Project Name: Automated library management sysetm.

Project Description: We built a database to automate library management. When a database admin enters roll/teacher_id into their specific table, it generate a member_id for him. We used member_id to identify student/teacher.

We have author table to contain author information, publisher table to contain publisher information, book table to contain book information. We created table book_author and book_publisher to reduce data redundancy and improve intrigity. Item table contains information about all copy of book. We have shelf table to contain information about item location. A user can check available,borrowed,damaged book and their location.

A member can take upto 2 book as loan. When active member of the library puts an item and his library card containing member id onto the machine, it automatically entries a loan if the member borrowed less than 2 book and the book in available status. A already borrowed book can not be borrowed

A database admin apply fine each day. If a member keeps a book more than 30 days ,a fine of 20 taka get entries in fine table when admin update fine. Each day the fine increase 3 taka and the maximum fine for a particular loan can be 1000 taka.

Our database contains following tables:

Address

Field Name	Data Type	Size	Characteristics
post_code	int		• primary key
city	varchar	30	• null not allowed
country	varchar	30	• null not allowed

Publisher unique(Name,phone)

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
publisher_id	varchar	10	• primary key • pub_ prefix followed by a number
Name	varchar	100	• not null
publication_year	char	4	• not null • a number containing 4 digit
post_code	int		• foreign key with reference to address table

Field Name	Data Type	Size	Characteristics
street	text		
phone	int		• not null
email	varchar	50	• not nul • email address format

Author unique(name,email)

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
author_id	varchar	10	• primary key • au_ prefix followed by a number
name	varchar	30	• not null
post_code	int		• foreign key with reference to address table • not null
nationality	varchar	30	• not null
email	varchar	50	• not null • email address format

Book unique(title,edition)

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
bool_id	varchar	10	• primary key • bk_ prefix followed by a number
year_of_publication	varchar	4	• 4 digit number • not null
edition	int		• greater than 0
title	varchar	50	• not null
sub	varchar	20	• available subject 'Computer Science','Electrical','Math','Communication' • not null

Book -Author unique(book_id,author_id)

Field Name	Data Type	Size	Characteristics
book_id	varchar	10	• foreign key with reference to book table • not null
author_id	varchar	10	• foreign key with reference to author table

Field Name	Data Type	Size	Characteristics
			• not null

Book -Publisher unique(book_id, publisher_id)

Field Name	Data Type	Size	Characteristics
book_id	varchar	10	• foreign key with reference to book table • not null
publisher_id	varchar	10	• foreign key with reference to publisher table • not null

Student unique(phone)

Field Name	Data Type	Size	Characteristics
roll	char	6	• primary key • 6 digit number
first_name	varchar	20	• not null
last_name	varchar	20	
depertment	varchar	20	• Available department 'ICE','CSE','EEE' • not null
dob	varchar	10	• [0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9] format • not null
post_code	int		• foreign key with reference to address table • not null
phone	int		• not null
email	varchar	50	• email address format • not null
sess	varchar	9	• [0-9][0-9][0-9][0-9]-[0-9][0-9][0-9][0-9] format • not null
street	text		• not null

Teacher unique(phone)

Field Name	Data Type	Size	Characteristics
teacher_id	char	4	• primary key • 4 digit number
first_name	varchar	20	• not null
last_name	varchar	20	
depertment	varchar	20	• Available department 'ICE','CSE','EEE' • not null
dob	varchar	10	• [0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9] format • not null
post_code	int		• foreign key with reference to address table

			• not null
phone	int		• not null
email	varchar	50	• email address format • not null
position	varchar	20	• available position 'lecturer','assistant professor','associate professor','professor' • not null
street	text		• not null

Member

Field Name	Data Type	Size	Characteristics
member_id	varchar	10	• primary key
member_type	char	7	• available type 'student','teacher • not null
loan_count	int		• greater than or equal 0 • not null
stat	char	6	• available option 'active','expire' • not null
membership_date	varchar	10	• '[0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9]' format • not null

Student-Member

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
member_id	varchar	10	• primary key • stu_ prefix followed by a number
roll	char	6	• foreign key with reference to student table • unique

Teacher-Member

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
member_id	varchar	10	• primary key

			• fac_ prefix followed by a number
teacher_id	char	4	• foreign key with reference to teacher table • unique

Shelf unique(shelf_no,row_no,col_no)

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
cell_id	varchar	10	• primary key • loc_ prefix followed by a number
shelf_no	char	2	• '[0-9][0-9]' format • not null
row_no	char	1	• '[0-9]' format • not null
col_no	char	1	• '[0-9]' format • not null

Item unique(book_id,copy_no)

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1 • hidden • not null
item_id	varchar	10	• primary key • it_ prefix followed by a number
copy_no	char	3	• 'C[0-9][0-9]' format • not null
stat	varchar	10	• options are 'available','borrowed','damaged' • not null
book_id	varchar	10	• foreign key with reference to book table • not null
cell_id	varchar	10	• foreign key with reference to shelf table • not null

loan

Field Name	Data Type	Size	Characteristics
id	int		• auto increment from 1

			• hidden • not null
loan_id	varchar	10	• primary key • ln_ prefix followed by a number
item_id	varchar	10	• foreign key with reference to item table • not null
stat	varchar	10	• available option 'active','return'
issue_date	varchar	10	• [0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9] format
member_id	varchar	10	• foreign key with reference to member table • not null

Fine

Field Name	Data Type	Size	Characteristics
fine_id	int		• auto increment from 1 • primary key
loan_id	varchar	10	• foreign key with reference to loan table • not null
fine_date	varchar	10	• [0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9] format
reason	text		
amount	money		• greater than or equal 0 • not null

The ER diagram is showed in next page or can be scanned the following QR to view it.