Project One  
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Evaluation and analysis:

The run time for reading the file and creating course objects is O(n) for all three data structures since each line of the file is processed once, where 𝑛 n is the number of courses. For vectors, each insertion has a constant cost, resulting in O(n) total, but searching or sorting later takes O(n) or O(n log n). Hash tables provide O(1) average insertion and search times but degrade to O(n) in worst-case scenarios due to collisions. Binary search trees, when balanced, allow O(log n) insertion and search times but degrade to O(n) in the worst case for unbalanced trees. Vectors are simple and memory-efficient but less performant for frequent searches; hash tables are fast for lookups but require more memory and careful collision handling; trees are efficient for ordered operations but require balancing overhead. Based on these analyses, the hash table is recommended for its superior average-case performance and suitability for fast lookups, which aligns with the advisor’s requirements.