1. An optimal binary search tree is a static binary search tree constructed so that the expected cost of looking up an item is minimized. To construct the tree, you must know the frequency of each item being accessed.
2. The goal of the project was to implement both a splay tree and an optimal binary search tree and thoroughly test both to see if the splay tree could be competitive with the optimal binary search tree. We created various tests and applied them to both trees to find sequences which were easy and hard for both structures. The open problem is whether or not splay trees are competitive with optimal binary search trees.
3. This problem is described as the most important open problem because the idea that an amortized dynamic data structure is competitive with a static optimal a priori data structure is surprising.
4. A splay tree would be preferred if you do not know the query sequence ahead of time, or if there are a lot of items that are looked up redundantly.