**Alondra Paulino Santos – Run Time Analisys**

**Vector - Runtime Analysis**

| **Code** | **Line Cost** | **# Times Executes** | **Total Cost** |
| --- | --- | --- | --- |
| **open file / error check** | 1 | 1 | 1 |
| **loop over lines** | 1 | n | n |
| **split + trim tokens** | 1 | n | n |
| **create Course object** | 1 | n | n |
| **add to temp map by courseNumber** | 1 | n | n |
| **validate prerequisites** | 1 | n | n |
| **append course to vector** | 1 | n | n |
| **Total Cost** | | | 6n + 1 |
| **Worst-case Runtime** | | | O(n) |

**Hash Table - Runtime Analysis**

| **Code** | **Line Cost** | **# Times Executes** | **Total Cost** |
| --- | --- | --- | --- |
| **open file / error check** | 1 | 1 | 1 |
| **loop over lines** | 1 | n | n |
| **split + trim tokens** | 1 | n | n |
| **create Course object** | 1 | n | n |
| **add to temp map by courseNumber** | 1 | n | n |
| **validate prerequisites** | 1 | n | n |
| **insert into hash table (worst-case collisions)** | n | n | n^2 |
| **Total Cost** | | | n^2 + 5n + 1 |
| **Worst-case Runtime** | | | O(n^2) |

**Binary Search Tree - Runtime Analysis**

| **open file / error check** | 1 | 1 | 1 |
| --- | --- | --- | --- |
| **loop over lines** | 1 | n | n |
| **split + trim tokens** | 1 | n | n |
| **create Course object** | 1 | n | n |
| **add to temp map by courseNumber** | 1 | n | n |
| **validate prerequisites** | 1 | n | n |
| **BST insert (unbalanced)** | n | n | n^2 |
| **Total Cost** | | | n^2 + 5n + 1 |
| **Worst-case Runtime** | | | O(n^2) |