**Vector Data Type**

|  |  |  |  |
| --- | --- | --- | --- |
| **Function** | **Line Cost** | **Times Executed** | **Total Line Cost** |
| Create vector | 1 | 1 | 1 |
| Append course | 1 | n | n |
| Remove course | 3 | n | 3n |
| Find course | 2 | n | 2n |
| Print courses | 1 + 2n | n | 1 + 2n |
| **Total Cost** | | | **2+7n** |
| **O Value** | | | **O(N)** |

**Hash Table Data Type**

|  |  |  |  |
| --- | --- | --- | --- |
| **Function** | **Line Cost** | **Times Executed** | **Total Line Cost** |
| Create Node structure | 3 | 1 | 3 |
| Create vector for nodes | 1 | 1 | 1 |
| Hash function | 1 | n | 1n |
| Insert Course | 5 + 1n + 1 | n | 6+1n |
| Remove Course | 7 + 1n + 1 +1n | n | 8+2n |
| Print Courses | 7 | n | 7n |
| Find Course | 6 | n | 6n |
| **Total Cost** | | | **18+17n** |
| **O Value** | | | **O(N)** |

**Binary Search Tree Data Type**

|  |  |  |  |
| --- | --- | --- | --- |
| **Function** | **Line Cost** | **Times Executed** | **Total Line Cost** |
| Create Node structure | 3 | 1 | 3 |
| Add Course | 1n + 1n/2 + 2 | n | 2n + n + n/2 |
| Remove course | 7 + n/2 | n | 7n + n/2 |
| Print courses | 1 + n/2 + 1 + n/2 | n | 1n + n/2 +1n + n/2 |
| Find course | 3 + 3n | n | 3n + 3n |
| **Total Cost** | | | 3 + 17n + n/4 |
| **O Value** | | | **O(NlogN)** |