using the hash table based on the efficiency and flexibility of the table. The ability to handle large amounts of data and key-value pairs also makes the hash table a proper recommendation.