Designing a REST API: a Library

Functional requirements

1. It must provide endpoints for accessing different resources, such as books, authors, and genres.
2. It must allow librarians to create, read, update, and delete resources using standard HTTP methods (POST, GET, PUT/PATCH, and DELETE).
3. It must filter by various attributes and pagination to limit the number of results returned.
4. It must require authentication of who the user is trying to access .
5. It must handle errors and return appropriate error responses with useful error messages.
6. It must support response formats in JSON.
7. It must support versioning to allow for changes to the API without breaking existing clients.
8. It must support caching to improve performance and reduce server load.
9. It must URLs to identify resources and provide links to related resources.
10. It must use hypermedia links to allow clients to discover and navigate the API.

Nonfunctional requirements

1. It should respond to requests quickly and efficiently, with minimal latency and minimal overhead.
2. It should be highly available and recover quickly from failures and errors.
3. It should be secure and protect against unauthorized access.

Use cases

1.

Title: Search and retrieval of library books:
Primary actor: The librarian.
Success scenario: The librarian searches for books using a GET request that includes search criteria, such as author, title, genre. The REST API can provide a way to retrieve the metadata of these items, such as the title, author, publication date, and genre.

Description	By using this endpoint, it is possible to get a list of books that are stored inside the library or specific information from a book
Authentication required	Yes
URL	https://libraryapi.com/v1/books/
Method	GET
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikp vaG4gRG9IiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0 bYG_b7wFG8jnOoVZf83etPkt89OjJg8 Cache-Control: max-age=36000

Request Params	**FIELD**	**TYPE**	**REQUIRED**	**NOTES**
	title	String	No	It represents the title of the book. It must be a String value, however this could be ignored.
	author	String	No	Is possible to search books from an author, so in this field we send the name of the author
	genre	String	No	It is possible to search books by genre, and this value must be a String value that could match inside a list of books with the specific genre.
	limit	int	No	It is an optional parameter that limits the quantity of items that the end point will return.
	offset	int	No	Represents the offset when the pagination is used.

URL params	**FIELD**	**TYPE**	**REQUIRED**	**NOTES**
	id	int	No	It represents the id of the book. It must be an int value, however this could be ignored.

Request Data (Body)	N/A
Response Headers	Content-type: application/json

Response Data	**FIELD**	**TYPE**	**NOTES**
	items	List<Book>	List of entities that represent a book inside the library. **Example:** A simple book look like

```
[
  {
```

```
  "self": "/books/10948",
  "id" : 10948,
  "isbn-10": 8478884459,
  "isbn-13": 9788478884452,
  "name": "Harry Potter and the philosopher's
  stone.",
  "author": "J.K. Rowling",
  "pages": 256,
  "synopsis": "...",
  "publisher": "Salamandra",
  "availableForReservation": "true",
  "dimensions": "5 x 0.5 x 8.3 in",
  "readingAge": "9 years and up",
  "publicationDate": "26/06/1997",
  "genres": ["Novel",
  "Children's literature",
  "Fantasy literature",
  "High fantasy"]
   }
 ]
```

XML example:

```xml
<books>
  <book self="/books/10948">
    <id>10948</id>
    <isbn-10>8478884459</isbn-10>
    <isbn-13>9788478884452</isbn-13>
    <name>Harry Potter and the philosopher's
stone.</name>
    <author>J.K. Rowling</author>
    <pages>256</pages>
    <synopsis>...</synopsis>
    <publisher>Salamandra</publisher>
<availableForReservation>true</availableForRe
servation>
  <dimensions>5x0.5x8.3in</dimensions>
    <readingAge>9 years+</readingAge>
<publicationDate>26/06/1997</publicationDate>
    <genres>
      <genre>Novel</genre>
      <genre>Children's..</genre>
```

<table>
<tr><td></td><td></td><td></td><td>

```
                <genre>Fantasy</genre>
                <genre>High fantasy</genre>
            </genres>
        </book>
    </books>
```

</td></tr>
<tr><td></td><td>_links</td><td>List<Entity></td><td>Is a list of hypermedia elements that enrich the response giving information on how to use the application.</td></tr>
</table>

Success Response	Code: 200 OK.
Error Response	- Code: 400 Bad Requests. - Code: 404 Not found (In case there's no books are found). - Code: 500 Internal server error.
Pagination	We can make pagination by creating some limits and offsets like the following example

LIMIT	LIMIT AND OFFSET
https://libraryapi.com/v1/books?author=JK+Rowling?limit=5	https://libraryapi.com/v1/books?author=JK+Rowling?limit=5&offset=5
https://libraryapi.com/v1/books?genre=fantasy?limit=5	https://libraryapi.com/v1/books?genre=fantasy?limit=5&offset=5
https://libraryapi.com/v1/books?title=harry+potter+philosofer+stone?limit=5	https://libraryapi.com/v1/books?title=harry+potter+philosofer+stone?limit=5&offset=5
https://libraryapi.com/v1/books?limit=5	https://libraryapi.com/v1/books?limit=5&offset=5

Sample call (id)	https://libraryapi.com/v1/books/10948
	
	Response: 200 OK
	
	``json
	"_links":[
	 {"self":"https://libraryapi.com/v1/books/10948"},
	   {"rel":"books", "href":"/books"},
	   {"rel":"books-by-id", "href":"/books/{id}"},
	   {"rel":"books-by-title", "href":"/books?title={title}"},
	   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
	   {"rel":"books-by-author", "href":"/books?author={author}"}
	   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
	   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
	],
	"items":[{
	    "self": "/books/10948",
	    "id": 10948,
	    "isbn-10": "8478884459",
	    "isbn-13": "9788478884452",
	    "name": "Harry Potter and the Philosopher's Stone",
	    "author": "J.K. Rowling",
	    "pages": 256,
	    "synopsis": "Harry Potter thinks he is an ordinary...",
	    "publisher": "Salamandra",
	    "availableForReservation": true,
	    "dimensions": "5 x 0.5 x 8.3 in",
	    "readingAge": "9 years and up",
	    "publicationDate": "26/06/1997",
	    "genres": [
	      "Novel",
	      "Children's literature",
	      "Fantasy literature",
	      "High fantasy"
	    ]
	  }
	]
	``

Sample call (Author)	https://libraryapi.com/v1/books?author=JK+Rowling
	
	Response: 200 OK
	
	``json
	"_links":[
	 {"self":"https://libraryapi.com/v1/books?author=JK+Rowling"},
	   {"rel":"books", "href":"/books"},
	   {"rel":"books-by-id", "href":"/books/{id}"},
	   {"rel":"books-by-title", "href":"/books?title={title}"},
	   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
	   {"rel":"books-by-author", "href":"/books?author={author}"}
	   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
	   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
	   ],
	"items":[{
	    "self": "/books/10948",
	    "id": 10948,
	    "isbn-10": "8478884459",
	    "isbn-13": "9788478884452",
	    "name": "Harry Potter and the Philosopher's Stone",
	    "author": "J.K. Rowling",
	    "pages": 256,
	    "synopsis": "Harry Potter thinks he is an ordinary...",
	    "publisher": "Salamandra",
	    "availableForReservation": true,
	    "dimensions": "5 x 0.5 x 8.3 in",
	    "readingAge": "9 years and up",
	    "publicationDate": "26/06/1997",
	    "genres": [
	      "Novel",
	      "Children's literature",
	      "Fantasy literature",
	      "High fantasy"
	    ]
	  },
	  {
	    "self": "/books/10949",
	    "id": 10949,
	    "isbn-10": "0439064864",
	    "isbn-13": "9780439064866",
	    "name": "Harry Potter and the Chamber of Secrets",
	    "author": "J.K. Rowling",
	    "pages": 384,
	    "synopsis": "The Dursleys were so mean and hideous...",
	    "publisher": "Scholastic",
	``

```json
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "9 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {
      "self": "/books/10950",
      "id": 10950,
      "isbn-10": "0439136350",
      "isbn-13": "9780439136358",
      "name": "Harry Potter and the Prisoner of Azkaban",
      "author": "J.K. Rowling",
      "pages": 448,
      "synopsis": "Harry Potter's third year at Hogwarts..",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "10 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    }
  ]
```

| **Sample call (genre)** | https://libraryapi.com/v1/books?genre=fantasy <br><br> **Response: 200 OK** <br><br> ```json
"_links":[
  {"self":"https://libraryapi.com/v1/books?genre=fantasy"},
  {"rel":"books", "href":"/books"},
  {"rel":"books-by-id", "href":"/books/{id}"},
  {"rel":"books-by-title", "href":"/books?title={title}"},
  {"rel":"books-by-genre", "href":"/books?genre={genre}"},
  {"rel":"books-by-author", "href":"/books?author={author}"}
``` |

```json
      {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
      {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
    ],
  "items":[ {
      "self": "/books/10948",
      "id": 10948,
      "isbn-10": "8478884459",
      "isbn-13": "9788478884452",
      "name": "Harry Potter and the Philosopher's Stone",
      "author": "J.K. Rowling",
      "pages": 256,
      "synopsis": "Harry Potter thinks he is an ordinary...",
      "publisher": "Salamandra",
      "availableForReservation": true,
      "dimensions": "5 x 0.5 x 8.3 in",
      "readingAge": "9 years and up",
      "publicationDate": "26/06/1997",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {
      "self": "/books/10949",
      "id": 10949,
      "isbn-10": "0439064864",
      "isbn-13": "9780439064866",
      "name": "Harry Potter and the Chamber of Secrets",
      "author": "J.K. Rowling",
      "pages": 384,
      "synopsis": "The Dursleys were so mean and hideous...",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "9 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {
      "self": "/books/10950",
      "id": 10950,
      "isbn-10": "0439136350",
      "isbn-13": "9780439136358",
      "name": "Harry Potter and the Prisoner of Azkaban",
      "author": "J.K. Rowling",
      "pages": 448,
```

```
      "synopsis": "Harry Potter's third year at Hogwarts..",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "10 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    }
  ]
```

Sample call (title)	https://libraryapi.com/v1/books?title=harry+potter+philosofer+stone
	
	 Response: 200 OK
	
	 <code>"_links":[
	
	 {"self":"https://libraryapi.com/v1/books?title=harry+potter+philosofer+stone"},
	   {"rel":"books", "href":"/books"},
	   {"rel":"books-by-id", "href":"/books/{id}"},
	   {"rel":"books-by-title", "href":"/books?title={title}"},
	   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
	   {"rel":"books-by-author", "href":"/books?author={author}"}
	   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
	   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
	   ],
	 "items":[{
	   "self": "/books/10948",
	   "id": 10948,
	   "isbn-10": "8478884459",
	   "isbn-13": "9788478884452",
	   "name": "Harry Potter and the Philosopher's Stone",
	   "author": "J.K. Rowling",
	   "pages": 256,
	   "synopsis": "Harry Potter thinks he is an ordinary...",
	   "publisher": "Salamandra",
	   "availableForReservation": true,
	   "dimensions": "5 x 0.5 x 8.3 in",
	   "readingAge": "9 years and up",
	   "publicationDate": "26/06/1997",
	   "genres": [
	     "Novel",
	     "Children's literature",
	     "Fantasy literature",
	     "High fantasy"</code>

| | ```
        ]
      }
    ]
``` |
| **Sample call (listing all of the books)** | https://libraryapi.com/v1/books<br><br>**Response: 200 OK**<br><br>```
"_links":[
    {"self":"https://libraryapi.com/v1/books"},
    {"rel":"books", "href":"/books"},
    {"rel":"books-by-id", "href":"/books/{id}"},
    {"rel":"books-by-title", "href":"/books?title={title}"},
    {"rel":"books-by-genre", "href":"/books?genre={genre}"},
    {"rel":"books-by-author", "href":"/books?author={author}"}
    {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
    {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
    ],
"items":[
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...},
    {...}
]
``` |

2.

Title: Add a book to the library collection.
Primary actor: The librarian.
Success scenario: The librarian wants to add the book including the book's metadata, such as the title, author, publication date, genre and summary. The API validates the request and adds the new book to the library's database.

Description	By using this endpoint, it is possible to add a book adding information such as the title, author, publication date, genre and summary.

Authentication required	Yes
URL	https://libraryapi.com/v1/books/add
Method	POST
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzl1NiIsInR5cCl6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSl6Ikp vaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0 bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A

Request Data (Body)	
	``json
	{
	    "id": 10948,
	    "isbn-10": "8478884459",
	    "isbn-13": "9788478884452",
	    "name": "Harry Potter and the Philosopher's Stone",
	    "author": "J.K. Rowling",
	    "pages": 256,
	    "synopsis": "Harry Potter thinks he is an ordinary...",
	    "publisher": "Salamandra",
	    "availableForReservation": true,
	    "dimensions": "5 x 0.5 x 8.3 in",
	    "readingAge": "9 years and up",
	    "publicationDate": "26/06/1997",
	    "genres": [
	      "Novel",
	      "Children's literature",
	      "Fantasy literature",
	      "High fantasy"
	    ]
	}
	``

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	Code 201 Created.
Error Response	● 400 Bad Request. ● 401 Unauthorized. ● 500 Internal Server Error.

Pagination	N/A

Sample call	**Response: 201 CREATED**
	
	``
	{
	  "id" : 10948,
	  "isbn-10": 8478884459,
	  "isbn-13": 9788478884452,
	  "name": "Harry Potter and the philosopher's stone.",
	  "author": "J.K. Rowling",
	  "pages": 256,
	  "synopsis": "...",
	  "publisher": "Salamandra",
	  "availableForReservation": true,
	  "dimensions": "5 x 0.5 x 8.3 in",
	  "readingAge": "9 years and up",
	  "publicationDate": "26/06/1997",
	  "genres": ["Novel",
	  "Children's literature",
	  "Fantasy literature",
	  "High fantasy"]
	  "_links":
	  {"rel":"reserve", "href":"/books/10948/reserve"}
	}
	``

3.

Title: Update a book.
Primary actor: The librarian.
Success scenario: The librarian updates the metadata of a book in the library's collection using a PUT request that includes the book's unique identifier and the updated metadata. The API validates the request and updates the book's metadata in the library's database.

Description	By using this endpoint, it is possible to update specific information from a book.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/update/{id}
Method	PUT
Request Headers	Content-type: application/json Accept: application/json

	Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A
Request Data (Body)	``` { "id": 10948, "isbn-10": "8478884459", "isbn-13": "9788478884452", "name": "Harry Potter and the Philosopher's Stone", "author": "J.K. Rowling", "pages": 256, "synopsis": "Harry Potter thinks he is an ordinary...", "publisher": "Salamandra", "availableForReservation": true, "dimensions": "9 x 0.5 x 9.3 in", "readingAge": "9 years and up", "publicationDate": "26/06/1997", "genres": ["Novel", "Children's literature", "Fantasy literature", "High fantasy"] } ```
Response Headers	Content-type: application/json
Response Data	N/A
Success Response	Code: 200 OK. Code: 204 No content.
Error Response	● Code: 400 Bad Requests. ● Code: 404 Not found (In case there's no books are found). ● Code: 409 Conflict.
Pagination	N/A
Sample call	https://libraryapi.com/v1/books/10948 **Response: 200 OK**

```json
{
  "id" : 10948,
  "isbn-10": 8478884459,
  "isbn-13": 9788478884452,
  "name": "Harry Potter and the philosopher's stone.",
  "author": "J.K. Rowling",
  "pages": 256,
  "synopsis": "...",
  "publisher": "Salamandra",
  "availableForReservation": true,
  "dimensions": "5 x 0.5 x 8.3 in",
  "readingAge": "9 years and up",
  "publicationDate": "26/06/1997",
  "genres": ["Novel",
  "Children's literature",
  "Fantasy literature",
  "High fantasy"],
  "_links":
  {"rel":"reserve", "href":"/books/10948/reserve"}
}
```

4.

Title: Delete a book.
Primary actor: The librarian.
Success scenario: The librarian removes a book from the library's collection. They use the REST API to send a DELETE request that includes the book's unique identifier. The API validates the request and removes the book from the library's database.

Description	By using this endpoint, it is possible to delete a book that are stored inside the library.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/delete/{id}
Method	DELETE
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9IiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0

	bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A
URL params	<table><thead><tr><th>FIELD</th><th>TYPE</th><th>REQUIRED</th><th>NOTES</th></tr></thead><tbody><tr><td>id</td><td>int</td><td>No</td><td>It represents the id of the book. It must be an int value, however this could be ignored.</td></tr></tbody></table>
Response Headers	Content-type: application/json
Response Data	N/A
Success Response	Code: 204 No Content.
Error Response	• Code: 404 Not found (In case there's no book found). • Code: 409 Conflict.
Pagination	N/A

Sample call	https://libraryapi.com/v1/books/10948
	
	Response: 204 NO CONTENT
	
	``json
	{
	  "message" : "Book with id 10948 has been successfully deleted"
	}
	``

5.

Title: Filter books.
Primary actor: The librarian.
Success scenario: The librarian filters the search of books according to the author, publisher, reading age and genre.

Description	By using this endpoint, it is possible to filter a list of books that are stored inside the library according to information from books such as author, publisher, reading age, genre.

Authentication required	Yes
URL	https://libraryapi.com/v1/books/
Method	GET
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9IIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0bYG_b7wFG8jnOoVZf83etPkt89OjJg8 Cache-Control: max-age=36000
Request Params	

FIELD	TYPE	REQUIRED	NOTES
author	String	No	It is possible to search books from an author, so in this field we send the name of the author
publisher	String	No	It represents the organization whose business is publishing books.
readingAge	String	No	It represents the age according to the reading level of a book.
genre	String	No	It is possible to search books by genre, and this value must be a String value that could match inside a list of books with the specific genre.
limit	int	No	It is an optional parameter that limits the quantity of items that the end point will return.
offset	int	No	Represents the offset when the pagination is used.

Request Data (Body)	N/A
Response Headers	Content-type: application/json
Response Data	

FIELD	TYPE	NOTES

	items	List\<Book\>	List of entities that represent books filter inside the library. **Example:** A result filtering by author looks like:
| | | | ```json
"_links":[

{"self":"https://libraryapi.com/v1/books?author
=JK+Rowling"},
    {"rel":"books", "href":"/books"},
    {"rel":"books-by-id", "href":"/books/{id}"},
    {"rel":"books-by-title",
"href":"/books?title={title}"},
    {"rel":"books-by-genre",
"href":"/books?genre={genre}"},
    {"rel":"books-by-author",
"href":"/books?author={author}"}
],
"items":[ {
    "self": "/books/10948",
    "id": 10948,
    "isbn-10": "8478884459",
    "isbn-13": "9788478884452",
    "name": "Harry Potter and the Philosopher's
Stone",
    "author": "J.K. Rowling",
    "pages": 256,
    "synopsis": "Harry Potter thinks he is an
ordinary...",
    "publisher": "Salamandra",
    "availableForReservation": true,
    "dimensions": "5 x 0.5 x 8.3 in",
    "readingAge": "9 years and up",
    "publicationDate": "26/06/1997",
    "genres": [
      "Novel",
      "Children's literature",
      "Fantasy literature",
      "High fantasy"
    ]
  },
  {
    "self": "/books/10949",
    "id": 10949,
    "isbn-10": "0439064864",
    "isbn-13": "9780439064866",
    "name": "Harry Potter and the Chamber of
``` |

```
Secrets",
    "author": "J.K. Rowling",
    "pages": 384,
    "synopsis": "The Dursleys were so mean and
hideous...",
    "publisher": "Scholastic",
    "availableForReservation": true,
    "dimensions": "5.2 x 1 x 8 in",
    "readingAge": "9 years and up",
    "publicationDate": "02/06/1999",
    "genres": [
      "Novel",
      "Children's literature",
      "Fantasy literature",
      "High fantasy"
    ]
  },
  {
    "self": "/books/10950",
    "id": 10950,
    "isbn-10": "0439136350",
    "isbn-13": "9780439136358",
    "name": "Harry Potter and the Prisoner of
Azkaban",
    "author": "J.K. Rowling",
    "pages": 448,
    "synopsis": "Harry Potter's third year at
Hogwarts..",
    "publisher": "Scholastic",
    "availableForReservation": true,
    "dimensions": "5.2 x 1 x 8 in",
    "readingAge": "10 years and up",
    "publicationDate": "02/06/1999",
    "genres": [
      "Novel",
      "Children's literature",
      "Fantasy literature",
      "High fantasy"
    ]
  }
]
```

XML example:

```xml
<books>
  <book self="/books/10948">
    <id>10948</id>
    <isbn-10>8478884459</isbn-10>
    <isbn-13>9788478884452</isbn-13>
    <name>Harry Potter and the philosopher's stone.</name>
    <author>J.K. Rowling</author>
    <pages>256</pages>
    <synopsis>...</synopsis>
    <publisher>Salamandra</publisher>
<availableForReservation>true</availableForReservation>
    <dimensions>5x0.5x8.3in</dimensions>
    <readingAge>9 years+</readingAge>
<publicationDate>26/06/1997</publicationDate>
    <genres>
      <genre>Novel</genre>
      <genre>Children's..</genre>
      <genre>Fantasy</genre>
      <genre>High fantasy</genre>
    </genres>
  </book>
  <book self="/books/10949">
    <id>10949</id>
    <isbn-10>0439064864</isbn-10>
    <isbn-13>9780439064866</isbn-13>
    <name>Harry Potter and the chamber of secrets.</name>
    <author>J.K. Rowling</author>
    <pages>384</pages>
    <synopsis>The Dursley were so mean and hideous...</synopsis>
    <publisher>Scholastic</publisher>
<availableForReservation>true</availableForReservation>
    <dimensions>5x0.5x8.3in</dimensions>
    <readingAge>9 years+</readingAge>
<publicationDate>02/06/1999</publicationDate>
    <genres>
      <genre>Novel</genre>
      <genre>Children's..</genre>
      <genre>Fantasy</genre>
```

|  |  |  | ```xml
        <genre>High fantasy</genre>
      </genres>
    </book>
</books>
``` |
| | _links | List<Entity> | Is a list of hypermedia elements that enrich the response giving information on how to use the application. |

Success Response	Code: 200 OK.
Error Response	● Code: 400 Bad Requests. ● Code: 404 Not found (In case there's no books are found). ● Code: 500 Internal server error.
Pagination	We can make pagination by creating some limits and offsets like the following example | LIMIT	LIMIT AND OFFSET
https://libraryapi.com/v1/books?author=JK+Rowling?limit=5	https://libraryapi.com/v1/books?author=JK+Rowling?limit=5&offset=5
https://libraryapi.com/v1/books?genre=fantasy?limit=5	https://libraryapi.com/v1/books?genre=fantasy?limit=5&offset=5	

Sample call (Author)	https://libraryapi.com/v1/books?author=JK+Rowling
	
	Response: 200 OK
	
	``json
	"_links":[
	 {"self":"https://libraryapi.com/v1/books?author=JK+Rowling"},
	   {"rel":"books", "href":"/books"},
	   {"rel":"books-by-id", "href":"/books/{id}"},
	   {"rel":"books-by-title", "href":"/books?title={title}"},
	   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
	   {"rel":"books-by-author", "href":"/books?author={author}"}
	   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
	   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
	  ],
	"items":[{
	    "self": "/books/10948",
	    "id": 10948,
	    "isbn-10": "8478884459",
	    "isbn-13": "9788478884452",
	    "name": "Harry Potter and the Philosopher's Stone",
	    "author": "J.K. Rowling",
	    "pages": 256,
	    "synopsis": "Harry Potter thinks he is an ordinary...",
	    "publisher": "Salamandra",
	    "availableForReservation": true,
	    "dimensions": "5 x 0.5 x 8.3 in",
	    "readingAge": "9 years and up",
	    "publicationDate": "26/06/1997",
	    "genres": [
	      "Novel",
	      "Children's literature",
	      "Fantasy literature",
	      "High fantasy"
	    ]
	  },
	  {
	    "self": "/books/10949",
	    "id": 10949,
	    "isbn-10": "0439064864",
	    "isbn-13": "9780439064866",
	    "name": "Harry Potter and the Chamber of Secrets",
	    "author": "J.K. Rowling",
	    "pages": 384,
	    "synopsis": "The Dursleys were so mean and hideous...",
	    "publisher": "Scholastic",
	``

```json
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "9 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {

      "self": "/books/10950",
      "id": 10950,
      "isbn-10": "0439136350",
      "isbn-13": "9780439136358",
      "name": "Harry Potter and the Prisoner of Azkaban",
      "author": "J.K. Rowling",
      "pages": 448,
      "synopsis": "Harry Potter's third year at Hogwarts..",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "10 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
  }
  ]
```

Sample call (publisher)	https://libraryapi.com/v1/books?publisher=scholastic
	Response: 200 OK

```
"_links":[
 {"self":"https://libraryapi.com/v1/books?publisher=scholastic"},
   {"rel":"books", "href":"/books"},
   {"rel":"books-by-id", "href":"/books/{id}"},
   {"rel":"books-by-title", "href":"/books?title={title}"},
   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
   {"rel":"books-by-author", "href":"/books?author={author}"}
   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
 ],
 "items":[
   {
     "self": "/books/10949",
     "id": 10949,
     "isbn-10": "0439064864",
     "isbn-13": "9780439064866",
     "name": "Harry Potter and the Chamber of Secrets",
     "author": "J.K. Rowling",
     "pages": 384,
     "synopsis": "The Dursleys were so mean and hideous...",
     "publisher": "Scholastic",
     "availableForReservation": true,
     "dimensions": "5.2 x 1 x 8 in",
     "readingAge": "9 years and up",
     "publicationDate": "02/06/1999",
     "genres": [
       "Novel",
       "Children's literature",
       "Fantasy literature",
       "High fantasy"
     ]
   },
   {
     "self": "/books/10950",
     "id": 10950,
     "isbn-10": "0439136350",
     "isbn-13": "9780439136358",
     "name": "Harry Potter and the Prisoner of Azkaban",
     "author": "J.K. Rowling",
     "pages": 448,
     "synopsis": "Harry Potter's third year at Hogwarts..",
```

```json
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "10 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    }
]
```

Sample call (reading age)	https://libraryapi.com/v1/books?readingAge=9+years

Response: 200 OK

```json
 "_links":[
  {"self":"https://libraryapi.com/v1/books?author=JK+Rowling"},
    {"rel":"books", "href":"/books"},
    {"rel":"books-by-id", "href":"/books/{id}"},
    {"rel":"books-by-title", "href":"/books?title={title}"},
    {"rel":"books-by-genre", "href":"/books?genre={genre}"},
    {"rel":"books-by-author", "href":"/books?author={author}"}
    {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
    {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
    ],
  "items":[ {
      "self": "/books/10948",
      "id": 10948,
      "isbn-10": "8478884459",
      "isbn-13": "9788478884452",
      "name": "Harry Potter and the Philosopher's Stone",
      "author": "J.K. Rowling",
      "pages": 256,
      "synopsis": "Harry Potter thinks he is an ordinary...",
      "publisher": "Salamandra",
      "availableForReservation": true,
      "dimensions": "5 x 0.5 x 8.3 in",
      "readingAge": "9 years and up",
      "publicationDate": "26/06/1997",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {
      "self": "/books/10949",
      "id": 10949,
      "isbn-10": "0439064864",
      "isbn-13": "9780439064866",
      "name": "Harry Potter and the Chamber of Secrets",
      "author": "J.K. Rowling",
      "pages": 384,
      "synopsis": "The Dursleys were so mean and hideous...",
      "publisher": "Scholastic",
```

```
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "9 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    }
  ]
```

Sample call (genre)	https://libraryapi.com/v1/books?genre=fantasy
	
	 Response: 200 OK
	
	 <pre>"_links":[
	  {"self":"https://libraryapi.com/v1/books?genre=fantasy"},
	  {"rel":"books", "href":"/books"},
	  {"rel":"books-by-id", "href":"/books/{id}"},
	  {"rel":"books-by-title", "href":"/books?title={title}"},
	  {"rel":"books-by-genre", "href":"/books?genre={genre}"},
	  {"rel":"books-by-author", "href":"/books?author={author}"}
	],
	"items":[{
	    "self": "/books/10948",
	    "id": 10948,
	    "isbn-10": "8478884459",
	    "isbn-13": "9788478884452",
	    "name": "Harry Potter and the Philosopher's Stone",
	    "author": "J.K. Rowling",
	    "pages": 256,
	    "synopsis": "Harry Potter thinks he is an ordinary...",
	    "publisher": "Salamandra",
	    "availableForReservation": true,
	    "dimensions": "5 x 0.5 x 8.3 in",
	    "readingAge": "9 years and up",
	    "publicationDate": "26/06/1997",
	    "genres": [
	      "Novel",
	      "Children's literature",
	      "Fantasy literature",
	      "High fantasy"
	    ]
	  },
	  {
	    "self": "/books/10949",</pre>

```
      "id": 10949,
      "isbn-10": "0439064864",
      "isbn-13": "9780439064866",
      "name": "Harry Potter and the Chamber of Secrets",
      "author": "J.K. Rowling",
      "pages": 384,
      "synopsis": "The Dursleys were so mean and hideous...",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "9 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {
      "self": "/books/10950",
      "id": 10950,
      "isbn-10": "0439136350",
      "isbn-13": "9780439136358",
      "name": "Harry Potter and the Prisoner of Azkaban",
      "author": "J.K. Rowling",
      "pages": 448,
      "synopsis": "Harry Potter's third year at Hogwarts..",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "10 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    }
  ]
```

6.

Title: Paginates retrieval of library items.
Primary actor: The system.
Success scenario: When the librarian performs a search, the results are broken up into smaller chunks, making it easier for the user to navigate through the list.

Description	By using this endpoint, it is possible to filter a list of books that are stored inside the library according to information from books such as author, publisher, reading age, genre.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/
Method	GET
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTIzAJ-0bYG_b7wFG8jnOoVZf83etPkt89OjJg8 Cache-Control: max-age=36000
Request Params	

FIELD	TYPE	REQUIRED	NOTES
author	String	No	It is possible to search books from an author, so in this field we send the name of the author
publisher	String	No	It represents the organization whose business is publishing books.
readingAge	String	No	It represents the age according to the reading level of a book.
genre	String	No	It is possible to search books by genre, and this value must be a String value that could match inside a list of books with the specific genre.
limit	int	No	It is an optional parameter that limits the quantity of items that the end point will return.
offset	int	No	Represents the offset when the pagination is used.

Request Data (Body)	N/A
Response Headers	Content-type: application/json

Response Data			
	FIELD	**TYPE**	**NOTES**
	items	List<Book>	List of entities that represent books divide by pages. **Example:** A result after paging:

```
"_links":[

{"self":"https://libraryapi.com/v1/books?limit=
3&offset=0"},
   {"rel":"books-paging",
"href":"/books?limit={limit}&offset={offset}"},
   {"rel":"books", "href":"/books"},
   {"rel":"books-by-id", "href":"/books/{id}"},
   {"rel":"books-by-title",
"href":"/books?title={title}"},
   {"rel":"books-by-genre",
"href":"/books?genre={genre}"},
   {"rel":"books-by-author",
"href":"/books?author={author}"}
   {"rel":"books-by-author",
"href":"/books?publisher={publisher}"}
   {"rel":"books-by-author",
"href":"/books?readingAge={readingAge}"}
   ],
"items":[ {
    "self": "/books/10948",
    "id": 10948,
    "isbn-10": "8478884459",
    "isbn-13": "9788478884452",
    "name": "Harry Potter and the Philosopher's
Stone",
    "author": "J.K. Rowling",
    "pages": 256,
    "synopsis": "Harry Potter thinks he is an
ordinary...",
    "publisher": "Salamandra",
    "availableForReservation": true,
    "dimensions": "5 x 0.5 x 8.3 in",
    "readingAge": "9 years and up",
    "publicationDate": "26/06/1997",
    "genres": [
      "Novel",
      "Children's literature",
      "Fantasy literature",
```

```
      "High fantasy"
    ]
  },
  {
    "self": "/books/10949",
    "id": 10949,
    "isbn-10": "0439064864",
    "isbn-13": "9780439064866",
    "name": "Harry Potter and the Chamber of
Secrets",
    "author": "J.K. Rowling",
    "pages": 384,
    "synopsis": "The Dursleys were so mean and
hideous...",
    "publisher": "Scholastic",
    "availableForReservation": true,
    "dimensions": "5.2 x 1 x 8 in",
    "readingAge": "9 years and up",
    "publicationDate": "02/06/1999",
    "genres": [
      "Novel",
      "Children's literature",
      "Fantasy literature",
      "High fantasy"
    ]
  },
  {
    "self": "/books/10950",
    "id": 10950,
    "isbn-10": "0439136350",
    "isbn-13": "9780439136358",
    "name": "Harry Potter and the Prisoner of
Azkaban",
    "author": "J.K. Rowling",
    "pages": 448,
    "synopsis": "Harry Potter's third year at
Hogwarts..",
    "publisher": "Scholastic",
    "availableForReservation": true,
    "dimensions": "5.2 x 1 x 8 in",
    "readingAge": "10 years and up",
    "publicationDate": "02/06/1999",
    "genres": [
      "Novel",
      "Children's literature",
```

```
      "Fantasy literature",
      "High fantasy"
    ]
  }
]
 "total_results": 25,
  "limit": 3,
  "offset": 0
```

XML example:

```xml
<response>
 <books>
  <book self="/books/10948">
    <id>10948</id>
    <isbn-10>8478884459</isbn-10>
    <isbn-13>9788478884452</isbn-13>
    <name>Harry Potter and the philosopher's
stone.</name>
    <author>J.K. Rowling</author>
    <pages>256</pages>
    <synopsis>...</synopsis>
    <publisher>Salamandra</publisher>
<availableForReservation>true</availableForRe
servation>
   <dimensions>5x0.5x8.3in</dimensions>
    <readingAge>9 years+</readingAge>
<publicationDate>26/06/1997</publicationDate>
    <genres>
      <genre>Novel</genre>
      <genre>Children's..</genre>
      <genre>Fantasy</genre>
      <genre>High fantasy</genre>
    </genres>
  </book>
  <book self="/books/10949">
    <id>10949</id>
    <isbn-10>0439064864</isbn-10>
    <isbn-13>9780439064866</isbn-13>
    <name>Harry Potter and the chamber of
secrets.</name>
    <author>J.K. Rowling</author>
```

```xml
      <pages>384</pages>
      <synopsis>The Dursley were so mean and
hideous...</synopsis>
      <publisher>Scholastic</publisher>
<availableForReservation>true</availableForRe
servation>
   <dimensions>5x0.5x8.3in</dimensions>
      <readingAge>9 years+</readingAge>
<publicationDate>02/06/1999</publicationDate>
      <genres>
        <genre>Novel</genre>
        <genre>Children's..</genre>
        <genre>Fantasy</genre>
        <genre>High fantasy</genre>
      </genres>
    </book>
<book self="/books/10950">
      <id>10949</id>
      <isbn-10>0439136350</isbn-10>
      <isbn-13>9780439136358</isbn-13>
      <name>Harry Potter and the prisioner of
Azkaban.</name>
      <author>J.K. Rowling</author>
      <pages>448</pages>
      <synopsis>Harry Potter's third year at
Hogwarts...</synopsis>
      <publisher>Scholastic</publisher>
<availableForReservation>true</availableForRe
servation>
   <dimensions>5x0.5x8.3in</dimensions>
      <readingAge>10 years+</readingAge>
<publicationDate>02/06/1999</publicationDate>
      <genres>
        <genre>Novel</genre>
        <genre>Children's..</genre>
        <genre>Fantasy</genre>
        <genre>High fantasy</genre>
      </genres>
    </book>
   </books>
   <total_results>25</total_results>
   <limit>3</limit>
   <offset>0</offset>
```

		```</response>```	
	_links	List<Entity>	Is a list of hypermedia elements that enrich the response giving information on how to use the application.

Success Response	Code: 200 OK.
Error Response	- Code: 400 Bad Requests. - Code: 404 Not found (In case there's no books found). - Code: 500 Internal server error.
Pagination	We can make pagination by creating some limits and offsets like the following example

LIMIT	LIMIT AND OFFSET
https://libraryapi.com/v1/books?author=JK+Rowling?limit=5	https://libraryapi.com/v1/books?author=JK+Rowling?limit=5&offset=5
https://libraryapi.com/v1/books?genre=fantasy?limit=5	https://libraryapi.com/v1/books?genre=fantasy?limit=5&offset=5
https://libraryapi.com/v1/books?limit=5	https://libraryapi.com/v1/books?limit=5&offset=0

Sample call	https://libraryapi.com/v1/books?limit=3&offset=0

Response: 200 OK

```
"_links":[
 {"self":"https://libraryapi.com/v1/books?limit=3&offset=0"},
   {"rel":"books-paging",
"href":"/books?limit={limit}&offset={offset}"},
   {"rel":"books", "href":"/books"},
   {"rel":"books-by-id", "href":"/books/{id}"},
   {"rel":"books-by-title", "href":"/books?title={title}"},
   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
   {"rel":"books-by-author", "href":"/books?author={author}"}
   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
  ],
"items":[ {
    "self": "/books/10948",
    "id": 10948,
    "isbn-10": "8478884459",
    "isbn-13": "9788478884452",
    "name": "Harry Potter and the Philosopher's Stone",
    "author": "J.K. Rowling",
    "pages": 256,
    "synopsis": "Harry Potter thinks he is an ordinary...",
    "publisher": "Salamandra",
    "availableForReservation": true,
    "dimensions": "5 x 0.5 x 8.3 in",
    "readingAge": "9 years and up",
    "publicationDate": "26/06/1997",
    "genres": [
      "Novel",
      "Children's literature",
      "Fantasy literature",
      "High fantasy"
    ]
  },
  {
    "self": "/books/10949",
    "id": 10949,
    "isbn-10": "0439064864",
    "isbn-13": "9780439064866",
    "name": "Harry Potter and the Chamber of Secrets",
    "author": "J.K. Rowling",
    "pages": 384,
```

```
      "synopsis": "The Dursleys were so mean and hideous...",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "9 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    },
    {
      "self": "/books/10950",
      "id": 10950,
      "isbn-10": "0439136350",
      "isbn-13": "9780439136358",
      "name": "Harry Potter and the Prisoner of Azkaban",
      "author": "J.K. Rowling",
      "pages": 448,
      "synopsis": "Harry Potter's third year at Hogwarts..",
      "publisher": "Scholastic",
      "availableForReservation": true,
      "dimensions": "5.2 x 1 x 8 in",
      "readingAge": "10 years and up",
      "publicationDate": "02/06/1999",
      "genres": [
        "Novel",
        "Children's literature",
        "Fantasy literature",
        "High fantasy"
      ]
    }
  ]
  "total_results": 25,
  "limit": 3,
  "offset": 0
```

7.

Title: Lend book
Primary actor: The librarian

Success scenario: The librarian searches for the book needed and verifies its credentials, checks if the book is available, and then reserves the book for the client and updates the book's status to show that it is checked out and sets a due date for its return.

Description	By using this endpoint, it is possible to lend a book by updating the book's status to show the lend date and set a due date for its return.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/{id}/lend
Method	PUT
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzl1NiIsInR5cCl6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSl6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A

Request Data (Body)	```json
	{
	
	    "availableForReservation": false,
	    "last_lend_date": "2023-02-25",
	    "return_date": "2023-03-25",
	    "client_name": "Pepito Perez",
	    "id_client" : 1025305114
	
	}
	``

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	● Code: 200 OK.
Error Response	● Code: 400 Bad Requests. ● Code: 401 Unauthorized. ● Code: 404 Not found (In case there's no books found). ● Code: 409 Conflict. ● Code: 500 Internal Server Error.

Sample call	
	
	Response: 200 OK
	
	`{`
	`  "id" : 10948,`
	`  "isbn-10": 8478884459,`
	`  "isbn-13": 9788478884452,`
	`  "name": "Harry Potter and the philosopher's stone.",`
	`  "author": "J.K. Rowling",`
	`  "pages": 256,`
	`  "synopsis": "...",`
	`  "publisher": "Salamandra",`
	`  "availableForReservation": false,`
	`  "dimensions": "5 x 0.5 x 8.3 in",`
	`  "readingAge": "9 years and up",`
	`  "publicationDate": "26/06/1997",`
	`  "genres": ["Novel",`
	`  "Children's literature",`
	`  "Fantasy literature",`
	`  "High fantasy"],`
	`  "last_lend_date": "2023-02-25",`
	`  "return_date": "2023-03-25",`
	`  "client_name": "Pepito Perez",`
	`  "id_client" : 1025305114,`
	`"_links":[`
	` {"self":"https://libraryapi.com/v1/books/10948/lend},`
	`  {"rel":"books", "href":"/books"},`
	`  {"rel":"books-by-id", "href":"/books/{id}"},`
	`  {"rel":"books-by-title", "href":"/books?title={title}"},`
	`  {"rel":"books-by-genre", "href":"/books?genre={genre}"},`
	`  {"rel":"books-by-author", "href":"/books?author={author}"}`
	`  {"rel":"books-by-author", "href":"/books?publisher={publisher}"}`
	`  {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}`
	`  ]`
	`}`

8.

Title: Book time renewal
Primary actor: The librarian
Success scenario: The librarian requests a renewal by updating the due date according to the renewal date to return it.

Description	By using this endpoint, it is possible to update the return date of a book.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/{id}/lend
Method	PUT
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9IIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A

Request Data (Body)	```json
	{
	
	    "return_date": "2023-03-28"
	
	}
	``

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	● Code: 200 OK.
Error Response	● Code: 400 Bad Requests. ● Code: 401 Unauthorized. ● Code: 404 Not found (In case there's no books found). ● Code: 409 Conflict. ● Code: 500 Internal Server Error.

Sample call	https://libraryapi.com/v1/books/10948/lend
	
	Response: 200 OK
	
	``json
	{
	  "id" : 10948,
	  "isbn-10": 8478884459,
	  "isbn-13": 9788478884452,
	  "name": "Harry Potter and the philosopher's stone.",
	  "author": "J.K. Rowling",
	  "pages": 256,
	``

```
    "synopsis": "...",
    "publisher": "Salamandra",
    "availableForReservation": false,
    "dimensions": "5 x 0.5 x 8.3 in",
    "readingAge": "9 years and up",
    "publicationDate": "26/06/1997",
    "genres": ["Novel",
    "Children's literature",
    "Fantasy literature",
    "High fantasy"],
    "last_lend_date": "2023-02-25",
    "return_date": "2023-03-28",
    "client_name": "Pepito Perez",
    "id_client" : 1025305114,
  "_links":[
   {"self":"https://libraryapi.com/v1/books/10948/lend"},
    {"rel":"books", "href":"/books"},
    {"rel":"books-by-id", "href":"/books/{id}"},
    {"rel":"books-by-title", "href":"/books?title={title}"},
    {"rel":"books-by-genre", "href":"/books?genre={genre}"},
    {"rel":"books-by-author", "href":"/books?author={author}"}
    {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
    {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
    ]
}
```

9.

Title: Book returned.
Primary actor: The librarian
Success scenario: The librarian marks the book as returned and updates its status as available for checkout.

Description	By using this endpoint, it is possible to update its status as available for checkout once the book has been returned.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/{id}/lend
Method	PUT
Request Headers	Content-type: application/json Accept: application/json

	Authentication: Bearer
	eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikp vaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTIzAJ-0 bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A

Request Data (Body)	```json
	{
	    "availableForReservation": true",
	}
	``

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	● Code: 200 OK.
Error Response	● Code: 400 Bad Requests. ● Code: 401 Unauthorized. ● Code: 404 Not found (In case there's no books found). ● Code: 409 Conflict. ● Code: 500 Internal Server Error.

Sample call	https://libraryapi.com/v1/books/10948/lend
	
	Response: 200 OK
	
	``json
	{
	  "id" : 10948,
	  "isbn-10": 8478884459,
	  "isbn-13": 9788478884452,
	  "name": "Harry Potter and the philosopher's stone.",
	  "author": "J.K. Rowling",
	  "pages": 256,
	  "synopsis": "...",
	  "publisher": "Salamandra",
	  "availableForReservation": true,
	  "dimensions": "5 x 0.5 x 8.3 in",
	  "readingAge": "9 years and up",
	  "publicationDate": "26/06/1997",
	  "genres": ["Novel",
	  "Children's literature",
	  "Fantasy literature",
	``

```
   "High fantasy"],
 "_links":[
  {"self":"https://libraryapi.com/v1/books/10948/lend"},
    {"rel":"books", "href":"/books"},
    {"rel":"books-by-id", "href":"/books/{id}"},
    {"rel":"books-by-title", "href":"/books?title={title}"},
    {"rel":"books-by-genre", "href":"/books?genre={genre}"},
    {"rel":"books-by-author", "href":"/books?author={author}"}
    {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
    {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
    {"rel":"reserve", "href":"/books/10948/reserve"}
    ]
}
```

10.

Title: Search Reservations.
Primary actor: The librarian.
Success scenario: The librarian searches for reservations of books currently checked out. Take into account the book's title and view the details of each reservation, such as the user's name, the reservation date, and the expected pickup date.

Description	By using this endpoint, it is possible to search a list of books reserved by a client in the library.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/
Method	GET
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikp vaG4gRG9IiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0 bYG_b7wFG8jnOoVZf83etPkt89OjJg8 Cache-Control: max-age=36000

Request Params	**FIELD**	**TYPE**	**REQUIRED**	**NOTES**
	title	String	No	It represents the title of the book. It must be a String value, however this could be ignored.
	reservation id	int	No	It represents the identifier of the reservation.
	reservation start date	Date	No	It represents the date when the reservation was made.
	reservation end date	Date	No	It represents the date when the reserved book is due to be returned.
	client name	String	No	It represents the name of the client who made the reservation.
	id client	int	No	It represents the identification of the client who made the reservation.

URL params	**FIELD**	**TYPE**	**REQUIRED**	**NOTES**
	id	int	No	It represents the id of the book. It must be an int value, however this could be ignored.

Request Data (Body)	N/A
Response Headers	Content-type: application/json

Response Data	**FIELD**	**TYPE**	**NOTES**

	items	List<Book>	List of entities that represent a book inside the library that is reserved. **Example:** A simple book look like
			
			 `[`
			`  {`

```
"self": "/books/10948/reserve",
"id" : 10948,
"name": "Harry Potter and the philosopher's
stone.",
"id-reservation" : 1234,
"start-date" : "2023-03-25",
"end-date" : "2023-03-25",
"client-name" : "Pepito perez",
"id-client" : 1025305114
 }
]
```

XML example:

```xml
<books>
  <book self="/books/10948/reserve">
    <id>10948</id>
    <name>Harry Potter and the philosopher's
stone.</name>
    <reservation>
      <id-reservation>1234</id-reservation>
      <start-date>2023-03-25</start-date>
      <end-date>2023-03-25</end-date>
      <client-name>Pepito perez</client-name>
      <id-client>1025305114</id-client>
    </reservation>
  </book>
</books>
```

	_links	List<Entity>	Is a list of hypermedia elements that enrich the response giving information on how to use the application.

Success Response	Code: 200 OK.
Error Response	● Code: 400 Bad Requests. ● Code: 404 Not found (In case there's no books are found). ● Code: 500 Internal server error.

Pagination	We can make pagination by creating some limits and offsets like the following example

LIMIT	LIMIT AND OFFSET
https://libraryapi.com/v1/books?id-reservation=1234?limit=5	https://libraryapi.com/v1/books?id-reservation=1234?limit=5&offset=5

Sample call (id)	https://libraryapi.com/v1/books?id-reservation=1234 **Response: 200 OK**

```
"_links":[
 {"self":"https://libraryapi.com/v1/books/10948"},
   {"rel":"books", "href":"/books"},
   {"rel":"books-by-id", "href":"/books/{id}"},
   {"rel":"books-by-title", "href":"/books?title={title}"},
   {"rel":"books-by-genre", "href":"/books?genre={genre}"},
   {"rel":"books-by-author", "href":"/books?author={author}"}
   {"rel":"books-by-author", "href":"/books?publisher={publisher}"}
   {"rel":"books-by-author", "href":"/books?readingAge={readingAge}"}
],
"items":[  {
"self": "/books/10948/reserve",
"id" : 10948,
"name": "Harry Potter and the philosopher's stone.",
"id-reservation" : 1234,
"start-date" : "2023-03-25",
"end-date" : "2023-03-25",
"client-name" : "Pepito perez",
"id-client" : 1025305114
 }
]
```

11.

Title: Create Reservations and holds.
Primary actor: The librarian.
Success scenario: The librarian reserves a book that is currently unavailable. They can create a reservation record by providing their name, library card number, the title of the book, and the date they would like to pick up the book.

Description	By using this endpoint, it is possible to create a list of books reserved by a client in the library.

Authentication required	Yes
URL	https://libraryapi.com/v1/books/{id}/reserve
Method	POST
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikp vaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0 bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A

Request Data (Body)	<pre>{
	    "id" : 10948,
	    "name": "Harry Potter and the philosopher's stone.",
	    "id-reservation" : 1234,
	    "start-date" : "2023-03-25",
	    "end-date" : "2023-03-25",
	    "client-name" : "Pepito perez",
	    "id-client" : 1025305114
	}</pre>

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	Code: 200 OK. Code: 201 Created.
Error Response	- Code: 400 Bad Requests. - Code: 401 Unauthorized. - Code: 403 Forbidden. - Code: 404 Not found (In case there's no books are found). - Code: 409 Conflict. - Code: 500 Internal server error.
Pagination	N/A
Sample call	**Response: 201 CREATED** <pre>{</pre>

```
    "id" : 10948,
    "name": "Harry Potter and the philosopher's stone.",
    "id-reservation" : 1234,
    "start-date" : "2023-03-25",
    "end-date" : "2023-03-25",
    "client-name" : "Pepito perez",
    "id-client" : 1025305114
}
```

12.

Title: Update Reservations and holds.
Primary actor: The librarian.
Success scenario: The librarian changes the date of the reservation. They can update their reservation record by providing their reservation ID.

Description	By using this endpoint, it is possible to update specific information from a book.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/update/{id-reservation}
Method	PUT
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikp vaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0 bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A
Request Data (Body)	```{ "id" : 10948, "name": "Harry Potter and the philosopher's stone.", "id-reservation" : 1234, "start-date" : "2023-03-25", "end-date" : "2023-03-28", "client-name" : "Pepito perez", "id-client" : 1025305114 }```

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	● Code: 200 OK. ● Code: 204 No content.
Error Response	● Code: 400 Bad Requests. ● Code: 404 Not found (In case there's no reservation found). ● Code: 409 Conflict.

Sample call	https://libraryapi.com/v1/books?id-reservation=1234
	
	Response: 200 OK
	
	<pre>{
	    "id" : 10948,
	    "name": "Harry Potter and the philosopher's stone.",
	    "id-reservation" : 1234,
	    "start-date" : "2023-03-25",
	    "end-date" : "2023-03-28",
	    "client-name" : "Pepito perez",
	    "id-client" : 1025305114
	}</pre>

13.

Title: Delete Reservations and holds.
Primary actor: The librarian.
Success scenario: The librarian cancels the reservation. They can delete their reservation record by providing their reservation ID. The book will then become available for other users to reserve.

Description	By using this endpoint, it is possible to delete a book that are stored inside the library.
Authentication required	Yes
URL	https://libraryapi.com/v1/books/delete/{id-reservation}
Method	DELETE
Request Headers	Content-type: application/json Accept: application/json Authentication: Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikp vaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyLCJleHAiOjE1MTYyMzkwMjJ9.PbW2TTlzAJ-0

	bYG_b7wFG8jnOoVZf83etPkt89OjJg8 no-cache
Request Params	N/A
URL params	

FIELD	TYPE	REQUIRED	NOTES
id-reser vation	int	No	It represents the id reservation of the book. It must be an int value.

Response Headers	Content-type: application/json
Response Data	N/A
Success Response	Code: 204 No Content.
Error Response	● Code: 404 Not found (In case there's no reservation found). ● Code: 409 Conflict.
Pagination	N/A

Sample call	https://libraryapi.com/v1/books?id-reservation=1234
	
	Response: 204 NO CONTENT
	
	``
	{
	    "message" : "The reservation has been deleted successfully"
	}
	``

14.

Title: Authorization to access the resources.
Primary actor: The librarian.
Success scenario: The librarian accesses his library account, including their personal information, borrowing history. The REST API can provide a way to authenticate users, update their information.

15.

Title: Caching retrieval of library items.
Primary actor: The system

Success scenario: The librarian searches in the library's collection and the same parameters are used multiple times, so the result for each set of input parameters is caches, the library can avoid redundant calculations and speed up subsequent calls to the function.

The caching is include in the headers section taking into account the following cache headers:

- Cache-Control: This is the name of the cache control header.
- no-cache: This header indicates that the response should not be cached, and that the client should revalidate the response with the server before using it.

16.

Title: Handle errors and return appropriate error responses
Primary actor: The system.
Success scenario: HTTP status codes in the 1xx range indicate that the server has received the request and is continuing to process it, HTTP status codes in the 2xx range indicate that the request was successful, HTTP status codes in the 3xx range indicate that the requested resource has been moved to a new location, HTTP status codes in the 4xx range indicate that the client made an error in the request. HTTP status codes in the 5xx range indicate that the server encountered an error while processing the request.

17.

Title: Hypermedia links
Primary actor: The system.
Success scenario: Hypermedia links can follow hypermedia links.