Relational schema for the Library management system

To convert the given ER Diagram into relational schema we need to follow the 7 steps as below.

Step 1: Strong Entities

members(m.id, name, address, phone,restricted)

librarian(l.id,password,address,phone)

copies(document name,m.id, copiesleft)

magazines(mag.id,title,contributor,name,editor,copiesleft,issue)

books(b.id,title,edition,publisher,year,author,copiesleft)

journal/articles(jou.id,publication date,journal name,copiesleft,title,author,editor,publisher)

Additional document(adddoc.id,type)

thesis(thesis.id,author,publisher,year,title)

technical report(ref.no,title,author,submitted to)

search(by author, by title, by document id, document type)

saved search(keyword,document.id, search time)

Step 2: Weak entities:

due database(m.id,document id, due_date, return date, fine impose)

citation (doc.title, by author, by title, by document id, cited document)

Step 3:

One-to-One:

librarian(l.id,password,address,phone,m.id, document.id, document name)

Step 4:

One-to-many:

members(m.id, name, address, phone,restricted,l.id,document name) saved search(keyword,document.id, search time,by author, by title)

Step 5:

Many-to-many

None Exist

Step 6:

N-ary relationship sets

modify(b.id, journal/article.id, magazines.id, Additional document.id, add, delete, update)

refers to(journal/article.id, magazines.id, b.id, Additional document.id)

will(by author, by title, by document.id, m.id, l.id)
Step 7:

Multi valued attribute

None -exist

SQL tables for the Library management system

After converting to the relational schema we need to create SQL tables for each of them. For converting them into SQL tables we have to use commands like CREATE TABLE, and the following are the SQL tables for the given library management system.

(strong entities)
Table for librarian:

```
create table librarian(
L.id char(5),
M.id char(5),
Password varchar(10),
Address varchar(10),
Phone numeric(10),
Document_id char(5),
Document_name varchar(10),
Primary key (L.id),
Foreign key (M.id, Document_id, Document_name) references (memebers, copies, search)
);
```

Table for members:

```
create table members(
M.id char(5),
L.id char(5),
name varchar(10),
Document_name varchar(10),
address varchar(10),
Phone numeric(10),
Restricted numeric(10).
Primary key (m.id),
Foreign key (l.id) references librarian
);
```

Table for books:

```
create table books(
B.id char(5),
Title varchar(10),
Edition varchar(10),
Year numeric(4,0),
publisher varchar(10),
Author varchar(10),
Copiesleft numeric(10),
Primary key (b.id),
Foreign key (copiesleft) references copies
);
```

Table for copies:

```
create table copies(
M.id char(5),
Document_name varchar(10),
Copiesleft numeric(10),
Primary key (m.id,document_name),
Foreign key (m.id) references members
);
```

Table for magazines:

```
create table magazines(
mag.id char(5),
Title varchar(10),
Contributor varchar(10),
Authorname varchar(10),
Edition varchar(10),
Issue varchar(20),
Copiesleft numeric(10),
Primary key (mag.id),
Foreign key (copiesleft) references copies
);
```

Table for journal_articles:

```
create table journal_articles(
jou.id char(5),
Publication_date date,
Journal_name varchar(10),
Author varchar(10),
Edition varchar(10),
Title varchar(10),
publisher varchar(10),
Copiesleft numeric(10),
Primary key (jou.id),
Foreign key (copiesleft) references copies
);
```

Table for additionaldoc:

```
create table additionaldoc(
adddoc.id char(5),
Title varchar(10),
Type varchar(10),
Primary key (adddoc.id)
);
```

Table for thesis:

```
create table thesis(
thesis.id char(5),
Title varchar(10),
Year numeric(4,0),
publisher varchar(10),
Author varchar(10),
Primary key (thesis.id)
);
```

Table for techreporter:

```
create table techreporter(
Ref.no char(5),
Title varchar(10),
Author varchar(10),
Submitted_to varchar(10),
Primary key (ref.no)
);
```

Table for search:

```
create table search(
By_author varchar(10),
By_title varchar(10),
By_document_id char(5),
Documenttype varchar(10),
Primary key (by_author,by_title,by_document_id)
);
```

Table for savedsearch:

```
create table savedsearch(
document.id char(5),
Keyword varchar(10),
Search_time varchar(10),
By_author varchar(10),
By_title varchar(10),
Primary key (document.id,keyword)
);
```

(weak entities)
Table for due_database:

```
create table due_database(
m.id char(5),
Document.id char(5),
Duedate date,
Returndate date,
Fineimpose numeric(100),
Primary key (m.id,document.id),
Foreign key (m.id) references members
);
```

Table for citation:

```
create table citation(
Doc_title varchar(10),
By_author varchar(10),
By_title varchar(10),
By_document_id char(5),
Citeddocument varchar(10),
Primary key (doc_title,by_author,by_title,by_document_id),
Foreign key (by_author,by_title,by-document_id) references search
);
```

(relations)
Table for modify:

```
create table modify(
b.id char(5),
Jou.id char(5),
Mag.id char(5),
Adddoc.id char(5),
Add varchar(10),
Delete varchar(10),
Update varchar(10),
Primary key (b.id,mag.id,u.id,adddoc.id),
Foreign key(b.id,mag.id,jou.id,adddoc.id) references (books,journal_articles,maganizes,additionaldoc)
);
```

Table for refers_to:

```
create table refers_to(
Jou.id char(5),
Mag.id char(5),
b.id char(5),
Adddoc.id char(5),
Primary key(jou.id,mag.id,b.id,adddoc.id),
Foreign key(b.id,mag.id,jou.id,adddoc.id) references (books,journal_articles,maganizes,additionaldoc)
);
```

Table for will:

```
create table will(
By_author varchar(10),
By_title varchar(10),
By_document.id char(5),
M.id char(5),
L.id char(5),
Primary key(by_author,by_title,by_document.id,m.id,l.id),
Foreign key(by_author,by_title,by_document.id) references (citation),
Foreign key(m.id,l.id) references(members,librarian)
);
```