## CS163 Test Plan

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**Test Plan # 4:**

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| **Test Cases for insert info** | **Expected Result** | **Verified?**  **(yes/no)** |
| No items (empty tree) | Insert at root |  |
| Less than root, leaf | Insert at leaf |  |
| To be inserted as internal node | Adjust existing values accordingly |  |
| Check return value | Should report correct number (0 or 1) based on situation. |  |

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| **Test Cases for Display all function** | **Expected Result** | **Verified?**  **(yes/no)** |
| Empty tree | Display nothing |  |
| 1 entry in a tree | Display 1 item |  |
| Multiple entries in tree | Display all items in tree |  |
| Display after removing a term | Should update without removed term |  |

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| **Test Cases for Display range function** | **Expected Result** | **Verified?**  **(yes/no)** |
| Empty tree | Display nothing |  |
| 1 entry in a tree | Display 1 entry |  |
| Multiple entries in tree | Display all entries in tree |  |
| Display after removing a term | Should update without removed term |  |
| Check that items in range boundaries are displayed. | Display boundaries specified by user, as well as values in between. |  |

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| **Test Cases for Remove item** | **Expected Result** | **Verified?**  **(yes/no)** |
| Empty tree | Remove nothing. |  |
| 1 item in tree | Remove item if match, set to empty tree |  |
| Match in tree not found | Delete nothing |  |
| Match in tree found, at leaf | Delete match, rest of tree should remain intact. |  |
| Match in tree found, at internal node w/ 1 child at left or right | Child should be set to the root node of match. |  |
| Match in tree found, at internal node with 2 children | Shift data accordingly. |  |

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| **Test Cases for Retrieve item** | **Expected Result** | **Verified?**  **(yes/no)** |
| Empty tree | Retrieve nothing. |  |
| Match in tree not found | Retrieve nothing, return false |  |
| Match in tree found | Retrieve match, return true |  |

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| **Test Cases for get height** | **Expected Result** | **Verified?**  **(yes/no)** |
| No items (empty tree) | Height is 0 |  |
| 1 Item in tree | Height is 1 |  |
| Unbalanced tree | Output largest height |  |
| Balanced tree | Output height, either side’s height should be correct |  |

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| **Test Cases for is efficient** | **Expected Result** | **Verified?**  **(yes/no)** |
| No items (empty tree) | Height is 0, tree is efficient |  |
| 1 Item in tree | Height is 1 |  |
| Unbalanced tree | Tree is not efficient; balance factor is not 0 |  |
| Balanced tree | Tree is efficient; balance factor is 0 |  |

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| **Test Cases for write/load functions** | **Expected Result** | **Verified?**  **(yes/no)** |
| Write with empty tree | Should empty out the text file. When loaded, it should not register any dictionary items. |  |
| Write in items | Should output properly to file with correct delimiters, and when loaded it should assign to each item data member correctly. |  |
| Write after “Quit without saving” in menu function | Should not change the file contents even if items were added/removed during runtime. |  |
| Write after “Save and quit” in menu function | Should write over the contents of the file with the new items and information. |  |