**TestCase 1**:

Input

|  |
| --- |
| InsertBook(101, "Introduction to Algorithms", "Thomas H. Cormen", "Yes")  InsertBook(48, "Data Structures and Algorithms", "Sartaj Sahni", "Yes")  PrintBook(48)  InsertBook(132, "Operating System Concepts", "Abraham Silberschatz", "Yes")  InsertBook(25, "Computer Networks", "Andrew S. Tanenbaum", "Yes")  BorrowBook(120, 48, 2)  BorrowBook(132, 101, 1)  InsertBook(73, "Introduction to the Theory of Computation", "Michael Sipser", "Yes")  InsertBook(12, "Artificial Intelligence: A Modern Approach", "Stuart Russell", "Yes")  InsertBook(6, "Database Management Systems", "Raghu Ramakrishnan", "Yes")  BorrowBook(144, 48, 3)  BorrowBook(140, 48, 3)  BorrowBook(142, 48, 2)  BorrowBook(138, 12, 4)  BorrowBook(150, 12, 3)  BorrowBook(162, 12, 1)  ReturnBook(120, 48)  FindClosestBook(9)  DeleteBook(12)  ColorFlipCount()  InsertBook(125, "Computer Organization and Design", "David A. Patterson", "Yes")  InsertBook(180, "Introduction to Software Engineering", "Ian Sommerville", "Yes")  BorrowBook(111, 73, 3)  BorrowBook(52, 73, 1)  InsertBook(115, "Operating Systems: Internals and Design Principles", "William Stallings", "Yes")  BorrowBook(153, 25, 2)  PrintBooks(10, 150)  InsertBook(210, "Machine Learning: A Probabilistic Perspective", "Kevin P. Murphy", "Yes")  BorrowBook(171, 25, 3)  BorrowBook(2, 132, 2)  FindClosestBook(50)  BorrowBook(18, 101, 2)  InsertBook(80, "Software Engineering: A Practitioner's Approach", "Roger S. Pressman", "Yes")  BorrowBook(210, 210, 1)  BorrowBook(43, 73, 1)  InsertBook(60, "Introduction to Computer Graphics", "David F. Rogers", "Yes")  PrintBook(210)  InsertBook(4, "Design Patterns: Elements of Reusable Object-Oriented Software", "Erich Gamma", "Yes")  InsertBook(2, "Introduction to the Theory of Computation", "Michael Sipser", "Yes")  BorrowBook(34, 210, 2)  InsertBook(65, "Computer Networks: Principles, Protocols, and Practice", "Olivier Bonaventure", "Yes")  ColorFlipCount()  DeleteBook(125)  DeleteBook(115)  DeleteBook(210)  ColorFlipCount()  DeleteBook(25)  DeleteBook(80)  ColorFlipCount()  Quit() |

Output:

|  |
| --- |
| BookID = 48  Title = "Data Structures and Algorithms"  Author = "Sartaj Sahni"  Availability = "Yes"  BorrowedBy = None  Reservations = []  Book 48 borrowed by Patron 120  Book 101 borrowed by Patron 132  Book 48 Reserved by Patron 144  Book 48 Reserved by Patron 140  Book 48 Reserved by Patron 142  Book 12 Borrowed by Patron 138  Book 12 Reserved by Patron 150  Book 12 Reserved by Patron 162  Book 48 Returned by Patron 120  Book 48 Allotted to Patron 142  BookID = 6  Title = "Database Management Systems"  Author = "Raghu Ramakrishnan"  Availability = "Yes"  BorrowedBy = None  Reservations = []  BookID = 12  Title = "Artificial Intelligence: A Modern Approach"  Author = "Stuart Russell"  Availability = "No"  BorrowedBy = 138  Reservations = [162, 150]  Book 12 is no longer available. Reservations made by Patrons 162, 150 have been cancelled!  Color Flip Count: 8  Book 73 borrowed by Patron 111  Book 73 Reserved by Patron 52  Book 25 borrowed by Patron 153  BookID = 25  Title = "Computer Networks"  Author = "Andrew S. Tanenbaum"  Availability = "No"  BorrowedBy = 153  Reservations = []  BookID = 48  Title = "Data Structures and Algorithms"  Author = "Sartaj Sahni"  Availability = "No"  BorrowedBy = 142  Reservations = [144, 140]  BookID = 73  Title = "Introduction to the Theory of Computation"  Author = "Michael Sipser"  Availability = "No"  BorrowedBy = 111  Reservations = [52]  BookID = 101  Title = "Introduction to Algorithms"  Author = "Thomas H. Cormen"  Availability = "No"  BorrowedBy = 132  Reservations = []  BookID = 115  Title = "Operating Systems: Internals and Design Principles"  Author = "William Stallings"  Availability = "yes"  BorrowedBy = None  Reservations = []  BookID = 125  Title = "Computer Organization and Design"  Author = "David A. Patterson"  Availability = "Yes"  BorrowedBy = None  Reservations = []  BookID = 132  Title = "Operating System Concepts"  Author = "Abraham Silberschatz"  Availability = "Yes"  BorrowedBy = None  Reservations = []  Book 25 Reserved by Patron 171  Book 132 Borrowed by Patron 2  BookID = 48  Title = "Data Structures and Algorithms"  Author = "Sartaj Sahni"  Availability = "No"  BorrowedBy = 142  Reservations = [144, 140]  Book 101 Reserved by Patron 18  Book 210 Borrowed by Patron 210  Book 73 Reserved by Patron 43  BookID = 210  Title = "Machine Learning: A Probabilistic Perspective"  Author = "Kevin P. Murphy"  Availability = "No"  BorrowedBy = 210  Reservations = []  Book 210 Reserved by Patron 34  Color Flip Count: 19  Book 125 is no longer available  Book 115 is no longer available  Book 210 is no longer available. Reservation made by Patron 34 has been cancelled!  Color Flip Count: 23  Book 25 is no longer available. Reservation made by Patron 171 has been cancelled!  Book 80 is no longer available  Color Flip Count: 27  Program Terminated!! |

**Test Case 2:**

Input

|  |
| --- |
| InsertBook(5, "The Secret Garden", "Jane Smith", "Yes");  BorrowBook(101, 5, 2)  InsertBook(3, "The Great Gatsby", "Mark Johnson", "Yes");  InsertBook(12, "To Kill a Mockingbird", "Sarah Lee", "Yes");  BorrowBook(101, 3, 2)  DeleteBook(12)  PrintBooks(1,10)  DeleteBook(3)  DeleteBook(5)  PrintBook(5)  InsertBook(50, "The Catcher in the Rye", "Michael Brown", "Yes")  InsertBook(22, "The Alchemist", "Paul Coelho", "Yes")  BorrowBook(104, 22, 3)  BorrowBook(171, 22, 1)  BorrowBook(103, 22, 2)  InsertBook(10, "The Hobbit", "J.R.R. Tolkien", "Yes")  InsertBook(72, "Brave New World", "Aldous Huxley", "Yes")  InsertBook(94, "1984", "George Orwell", "Yes")  ColorFlipCount()  BorrowBook(171, 94, 1)  ReturnBook(104, 22)  BorrowBook(132, 50, 3)  BorrowBook(103, 10, 2)  InsertBook(28, "Lord of the Flies", "William Golding", "Yes")  BorrowBook(109, 72, 4)  BorrowBook(101, 50, 2)  DeleteBook(94)  BorrowBook(105, 22, 1)  PrintBooks(5, 100)  FindClosestBook(26)  ReturnBook(171, 22)  BorrowBook(171, 28, 1)  DeleteBook(50)  ColorFlipCount()  BorrowBook(107, 22, 2)  ReturnBook(103, 10)  BorrowBook(121, 10, 3)  DeleteBook(10)  DeleteBook(22)  ColorFlipCount()  Quit()  InsertBook(10, "The Hobbit", "J.R.R. Tolkien", "Yes") |

Output:

|  |
| --- |
| Book 5 Borrowed by patron 101  Book 3 Borrowed by patron 101  Book 12 is no longer available  BookID = 3  Title = "The Great Gatsby"  Author = "Mark Johnson"  Availability = "No"  BorrowedBy = 101  Reservations = []  BookID = 5  Title = "The Secret Garden"  Author = "Jane Smith"  Availability = "No"  BorrowedBy = 101  Reservations = []  Book 3 is no longer available  Book 5 is no longer available  Book 5 not found in the library  Book 22 Borrowed by patron 104  Book 22 Reserved by patron 171  Book 22 Reserved by patron 103  Color Flip Count: 6  Book 94 borrowed by patron 171  Book 22 returned by Patron 104  Book 22 allotted to Patron 171  Book 50 borrowed by patron 132  Book 10 borrowed by patron 103  Book 72 borrowed by patron 109  Book 50 reserved by patron 101  Book 94 is no longer available  Book 22 reserved by patron 105  BookID = 10  Title = "The Hobbit"  Author = "J.R.R. Tolkien"  Availability = "No"  BorrowedBy = 103  Reservations = []  BookID = 22  Title = "The Alchemist"  Author = "Paul Coelho"  Availability = "No"  BorrowedBy = 171  Reservations = [105, 103]  BookID = 28  Title = "Lord of the Flies"  Author = "William Golding"  Availability = "Yes"  BorrowedBy = None  Reservations = []  BookID = 50  Title = "The Catcher in the Rye"  Author = "Michael Brown"  Availability = "No"  BorrowedBy = 132  Reservations = [101]  BookID = 72  Title = "Brave New World"  Author = "Aldous Huxley"  Availability = "No"  BorrowedBy = 109  Reservations = []  BookID = 28  Title = "Lord of the Flies"  Author = "William Golding"  Availability = "Yes"  BorrowedBy = None  Reservations = []  Book 22 Returned by Patron 171  Book 22 Allotted to Patron 105  Book 28 Borrowed by Patron 171  Book 50 is no longer available. Reservation made by Patron 101 has been cancelled!  Color Flip Count: 13  Book 22 reserved by patron 107  Book 10 returned by Patron 103  Book 10 borrowed by patron 121  Book 10 is no longer available  Book 22 is no longer available. Reservations made by Patrons 103, 107 have been cancelled!  Color Flip Count: 15  Program Terminated!! |

**Test Case- 3 - working**

Input

|  |
| --- |
| InsertBook(1, "Book1", "Author1", "Yes")  InsertBook(2, "Book2", "Author2", "Yes")  InsertBook(3, "Book3", "Author3", "Yes")  InsertBook(4, "Book4", "Author4", "Yes")  InsertBook(5, "Book5", "Author5", "Yes")  BorrowBook(102, 2, 2)  BorrowBook(103, 3, 3)  InsertBook(6, "Book6", "Author6", "Yes")  InsertBook(7, "Book7", "Author7", "Yes")  InsertBook(8, "Book8", "Author8", "Yes")  BorrowBook(104, 4, 4)  BorrowBook(105, 5, 5)  ReturnBook(102, 2)  ReturnBook(103, 3)  ReturnBook(104, 4)  ReturnBook(105, 5)  BorrowBook(101, 6, 1)  BorrowBook(102, 7, 2)  BorrowBook(103, 8, 3)  InsertBook(9, "Book9", "Author9", "Yes")  InsertBook(10, "Book10", "Author10", "Yes") |

Output:

|  |
| --- |
| Book 2 Borrowed by Patron 102  Book 3 Borrowed by Patron 103  Book 4 Borrowed by Patron 104  Book 5 Borrowed by Patron 105  Book 2 Returned by Patron 102  Book 3 Returned by Patron 103  Book 4 Returned by Patron 104  Book 5 Returned by Patron 105  Book 6 Borrowed by Patron 101  Book 7 Borrowed by Patron 102  Book 8 Borrowed by Patron 103 |

**Test Case- 4 - working**

Input

|  |
| --- |
| InsertBook(1, "Book1", "Author1", "Yes")  InsertBook(2, "Book2", "Author2", "Yes")  InsertBook(3, "Book3", "Author3", "Yes")  InsertBook(4, "Book4", "Author4", "Yes")  InsertBook(5, "Book5", "Author5", "Yes")  InsertBook(6, "Book6", "Author6", "Yes")  InsertBook(7, "Book7", "Author7", "Yes")  InsertBook(8, "Book8", "Author8", "Yes")  InsertBook(9, "Book9", "Author9", "Yes")  InsertBook(10, "Book10", "Author10", "Yes")  BorrowBook(101, 1, 1)  BorrowBook(102, 2, 2)  BorrowBook(103, 3, 3)  BorrowBook(104, 4, 4)  BorrowBook(105, 5, 5)  ReturnBook(101, 1)  BorrowBook(106, 1, 1)  BorrowBook(107, 2, 1)  BorrowBook(108, 3, 1)  BorrowBook(109, 4, 1)  BorrowBook(110, 5, 1)  ReturnBook(102, 2)  BorrowBook(107, 2, 1)  DeleteBook(1)  FindClosestBook(10)  InsertBook(11, "Book11", "Author11", "Yes")  ReturnBook(103, 3)  BorrowBook(112, 11, 1)  DeleteBook(11) |

Output:

|  |
| --- |
| Book 1 Borrowed by Patron 101  Book 2 Borrowed by Patron 102  Book 3 Borrowed by Patron 103  Book 4 Borrowed by Patron 104  Book 5 Borrowed by Patron 105  Book 1 Returned by Patron 101  Book 1 Borrowed by Patron 106  Book 2 Reserved by Patron 107  Book 3 Reserved by Patron 108  Book 4 Reserved by Patron 109  Book 5 Reserved by Patron 110  Book 2 Returned by Patron 102  Book 2 Allotted to Patron 107  Book 2 Reserved by Patron 107  Book 1 is no longer available  BookID = 10  Title = "Book10"  Author = "Author10"  Availability = "Yes"  BorrowedBy = None  Reservations = []  Book 3 Returned by Patron 103  Book 3 Allotted to Patron 108  Book 11 Borrowed by Patron 112  Book 11 is no longer available |