A picture containing text, photo, person, newspaper

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Stroom: Study Room Reservation System

# Background

A few years ago, the Fort Bend County Library System (FBCL) changed its mission statement. One of the three major areas of service FBCL has identified is serving as independent learning center by functioning as a hub of community and cultural activities. The FBCL realizes this goal by providing study rooms in eight of its twelve branches (including Sienna Branch Library).

With the new access of study rooms, the library’s policy and procedures were updated and a spreadsheet was created. This spreadsheet keeps tracks of the rooms being used, how many people used them, and the duration of the room usage. Study rooms are provided by the Adult Reference staff and can be used by anyone whether they are member or not of the library.

# Issues with the Current System

As mentioned before, an Excel spreadsheet (see Figure 1 in **Appendix B**) was created to keep track of the study room usage. This spreadsheet can only be managed by one staff member since the spreadsheet is stored in a flash drive. This condition raises a problem when the reference desk is swamped with multiple patrons asking for a study room and only one person can provide information.

In addition of keeping data of the study rooms’ usage, the spreadsheet is also used to keep track of a room called Distance Learning Room. This room is used for proctored tests. Only the Department Manager can check-in/check-out people from this room, which can cause some inconvenience if the manager is not present at the reference desk.

Because study rooms are limited, implementing a first-come, first-serve system was essential (see Figure 2 in **Appendix B**). This policy prevents patrons from hoarding a study room. As stated by the Study Room Policy, patrons have two hours guaranteed per day, which means they can only use a study room once per day. Since we only keep first names in the people can have the same first name.

Furthermore, the current spreadsheet does not facilitate the elaboration of statistics. Thus, there is no way the library can keep track if the study rooms do comply with the library’s mission to a space for study and collaboration.

# Vision

The main goal of Stroom is to provide a secure database that can be accessed by several staff member and keep data integrity. Uniformity and consistency are the motivation behind Stroom. Besides steadiness, Stroom will help provide information if the study rooms are being used correctly and if they meet the library’s mission.

In the future, further improvements to Stroom would be converting the database into a web-application so students can book the study rooms online. Nevertheless, with the constraints of time and knowledge, converting the spreadsheet into a database is the goal.

# Stakeholders

Librarians, paraprofessionals, and library assistants will be directly benefited from this database. They can keep track of the rooms used and who are using them. The branch manager will also be benefited since he can include in his quarterly a report of the use of the study rooms. Furthermore, Stroom can also be helpful for patrons. Even though patrons will not be allowed direct access to the database, the library administration can renovate the study rooms (by adding white boards, audiovisuals, etc.) with the tracking of Stroom.

# Cost

For the moment, Stroom and any application used to develop Stroom are free of cost.

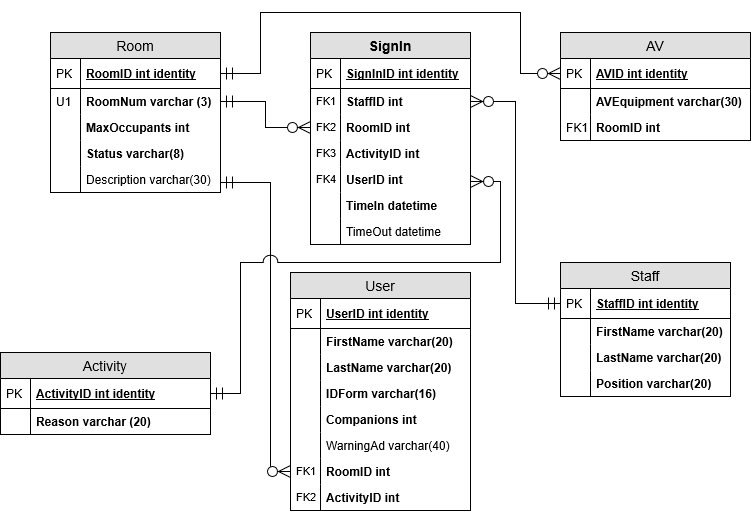
# Entities and Business Rules

The business rules by which the database is defined are the following:

|  |  |  |
| --- | --- | --- |
| **Entity** | **Attribute** | **Description** |
| Room | RoomID\* | Primary Key: Identifies the room uniquely |
| RoomNum [ru] | Room Number. It is a three-digit number. The first number specifies the floor the room is in. |
| MaxOccupants [r] | Maximum number of occupants for a room |
| Occupants [r] | Number of occupants for a room |
| Status [r] | Status of the room. It can be vacant, occupied, or closed. |
| Description | Description about the room |
| Activity | ActivityID\* | Primary Key: Identifies the activity uniquely |
| Reason [r] | Reason for reserving a room. It can be tutoring, distance learning, studying, meeting, or other. |
| SignIn[[1]](#footnote-1) | SignInID | Primary Key: Identifies the SignIn uniquely |
| *RoomID [r]* | Foreign Key from Room table |
| *StaffID [r]* | Foreign Key from Staff table |
| *UserID [r]* | Foreign Key from User table |
| *ActivityID [r]* | Foreign Key from Activity table |
| TimeIn [r] | Time of sign in |
| TimeOut[[2]](#footnote-2) | Time of sign out |
| User | UserID\* | Primary Key: Identifies the user uniquely |
| FirstName [r] | First name of user |
| LastName [r] | Last name of user |
| IDForm [r] | Form of identification. It could be driver’s license, library card, school ID, or other. |
| Companions[r] | Number of companions the user has. It includes the user. |
| WarningAd | Message about user. Staff can add information if the user has been disruptive before of if the user has had a room for the day. |
| *RoomID [r]* | Foreign Key from Room table |
| *ActivityID [r]* | Foreign Key from Activity table |
| Staff | StaffID\* | Primary Key: Identifies the staff uniquely |
| FirstName [r] | First name of staff member |
| LastName [r] | Last name of staff member |
| Position [r] | Job position of staff member |
| AV | AVID\* | Primary Key: Identifies the audiovisual device uniquely |
| AVEquipment [r] | Name of audiovisual device |
| *RoomID [r]* | Foreign key from Room table |
| **Relationships** | | |
| * A User can reserve only one Room per day. A Room can be occupied by zero or many Users. * A Room can be used for zero or many activities. An activity can be carried out at many rooms. * A Room can have none or many Audiovisual (AV) devices. An AV device can only be placed in one Room at the time. * A Staff member can manage zero or multiple rooms. A Room is managed by one or multiple Staff members. * A Staff member can service zero or many users. A user can be served by one or many Staff members. * A user can only have one Activity. An Activity can belong to zero or many Users. | | |

# ER Model

A logical model describes the business data and the rules for governing their use and storage (Chad, 2020).For a legend of the symbols and abbreviations shown in the logical mode, see Figure 3 in Appendix.



# Data Questions

Add Info Here

# Database Design and Programming (SQL)

## Table Creation

Add Info Here

## Data Insertion

Add Info Here

## Table Creation

Add Info Here

## Joining Tables

Add Info Here

# Answering Data Questions

Functions, Views, and stored procedures

# Database Infrastructure

The database infrastructure is based on client-server model. SQL server is used as the database engine and access is used as the interface design tool. Data is inserted, deleted, updated and queried from the SQL server database with the help of forms on Access. Useful data stored on SQL database can also be viewed with the help of reports generated through access.

# Security: Permissions and Back-ups

Add Info Here

# Interface

Create forms and reports for users to perform data input and output easily. Include the screenshot. Add captions to explain the purpose of each report or form.

# ~~Downside~~

~~While there are many advantages of transitioning from spreadsheet to database, databases generally require a higher level of technological expertise. Most of the library staff is not technologically savvy. Therefore, proper training must be offered in order for Stroom to be successful.~~

# Appendix A

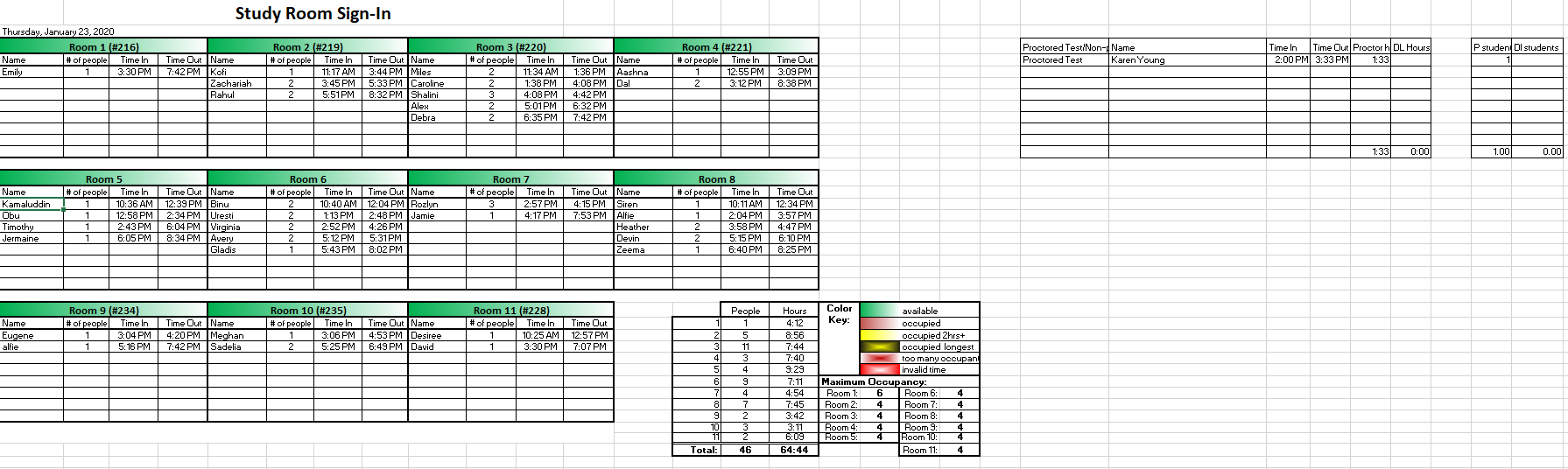
## Glossary

**AV:** refers to audiovisual devices like computers, projectors, microphones, etc.

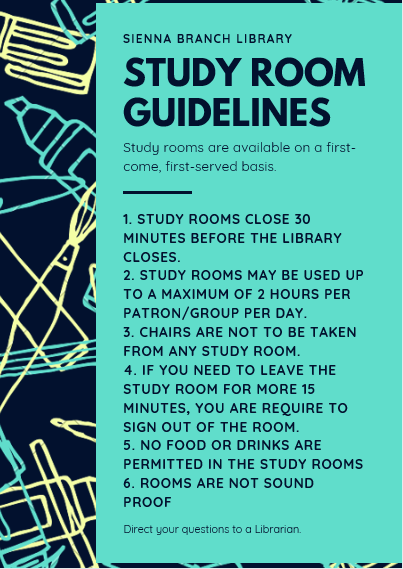
**Fort Bend County Library System (FBCL):** public library system serving the county of Fort Bend, Texas.

**Sienna Branch Library:** one of the eleven library branches of the FBCL.

# Appendix B



**Figure 1** Screenshot of the current spreadsheet which keeps track of the study rooms.



**Figure 2** Flyer with the library’s policy for study rooms.

**Figure 3** Logical model legend.

# SQL Script

--Part 1: Let’s create tables

--First Table: Staff

Create table s\_Staff (

s\_StaffID int identity,

FirstName varchar(20) NOT NULL,

LastName varchar(20) NOT NULL,

Position varchar(20) NOT NULL,

--constraints

constraint PK\_s\_Staff Primary key (s\_StaffID),--Primary Key

)

--Second Table: Room

Create table s\_Room (

s\_RoomID int identity,

RoomNum varchar(3) NOT NULL,

MaxOccupants int NOT NULL,

Status varchar(8) NOT NULL,

Description varchar(30),

--constraints

constraint PK\_s\_Room Primary key (s\_RoomID),--Primary Key

constraint U1\_s\_Room Unique (RoomNum)

)

--Third Table: User

Create table s\_User (

s\_UserID int identity,

s\_RoomID int NOT NULL, --Foreign key

s\_ActivityID int NOT NULL, --Foreign key

FirstName varchar(20) NOT NULL,

LastName varchar(20) NOT NULL,

IDForm varchar(16) NOT NULL,

Companions int NOT NULL,

WarningAd varchar(40), --I didn’t add the NOT NULL because it isn’t required

--constraints

constraint PK\_s\_User Primary key (s\_UserID),--Primary Key

constraint FK\_s\_User Foreign Key (s\_RoomID) references s\_Room(s\_RoomID),

constraint FK2\_s\_User Foreign Key (s\_ActivityID) references s\_Activity(s\_ActivityID)

)

--Fourth Table: Activity

Create table s\_Activity (

s\_ActivityID int identity,

Reason varchar(20) NOT NULL,

--constraints

constraint PK\_s\_Activity Primary key (s\_ActivityID),--Primary Key

)

--Fifth Table: AV

Create table s\_AV (

s\_AVID int identity,

AVEquipment varchar(30) NOT NULL,

s\_RoomID int NOT NULL, --Foreign key

--constraints

constraint PK\_s\_AV Primary key (s\_AVID),--Primary Key

constraint FK\_s\_AV Foreign Key (s\_RoomID) references s\_Room(s\_RoomID)

)

--Sixth Table: SignUp

Create table s\_SignIn (

s\_SignInID int identity,

s\_StaffID int NOT NULL, --Foreign key

s\_RoomID int NOT NULL, --Foreign key

s\_ActivityID int NOT NULL, --Foreign key

s\_UserID int NOT NULL, --Foreign key

TimeIn datetime NOT NULL default GetDate(),

TimeOut datetime default GetDate(),--I didn’t add the NOT NULL because it isn’t required

--constraints

constraint PK\_s\_SignIn Primary key (s\_SignInID),--Primary Key

constraint FK\_s\_SignIn Foreign Key (s\_StaffID) references s\_Staff(s\_StaffID),

constraint FK1\_s\_SignIn Foreign Key (s\_RoomID) references s\_Room(s\_RoomID),

constraint FK2\_s\_SignIn Foreign Key (s\_ActivityID) references s\_Activity(s\_ActivityID),

constraint FK3\_s\_SignIn Foreign Key (s\_UserID) references s\_User(s\_UserID)

)

--Part 2: Let’s add data

--Lab 5

-- Add data: Room

--adding data to the Room table

insert into s\_Room(RoomNum, MaxOccupants, Status, Description)

values

('201', 6, 'active', 'It has a window'),

('202', 4, 'active', 'Gets cold'),

('203', 4, 'active', 'Gets hot'),

('204', 4, 'active', 'Light flickers'),

('205', 4, 'active', 'It has window')

--Let’s verify additions

select \* from s\_Room

-- Add data: Activity

--adding data to the Activity table

insert into s\_Activity(Reason)

values

('tutoring'),

('meeting'),

('studying'),

('distance learning'),

('other')

--Let’s verify additions

select \* from s\_Activity

-- Add data: User

--adding data to the user table

insert into s\_User(FirstName, LastName, IDForm, s\_RoomID, s\_ActivityID, Companions)

values

('Mary', 'Joseph', 'Driver’s License', 2,1,3),

('Sam', 'Pocket', 'Driver’s License', 3,1,2),

('Tom', 'Hanks', 'None',4,3,1),

('Tony', 'Stark', 'Library Card',1,2,6),

('Denise', 'Quinones', 'Library Card',5,5,2)

--Let’s verify additions

select \* from s\_User

-- Add data: Staff

--adding data to the Staff table

insert into s\_Staff(FirstName, LastName, Position)

values

('Laura', 'Larregui', 'library assistant'),

('Alex', 'Green', 'library assistant'),

('Raquel', 'Stan', 'librarian'),

('Joe', 'Dillard', 'librarian'),

('Andy', 'Warhol', 'manager')

--Let’s verify additions

select \* from s\_Staff

-- Add data: AV

--adding data to the Av table

insert into s\_AV(AVEquipment, s\_RoomID)

values

('Computer1',5),

('Phone1', 5),

('Sharpener1',1),

('Sharpener2',2),

('Sharpener3',3),

('Sharpener4',4),

('Sharpener5',5)

--Let’s verify additions

select \* from s\_AV

1. The SignIn entity is used as a bridge table. A bridge table is a table that contains the keys between two tables in a many-to-many relationship. [↑](#footnote-ref-1)
2. The TimeOut attribute is not categorized as require because a Staff member cannot anticipate how long the User will occupy the Room. It is encouraged for Staff members update the SignIn entity once the User leaves the Room. [↑](#footnote-ref-2)