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| --- | --- | --- | --- | --- |
| Test | Menu options | Input Key | Output | Remarks |
| 1 | 1.  Display data | Y | Sorted data displayed on a row by secondary key | Display data in order by title |
| 2 | 3.  Search Manager (By Barcode) | Y  028941776834 | 028941776834 not found! |  |
| 3 | 3.  Search Manager (By Barcode) | Y  028943044721 | 028943044721 Holst The Planets Sir Georg Solti 1977 |  |
| 4 | 4.  Search Manager (By Title) | Y  Symphony No.1 | 028942314122 Brahms Symphony No.1; Herbert Von Karajan; 1987  077776451121 Elgar Symphony No.1; Sir John Barbirolli; 1963  081757753722 Mahler Symphony No.1; Eliahu Inbal; 1989 | All datas with the same title are displayed |
| 5 | 4.  Search Manager (By Title) | Y  Symphony No.15 | Title " Symphony No.15" was not found in this list. |  |
| 6 | 2.  Remove an Item | Y  028943044721 | Item deleted  028943044721 Holst The Planets Sir Georg Solti 1977 | Removes an item both from BST and Hash Table both |
| 7 | 3.  Search Manager (By Barcode) | Y  028943044721 | 028943044721  Not found! | Notice the deletion from hash table |
| 8 | 4.  Search Manager (By Title) | Y  The Planets | Title " The Planets" was not found in this list. | Notice the deletion from BST |
| 9 | 5.  Undo | Y | Adds items removed to the BST and Hash Table |  |
| 10 | 3.  Search Manager (By Barcode) | Y  028943044721 | 028943044721 Holst The Planets Sir Georg Solti 1977 | Notice the insertion in the hashtable |
| 11 | 4.  Search Manager (By Title) | Y  The Planets | 028943044721 Holst The Planets Sir Georg Solti 1977 | Notice the insertion in the BST |
| 12 | 5.  Undo | Y | Error: Remove an Item First | Item must be removed before undoing |
| 13 | 2.  Remove an Item | Y  077776451121 | Item deleted  077776451121 Elgar Symphony No.1 Sir John Barbirolli 1963 | Removing item with multiple same title |
| 14 | 4.  Search Manager (By Title) | Y  Symphony No.1 | 028942314122 Brahms Symphony No.1 Herbert Von Karajan 1987  081757753722 Mahler Symphony No.1 Eliahu Inbal 1989 | The third Symphony  No.1 with barcode 077776451121  is not present, which means it correctly deleted the right item. |
| 15 | 6.  Write data to the file | N/A | Report saved in: HashReport.txt | Output file is created with data |
| 16 | 5.  Undo | Y | Error: Remove an Item First | When saving the repost, it clears the stack as well and removal is necessary in order to UNDO. |
| 17 | 2.  Remove the root of the tree | Y  090317734026 | Item deleted  090317734026 Liszt Dante Symphony Daniel Barenboim 1994 | Root of the tree deleted |
| 18 | 4.  Search Manager (By Title) | Y  Dante Symphony | Title "Dante Symphony" was not found in this list. | Successfully deleted |
| 19 | 8.  Insert an Item | Y  123456789123  Lunce  Symphony No.1  Djleecal  1999 | Item Added  123456789123  Lunce  Symphony No.1  Djleecal  1999 |  |
| 20 | 3.  Search Manager (By Barcode) | Y  123456789123 | 123456789123 Lunce Symphony No.1 Djleecal 1999 | Successfully inserted |
| 21 | 4.  Search Manager (By Title) | Y  Symphony No.1 | 028942314122 Brahms Symphony No.1 Herbert Von Karajan 1987  077776451121 Elgar Symphony No.1 Sir John Barbirolli 1963  081757753722 Mahler Symphony No.1 Eliahu Inbal 1989  123456789123 Lunce Symphony No.1 Djleecal 1999 | Successfully inserted |
| 22 | 8.  Insert an Item | Y  090317734026 | Duplicate barcode could not be added or or barcode is longer than 12 digits | Rejected |
| 23 | 8.  Insert a synonym | Y  047257518761  047257518761 dfddf fdf dfdf 1234 | 047257518761 dfddf fdf dfdf 1234 | Succesfully added to the linked list hash node 38 |
| 24 | 7.  Stats | N/A | Load Factor: 0.566038  Number of Collisions: 3  Longest Linked List: 2  Number of longest linked lists: 3 |  |
| 25 | 6.  Write to the file | N/A | Report saved in: HashReport.txt |  |
| 26 | 10.  Help | N/A | 1: Display Manager  2: Remove Manager  3: Search Manager(Barcode)  4: Search Manager(Title)  5: Undo  6: Write Data to the File  7: Stats  8: Insert  9: Help  Enter your options ['O' to quit/'8' for help (Back to menu)]: | Takes you back to the menu |
| 27 | 0. | N/A | Program ended with exit code: 0 | Terminates the program |