→ FLOWCHART: (LIBRARY MANAGEMENT SYSTEM)

```
+--------------------------------------+
|           Library Management         |
|                System                |
+--------------------------------------+
                   |
                   |
                   V
+------------------------------------------------------+
|                     Main                   |
|                                            |
| +--------------------------------------------------+ |
| | Initialize ArrayBasedList, Vector of Books, and     | |
| | BookManagementSystem                          | |
| +--------------------------------------------------+ |
|               |                       |
|               V                       |
|        +---------------+                |
|        | Display Menu  |                |
|        +---------------+                |
|               |                       |
|               V                       |
| +--------------------------------------------------+ |
| |  1. Add Student                     | |
| |  2. Search Student                      | |
| |  3. Display Students                      | |
| |  4. Sort Students                     | |
| |  5. Delete Student                      | |
| |  6. Checkout Book                       | |
| |  7. Return Book                       | |
```
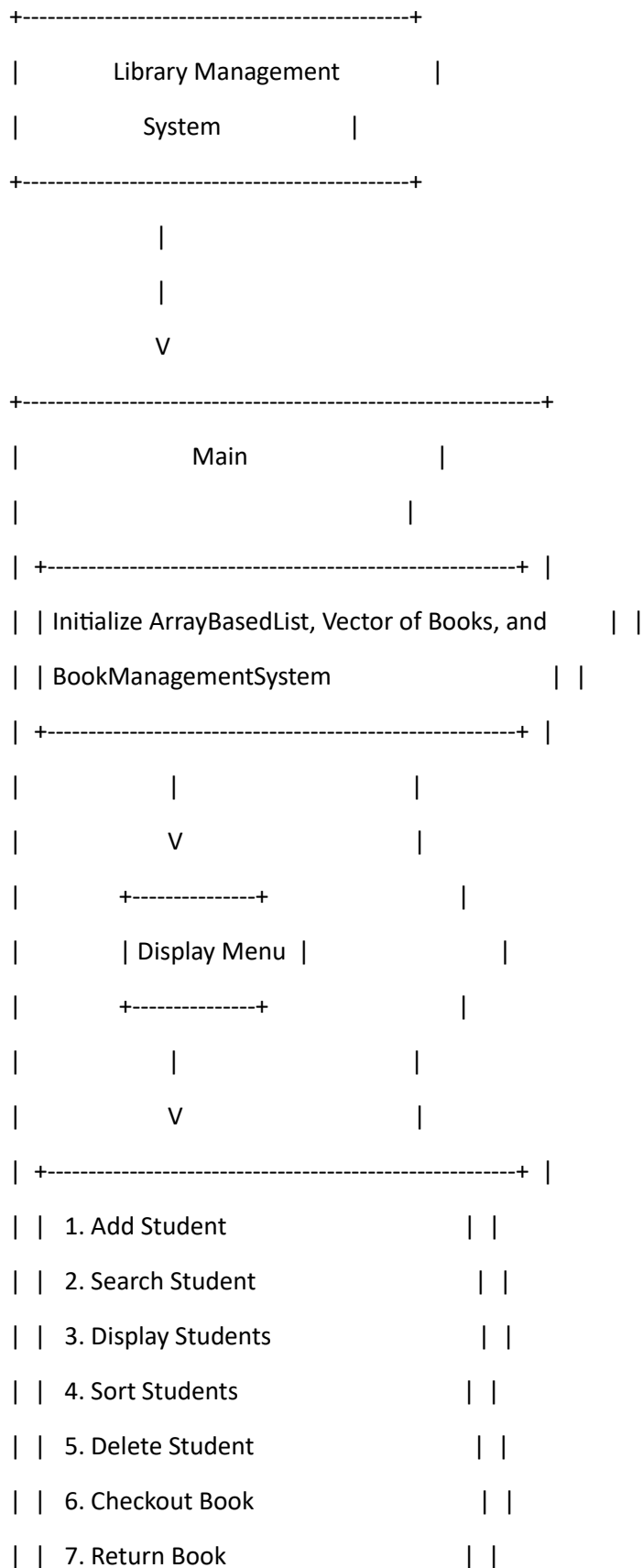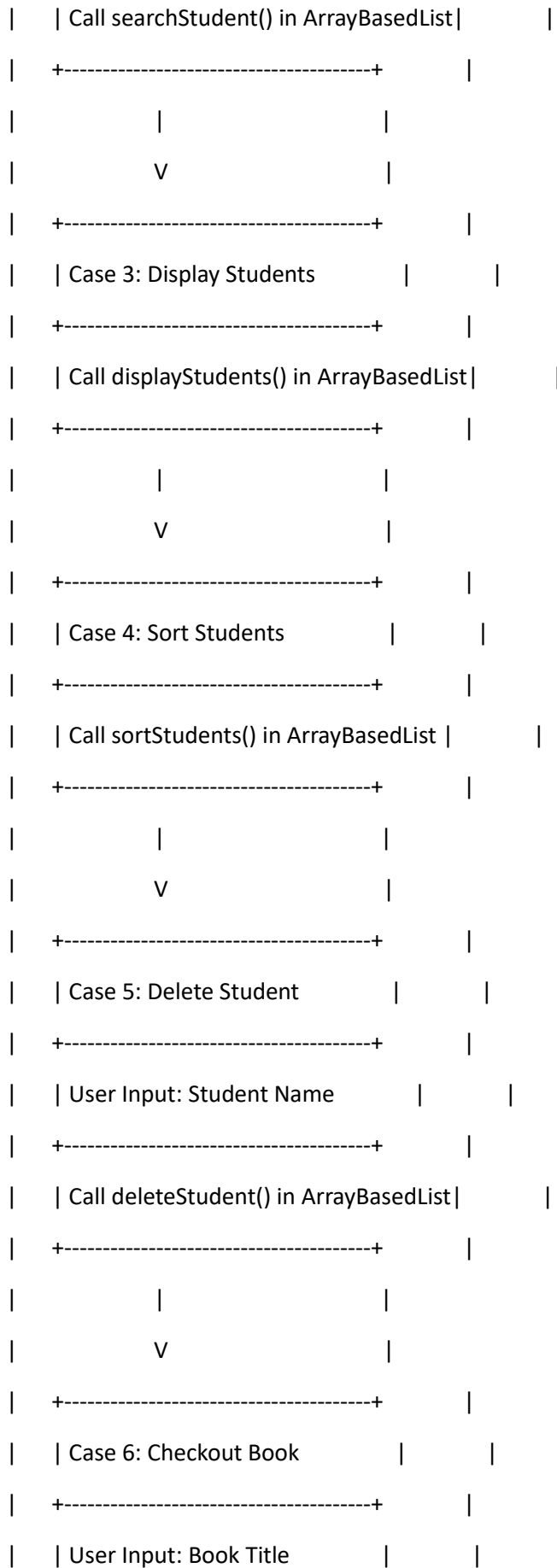
```
|  |   8. Display Checked Out Books              |  |
|  |   9. Display Return Queue                   |  |
|  |   10. Display Available Books               |  |
|  |   11. Exit                        |  |
|  |   12. Display Hardcoded Students and Books        |  |
|  +-------------------------------------------------------+  |
|               |                      |
|               V                      |
|  +-------------------------------------------------------+  |
|  | User Input: Choice                  |  |
|  +-------------------------------------------------------+  |
|               |                      |
|               V                      |
|  +-------------------------------------------------------+  |
|  | Switch (Choice)                   |  |
|  +-------------------------------------------------------+  |
|               |                      |
|     +---------------------------------------+        |
|     | Case 1: Add Student              |        |
|     +---------------------------------------+        |
|     | User Input: Student Information      |        |
|     +---------------------------------------+        |
|     | Call addStudent() in ArrayBasedList   |        |
|     +---------------------------------------+        |
|               |                      |
|               V                      |
|     +---------------------------------------+        |
|     | Case 2: Search Student             |        |
|     +---------------------------------------+        |
|     | User Input: Student Name            |        |
|     +---------------------------------------+        |
```
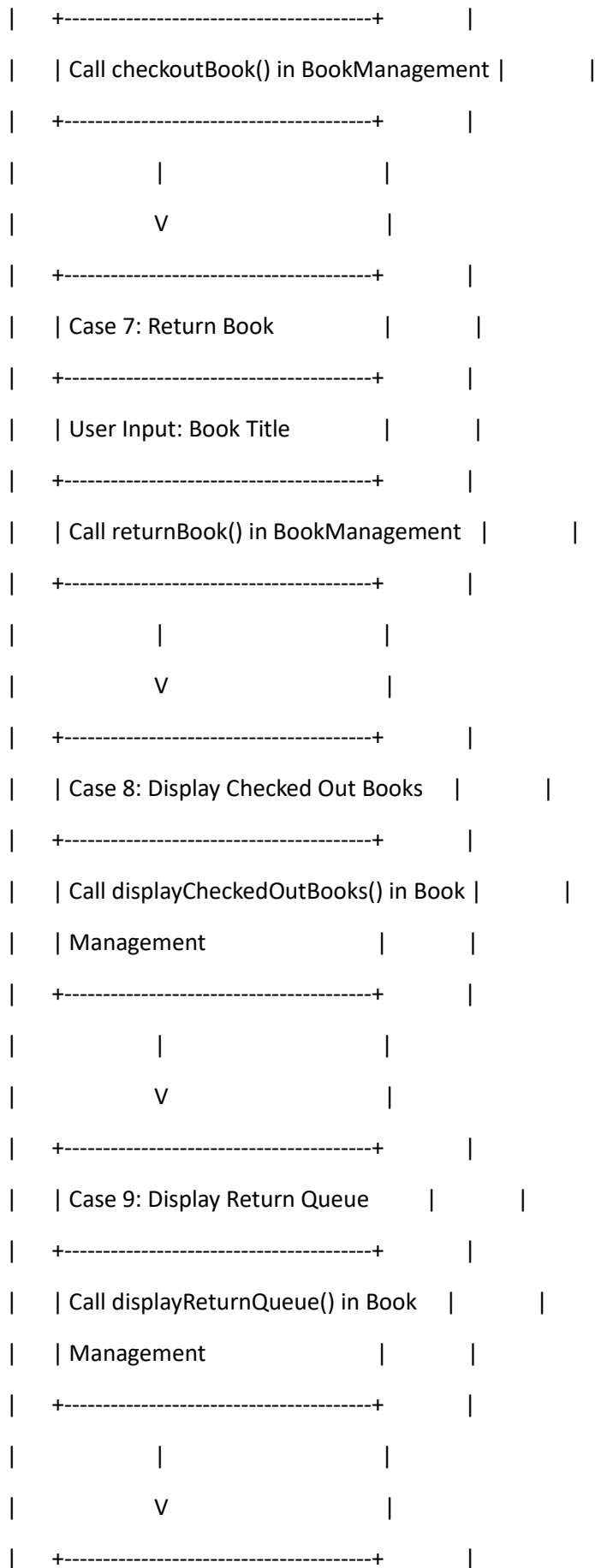
```
|     | Call searchStudent() in ArrayBasedList|        |

|     +-------------------------------------+        |

|               |                     |

|               V                     |

|     +-------------------------------------+        |

|     | Case 3: Display Students        |        |

|     +-------------------------------------+        |

|     | Call displayStudents() in ArrayBasedList|        |

|     +-------------------------------------+        |

|               |                     |

|               V                     |

|     +-------------------------------------+        |

|     | Case 4: Sort Students         |        |

|     +-------------------------------------+        |

|     | Call sortStudents() in ArrayBasedList |        |

|     +-------------------------------------+        |

|               |                     |

|               V                     |

|     +-------------------------------------+        |

|     | Case 5: Delete Student        |        |

|     +-------------------------------------+        |

|     | User Input: Student Name        |        |

|     +-------------------------------------+        |

|     | Call deleteStudent() in ArrayBasedList|        |

|     +-------------------------------------+        |

|               |                     |

|               V                     |

|     +-------------------------------------+        |

|     | Case 6: Checkout Book         |        |

|     +-------------------------------------+        |

|     | User Input: Book Title        |        |
```

```
|   +--------------------------------------+        |
|   | Call checkoutBook() in BookManagement |       |
|   +--------------------------------------+        |
|                |                    |
|                V                    |
|   +--------------------------------------+        |
|   | Case 7: Return Book           |        |
|   +--------------------------------------+        |
|   | User Input: Book Title        |        |
|   +--------------------------------------+        |
|   | Call returnBook() in BookManagement  |        |
|   +--------------------------------------+        |
|                |                    |
|                V                    |
|   +--------------------------------------+        |
|   | Case 8: Display Checked Out Books  |        |
|   +--------------------------------------+        |
|   | Call displayCheckedOutBooks() in Book |       |
|   | Management                 |        |
|   +--------------------------------------+        |
|                |                    |
|                V                    |
|   +--------------------------------------+        |
|   | Case 9: Display Return Queue     |        |
|   +--------------------------------------+        |
|   | Call displayReturnQueue() in Book   |        |
|   | Management                 |        |
|   +--------------------------------------+        |
|                |                    |
|                V                    |
|   +--------------------------------------+        |
```

```
|    | Case 10: Display Available Books     |          |
|    +-------------------------------------+          |
|    | Call displayAvailableBooks() in Book  |         |
|    | Management                       |         |
|    +-------------------------------------+          |
|                |                        |
|                V                        |
|    +-------------------------------------+          |
|    | Case 11: Exit                |         |
|    +-------------------------------------+          |
|    | Display Exit Message            |         |
|    +-------------------------------------+          |
|                |                        |
|                V                        |
|    +-------------------------------------+          |
|    | Case 12: Display Hardcoded Students  |          |
|    +-------------------------------------+          |
|    | Call displayStudents() in ArrayBasedList |        |
|    | Call displayAvailableBooks() in Book  |         |
|    | Management                       |         |
|    | Call displayCheckedOutBooks() in Book |          |
|    | Management                       |         |
|    +-------------------------------------+          |
+------------------------------------------------------------+
```