Proiect Databases
Library Management System

Baza de date conține următoarele tabele:

Loans:

- **Descriere**: Tabelul Loans stochează informațiile despre împrumuturile realizate în cadrul bibliotecii. Fiecare rând reprezintă un împrumut unic realizat de un membru al bibliotecii pentru o carte specifică.
- **Atribute**:
  - **IDLoan**: Identificator unic pentru fiecare împrumut. Este cheia primară a tabelului.
  - **IDBook**: Identificatorul cărții împrumutate. Este o cheie străină care face referire la coloana IDBook din tabelul Books.
  - **IDMember**: Identificatorul membrului care a împrumutat cartea. Este o cheie străină care face referire la coloana IDMember din tabelul Members.
  - **LoanDate**: Data la care a fost realizat împrumutul.
  - **ReturnDate**: Data la care cartea a fost returnată. Dacă această valoare este NULL, înseamnă că împrumutul este încă activ.

Books:

- **Descriere**: Tabelul Books stochează detalii despre toate cărțile disponibile în bibliotecă.
- **Atribute**:
  - **IDBook**: Identificator unic pentru fiecare carte. Este cheia primară a tabelului.
  - **Title**: Titlul cărții.
  - **Author**: Autorul cărții.
  - **Genre**: Genul literar al cărții.
  - **YearPublished**: Anul publicării.
  - **IsAvailable**: Indică dacă cartea este disponibilă pentru împrumut (1 pentru disponibil, 0 pentru indisponibil).

Members:

- **Descriere**: Tabelul Members conține informații despre membrii bibliotecii.
- **Atribute**:
  - **IDMember**: Identificator unic pentru fiecare membru. Este cheia primară a tabelului.
  - **FirstName**: Prenumele membrului.
  - **LastName**: Numele de familie al membrului.
  - **PhoneNumber**: Numărul de telefon al membrului.
  - **RegistrationDate**: Data înregistrării membrului în bibliotecă.
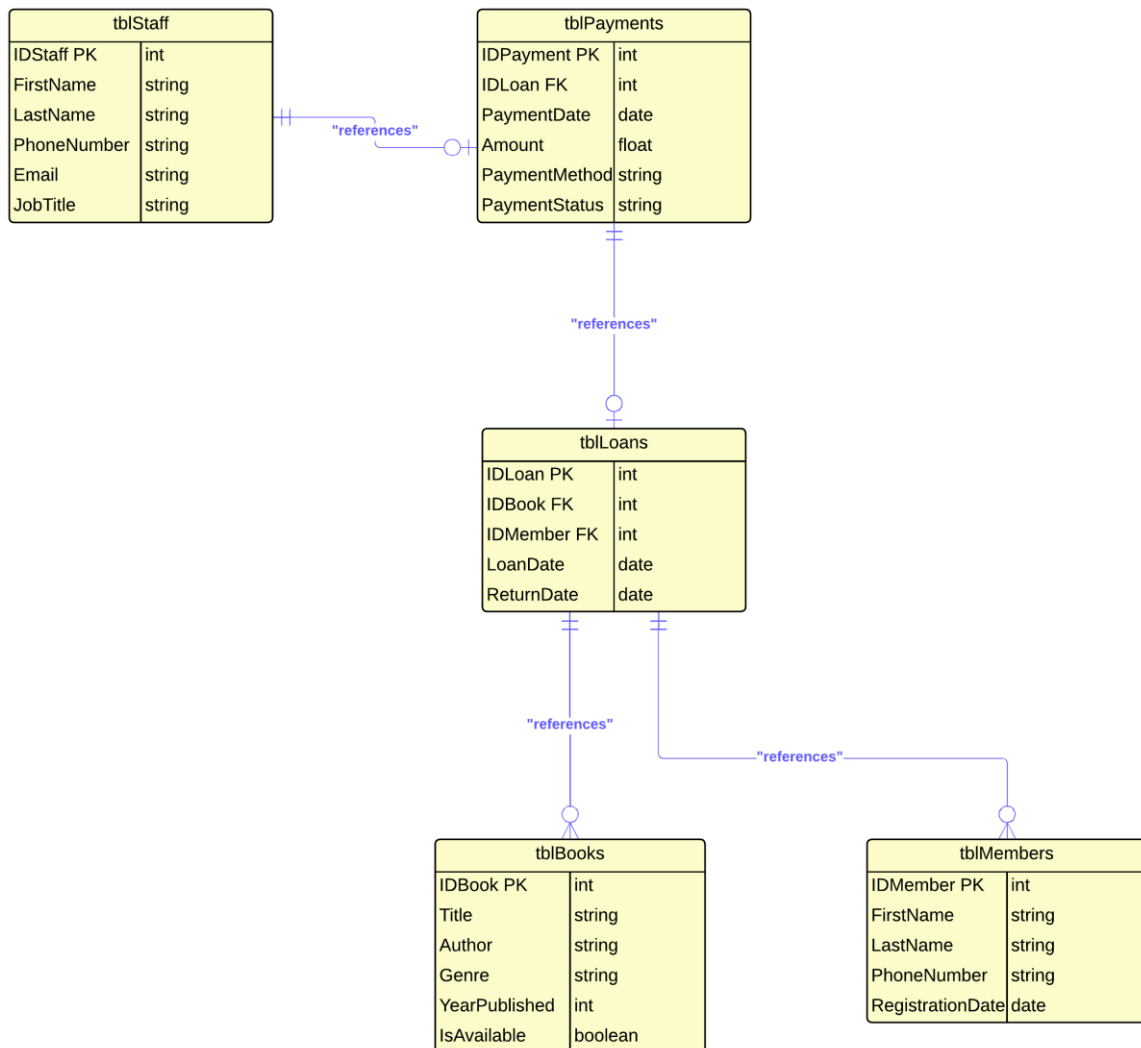
Staff:

- **Descriere**: Tabelul Staff stochează informații despre personalul care lucrează în bibliotecă.
- **Atribute**:
  - **IDStaff**: Identificator unic pentru fiecare angajat. Este cheia primară a tabelului.
  - **FirstName**: Prenumele angajatului.
  - **LastName**: Numele de familie al angajatului.
  - **PhoneNumber**: Numărul de telefon al angajatului.
  - **Email**: Adresa de e-mail a angajatului.
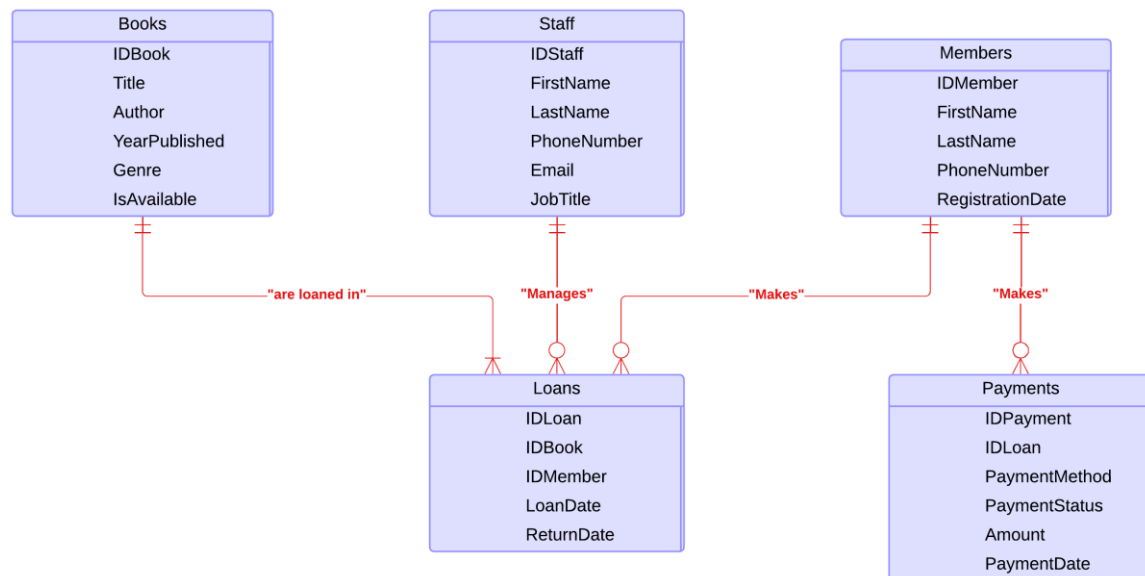 - **JobTitle**: Funcția angajatului în cadrul bibliotecii (e.g., librarian, manager).

Payments:

- **Descriere**: Tabelul Payments conține informații despre plățile realizate de membri pentru întârzierea returnării cărților.
- **Atribute**:
  - **IDPayment**: Identificator unic pentru fiecare plată. Este cheia primară a tabelului.
  - **IDLoan**: Identificatorul împrumutului pentru care s-a realizat plata. Este o cheie străină care face referire la IDLoan din tabelul Loans.
  - **PaymentDate**: Data la care s-a realizat plata.
  - **Amount**: Suma plătită.
  - **PaymentMethod**: Metoda utilizată pentru plată (e.g., cash, card).
  - **PaymentStatus**: Statusul plății (e.g., Completed, Pending).

Relational model diagram:

tblStaff

IDStaff PK	int
FirstName	string
LastName	string
PhoneNumber	string
Email	string
JobTitle	string

"references"

tblPayments

IDPayment PK	int
IDLoan FK	int
PaymentDate	date
Amount	float
PaymentMethod	string
PaymentStatus	string

"references"

tblLoans

IDLoan PK	int
IDBook FK	int
IDMember FK	int
LoanDate	date
ReturnDate	date

"references"

"references"

tblBooks

IDBook PK	int
Title	string
Author	string
Genre	string
YearPublished	int
IsAvailable	boolean

tblMembers

IDMember PK	int
FirstName	string
LastName	string
PhoneNumber	string
RegistrationDate	date

Entity-Relationship Diagram:

Loans table content:

Books table content:

```
SELECT * FROM dbo.tblBooks;
```

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⊞ Results ⃞ Messages

	IDBook	Title	Author	Genre	YearPublished	IsAvailable
1	001	Pride and Prejudice	Jane Austen	Romance	1813	1
2	002	1984	George Orwell	Dystopian	1949	1
3	003	The Great Gatsby	F. Scott Fitzgerald	Classic	1925	0
4	004	To Kill a Mockingbird	Harper Lee	Classic	1960	1
5	005	The Hobbit	J.R.R. Tolkien	Fantasy	1937	1
6	006	War and Peace	Leo Tolstoy	Historical	1869	1
7	007	Moby Dick	Herman Melville	Adventure	1851	1
8	008	Crime and Punishment	Fyodor Dostoevsky	Philosophical	1866	1
9	009	Brave New World	Aldous Huxley	Dystopian	1932	1
10	010	Anna Karenina	Leo Tolstoy	Romance	1878	1

Members table content :

```
SELECT * FROM dbo.tblMembers;
```

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⊞ Results ⃞ Messages

	IDMember	FirstName	LastName	PhoneNumber	RegistrationDate
1	0001	Vasile	Ion	0721000000	2023-01-01 00:00:00.000
2	0002	Alexandru	Maria	0722000000	2023-03-15 00:00:00.000
3	0003	Georgescu	Andrei	0723000000	2023-05-10 00:00:00.000
4	0004	Mihai	Silvia	0724000000	2023-06-20 00:00:00.000
5	0005	Ana	Popa	0725000000	2023-07-25 00:00:00.000
6	0006	Cristian	Vlad	0726000000	2023-08-30 00:00:00.000
7	0007	Elena	Constantin	0727000000	2023-09-10 00:00:00.000
8	0008	Radu	Alexandrescu	0728000000	2023-10-05 00:00:00.000
9	0009	George	Radulescu	0729000000	2023-11-15 00:00:00.000
10	0010	Silvia	Marin	0730000000	2023-12-01 00:00:00.000

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Payments table content:

```
SELECT * FROM dbo.tblPayments;
```

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⊞ Results ▤ Messages

	IDPayment	IDLoan	PaymentDate	Amount	PaymentMethod	PaymentStatus
1	P001	L001	2023-06-16 00:00:00.000	10.00	Cash	Completed
2	P002	L002	2023-08-01 00:00:00.000	5.00	Card	Pending
3	P003	L003	2023-08-06 00:00:00.000	8.00	Cash	Completed
4	P004	L004	2023-08-26 00:00:00.000	6.00	Card	Completed
5	P005	L005	2023-09-16 00:00:00.000	7.00	Cash	Completed
6	P006	L006	2023-09-30 00:00:00.000	9.00	Card	Pending
7	P007	L007	2023-10-16 00:00:00.000	10.00	Cash	Completed
8	P008	L008	2023-10-25 00:00:00.000	4.00	Card	Pending
9	P009	L009	2023-11-21 00:00:00.000	3.00	Cash	Completed
10	P010	L010	2023-12-15 00:00:00.000	12.00	Card	Pending

Staff table content:

```
SELECT * FROM dbo.tblStaff;
```

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⊞ Results ▤ Messages

	IDStaff	FirstName	LastName	PhoneNumber	Email	JobTitle
1	01	Ionescu	Maria	0723456789	maria.ionescu@example.com	Librarian
2	02	Popescu	Andrei	0723987654	andrei.popescu@example.com	Manager
3	03	Dumitrescu	Ana	0723546789	ana.dumitrescu@example.com	Assistant
4	04	Vlad	Ioana	0724556789	ioana.vlad@example.com	Librarian
5	05	Marin	George	0725456789	george.marin@example.com	Technician
6	06	Radulescu	Elena	0726356789	elena.radulescu@example.com	Librarian
7	07	Constantin	Mihai	0727256789	mihai.constantin@example.com	Assistant
8	08	Alexandrescu	Radu	0728156789	radu.alexandrescu@example.com	Manager
9	09	Georgescu	Silvia	0729056789	silvia.georgescu@example.com	Technician
10	10	Popa	Adriana	0729956789	adriana.popa@example.com	Librarian

1.Interrogation : List all available books

```sql
-- 1. List all available books
SELECT Title, Author, Genre, YearPublished
FROM dbo.tblBooks
WHERE IsAvailable = 1;
GO

-- 2. List members with active loans
SELECT m.FirstName, m.LastName, l.LoanDate
FROM dbo.tblLoans l
```

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Results | **Messages**

	Title	Author	Genre	YearPublished
1	Pride and Prejudice	Jane Austen	Romance	1813
2	1984	George Orwell	Dystopian	1949
3	To Kill a Mockingbird	Harper Lee	Classic	1960
4	The Hobbit	J.R.R. Tolkien	Fantasy	1937
5	War and Peace	Leo Tolstoy	Historical	1869
6	Moby Dick	Herman Melville	Adventure	1851
7	Crime and Punishment	Fyodor Dostoevsky	Philosophical	1866
8	Brave New World	Aldous Huxley	Dystopian	1932
9	Anna Karenina	Leo Tolstoy	Romance	1878

2.Interrogation: List members with active loans

```sql
-- 2. List members with active loans
SELECT m.FirstName, m.LastName, l.LoanDate
FROM dbo.tblLoans l
JOIN dbo.tblMembers m ON l.IDMember = m.IDMember
WHERE l.ReturnDate IS NULL;
GO

-- 3. Show payments grouped by status
SELECT PaymentStatus, COUNT(*) AS TotalPayments, S
```

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Results | Messages

	FirstName	LastName	LoanDate
1	Alexandru	Maria	2023-07-10 00:00:00.000
2	Cristian	Vlad	2023-09-20 00:00:00.000
3	Radu	Alexandrescu	2023-10-10 00:00:00.000
4	Silvia	Marin	2023-12-01 00:00:00.000

3.Interrogation: Show payments grouped by status

```sql
-- 3. Show payments grouped by status
SELECT PaymentStatus, COUNT(*) AS TotalPayments, SUM(Amount) AS TotalAmount
FROM dbo.tblPayments
GROUP BY PaymentStatus;
GO

-- 4. Find the most borrowed book
SELECT b.Title, COUNT(l.IDLoan) AS LoanCount
FROM dbo.tblLoans l
JOIN dbo.tblBooks b ON l.IDBook = b.IDBook
GROUP BY b.Title
```

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Results | Messages

	PaymentStatus	TotalPayments	TotalAmount
1	Completed	6	44.00
2	Pending	4	30.00

4.Interrogation: Find the most borrowed book

```sql
-- 4. Find the most borrowed book
SELECT b.Title, COUNT(l.IDLoan) AS LoanCount
FROM dbo.tblLoans l
JOIN dbo.tblBooks b ON l.IDBook = b.IDBook
GROUP BY b.Title
ORDER BY LoanCount DESC;
GO

-- 5. List loans by members, ordered by loan d.
SELECT m.FirstName, m.LastName, b.Title, l.Loar
FROM dbo.tblLoans l
JOIN dbo.tblBooks b ON l.IDBook = b.IDBook
JOIN dbo.tblMembers m ON l.IDMember = m.IDMembe
ORDER BY l.LoanDate DESC;
```

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Results | Messages

	Title	LoanCount
1	1984	1
2	Anna Karenina	1
3	Brave New World	1
4	Crime and Punishment	1
5	Moby Dick	1
6	Pride and Prejudice	1
7	The Great Gatsby	1
8	The Hobbit	1
9	To Kill a Mockingbird	1
10	War and Peace	1

5.Interrogation: List loans by members, ordered by loan date

```sql
SELECT m.FirstName, m.LastName, b.Title, l.LoanDate
FROM dbo.tblLoans l
JOIN dbo.tblBooks b ON l.IDBook = b.IDBook
JOIN dbo.tblMembers m ON l.IDMember = m.IDMember
ORDER BY l.LoanDate DESC;
GO

-- 6. Show overdue loans
```

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⊞ Results   📄 Messages

	FirstName	LastName	Title	LoanDate
1	Silvia	Marin	Anna Karenina	2023-12-01 00:00:00.000
2	George	Radulescu	Brave New World	2023-11-01 00:00:00.000
3	Radu	Alexandrescu	War and Peace	2023-10-10 00:00:00.000
4	Elena	Constantin	Crime and Punishment	2023-10-01 00:00:00.000
5	Cristian	Vlad	Moby Dick	2023-09-20 00:00:00.000
6	Ana	Popa	To Kill a Mockingbird	2023-09-01 00:00:00.000
7	Mihai	Silvia	1984	2023-08-10 00:00:00.000
8	Georgescu	Andrei	The Hobbit	2023-07-20 00:00:00.000
9	Alexandru	Maria	Pride and Prejudice	2023-07-10 00:00:00.000
10	Vasile	Ion	The Great Gatsby	2023-06-01 00:00:00.000

6.Interrogation: Show overdue loans

```sql
SELECT m.FirstName, m.LastName, b.Title, l.LoanDate, l.ReturnDate
FROM dbo.tblLoans l
JOIN dbo.tblBooks b ON l.IDBook = b.IDBook
JOIN dbo.tblMembers m ON l.IDMember = m.IDMember
WHERE l.ReturnDate IS NULL AND l.LoanDate < GETDATE() - 30;
GO

-- 7. Count total books by genre
SELECT Genre, COUNT(*) AS TotalBooks
```

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⊞ Results   📄 Messages

	FirstName	LastName	Title	LoanDate	ReturnDate
1	Alexandru	Maria	Pride and Prejudice	2023-07-10 00:00:00.000	NULL
2	Cristian	Vlad	Moby Dick	2023-09-20 00:00:00.000	NULL
3	Radu	Alexandrescu	War and Peace	2023-10-10 00:00:00.000	NULL
4	Silvia	Marin	Anna Karenina	2023-12-01 00:00:00.000	NULL

7.Interrogation: Count total books by genre

```sql
-- 7. Count total books by genre
SELECT Genre, COUNT(*) AS TotalBooks
FROM dbo.tblBooks
GROUP BY Genre;
GO
```

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Results | Messages

	Genre	TotalBooks
1	Adventure	1
2	Classic	2
3	Dystopian	2
4	Fantasy	1
5	Historical	1
6	Philosophical	1
7	Romance	2

8.Interrogation: Show total payments by member

```sql
-- 8. Show total payments by member
SELECT m.FirstName, m.LastName, SUM(p.Amount) AS TotalPaid
FROM dbo.tblPayments p
JOIN dbo.tblLoans l ON p.IDLoan = l.IDLoan
JOIN dbo.tblMembers m ON l.IDMember = m.IDMember
GROUP BY m.FirstName, m.LastName;
GO

-- 9. List staff members ordered by job title
SELECT FirstName, LastName, JobTitle
FROM dbo.tblStaff
```

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⊞ Results ▤ Messages

	FirstName	LastName	TotalPaid
1	Radu	Alexandrescu	4.00
2	Georgescu	Andrei	8.00
3	Elena	Constantin	10.00
4	Vasile	Ion	10.00
5	Alexandru	Maria	5.00
6	Silvia	Marin	12.00
7	Ana	Popa	7.00
8	George	Radulescu	3.00
9	Mihai	Silvia	6.00
10	Cristian	Vlad	9.00

9.Interrogation: List staff members ordered by job title

```sql
-- 9. List staff members ordered by job title
SELECT FirstName, LastName, JobTitle
FROM dbo.tblStaff
ORDER BY JobTitle;
GO

-- 10. Show books borrowed but not yet returne
SELECT b.Title, m.FirstName, m.LastName, l.Loa
FROM dbo.tblLoans l
```

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Results | Messages

	FirstName	LastName	JobTitle
1	Dumitrescu	Ana	Assistant
2	Constantin	Mihai	Assistant
3	Radulescu	Elena	Librarian
4	Popa	Adriana	Librarian
5	Vlad	Ioana	Librarian
6	Ionescu	Maria	Librarian
7	Popescu	Andrei	Manager
8	Alexandrescu	Radu	Manager
9	Georgescu	Silvia	Technician
10	Marin	George	Technician

10.Interrogation: Show books borrowed but not yet returned

```sql
-- 10. Show books borrowed but not yet returned
SELECT b.Title, m.FirstName, m.LastName, l.LoanDate
FROM dbo.tblLoans l
JOIN dbo.tblBooks b ON l.IDBook = b.IDBook
JOIN dbo.tblMembers m ON l.IDMember = m.IDMember
WHERE l.ReturnDate IS NULL;
GO
```

110 %

Results | Messages

	Title	FirstName	LastName	LoanDate
1	Pride and Prejudice	Alexandru	Maria	2023-07-10 00:00:00.000
2	Moby Dick	Cristian	Vlad	2023-09-20 00:00:00.000
3	War and Peace	Radu	Alexandrescu	2023-10-10 00:00:00.000
4	Anna Karenina	Silvia	Marin	2023-12-01 00:00:00.000