

```

class Author:
    def __init__(self, author_name):
        self.author_name = author_name

    def __str__(self):
        return f"Author: {self.author_name}"

class Book:
    def __init__(self, title, author, copies=1):
        self.title = title
        self.author = author
        self.copies_available = copies

    def __str__(self):
        return f"Title: {self.title}\n{self.author}\nCopies available: {self.copies_available}"

    def borrow(self):
        if self.copies_available > 0:
            self.copies_available -= 1
            return f"A copy of '{self.title}' has been borrowed."
        else:
            return f"All copies of '{self.title}' are currently checked out."

class Library:
    def __init__(self):
        self.books = []

    def add_book(self, book):
        self.books.append(book)

    def search_by_author(self, author_name):
        author_books = [book for book in self.books if book.author.author_name == author_name]
        return author_books

    def search_by_title(self, title):
        title_books = [book for book in self.books if book.title.lower() == title.lower()]
        return title_books

    def display_books(self):
        for book in self.books:
            print(book)
            print("-----")

# Example usage:
if __name__ == "__main__":
    # Create authors
    author1 = Author("Jane Doe")
    author2 = Author("John Smith")

    # Create books
    book1 = Book("Introduction to Python", author1, 5)
    book2 = Book("Data Science Essentials", author1, 3)
    book3 = Book("Machine Learning Basics", author2, 2)

    # Create a library
    library = Library()

    # Add books to the library
    library.add_book(book1)
    library.add_book(book2)
    library.add_book(book3)

    # Search for books by author
    print("Books by Jane Doe:")
    jane_doe_books = library.search_by_author("Jane Doe")
    for book in jane_doe_books:
        print(book)

    # Search for books by title
    print("\nBooks with title 'Introduction to Python':")
    intro_to_python_books = library.search_by_title("Introduction to Python")
    for book in intro_to_python_books:
        print(book)

```

```
# Display all books in the library
print("\nAll Books in the Library:")
library.display_books()

# Borrow a book
print("\nBorrowing a copy of 'Introduction to Python'")
print(book1.borrow())

# Display updated book information
print("\nUpdated Information for 'Introduction to Python':")
print(book1)
```

```
Books by Jane Doe:
Title: Introduction to Python
Author: Jane Doe
Copies available: 5
Title: Data Science Essentials
Author: Jane Doe
Copies available: 3
```

```
Books with title 'Introduction to Python':
Title: Introduction to Python
Author: Jane Doe
Copies available: 5
```

```
All Books in the Library:
Title: Introduction to Python
Author: Jane Doe
Copies available: 5
-----
Title: Data Science Essentials
Author: Jane Doe
Copies available: 3
-----
Title: Machine Learning Basics
Author: John Smith
Copies available: 2
-----
```

```
Borrowing a copy of 'Introduction to Python'
A copy of 'Introduction to Python' has been borrowed.
```

```
Updated Information for 'Introduction to Python':
Title: Introduction to Python
Author: Jane Doe
Copies available: 4
```