**VITABU MTAANI PROJECT.**

**OBJECTIVE.**

A project that aims at fostering a reading culture amongst the youth within the metropolitan areas of Nairobi

**DEFINE THE PROBLEM**

* Rise in negative behaviors amongst the youth due to lack of productive activities to engage in.
* Decrease in literacy levels among the people hence and indication that fewer people are able to read and write effectively.
* Decrease in the reading culture among the youth.
* Existing libraries are not keeping up with the digital age making them less appealing to the tech-savvy youths.
* Lack of sufficient libraries and bookstores making it difficult for residents to access books and educational materials.
* Lack of readily available infrastructure and resources to run mobile libraries (e.g. adequate vehicles, staffs and technology)
* Mobile libraries are facing safety and security issues including theft and vandalism.
* Lack of maintenance and sustainability of both mobile libraries and physical libraries, regular maintenance of vehicles and library materials is essential for long term sustainability.
* Lack of integration with educational institutions, coordination with educational institutions would maximize impact of mobile libraries.

**DEFINE THE SOLUTION.**

* Providing the youths with libraries will offer them a constructive way to spend their time encouraging reading and learning hence eliminating idleness and encouraging industriousness.
* Introducing mobile libraries will make books and reading materials accessible hence improving literacy levels across the community.
* Mobile libraries will also reignite the reading culture among the people by bringing books directly to where people live and gather.
* Incorporating digital resources e.g. e-books and online catalogs and modern management systems will make them attractive and relevant to today’s youth.
* Deploying a network of mobile libraries to regularly visit under severed areas ensuring consistent access to a variety of books and resources.
* One could seek funds and resource support from the government, private sectors and NGOs. Also encourage community members and students to volunteer helping in operating the libraries in their areas.
* Mobile libraries may be equipped with security systems such as GPS tracking, alarms and security personnel’s, local communities may also be engaged in protecting and valuing the mobile libraries fostering a sense of ownership and responsibility.
* Implementing a strict maintenance schedule for vehicles and equipments to prevent breakdowns and smooth operation.
* Develop programs in partnership with local schools e.g. Reading assignments and book clubs to integrate the mobile libraries into the educational system.

**THE CONCEPT (Conceptual Modeling)**

**Brainstorming session:**

* Library in every constituency
* Books in every library
* Books will be of different genres
* People who manage the library
* Users who use the library system
* Events being hold by the libraries
* Reports from the libraries

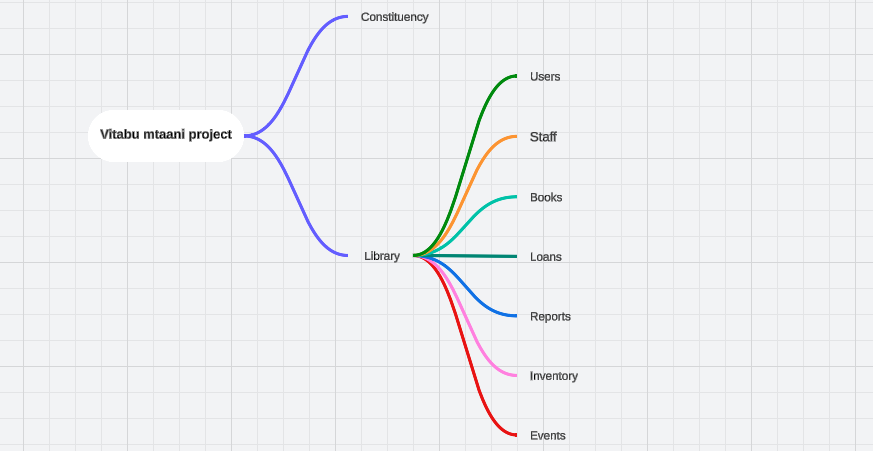


Fig 1. mind map

**Processes:**

**Identifying entities**

1. Visits

2. Visitors

3. Authors

4. Reports

5. Staffs

6. Libraries

7. Books

8. Genre

9. Location

10. Constituencies

13. Publisher

14. Vehicles

15. Loans

16. Events

17. Users

**Identifying the relationships.**

1. Visits

* A visitor can have one or many visits.
* A library can be visited many times.

2. Visitors

* One visitor can be associated with one user.
* One visitor can have many loans.
* One visitor can attend many events and one event can be attended by many visitors.

3. Authors

* One author can write many books, and one book can have many authors.

4. Reports

* One staff member can create many reports.
* One library can have many reports.

5. Staffs

* One library can have many staff members.

6. Libraries

* One library can have many books.
* One library can have many visits.
* One library can host many events.

7. Books

* One book can belong to one genre, but one genre can have many books.
* One book can have many authors, and one author can write many books.
* One book can have one publisher, but one publisher can publish many books.
* One book can be loaned out many times.

8. Genre

* One genre can have many books.

9. Location

* One location can have many libraries.

10. Constituencies

* One constituency can have many libraries.
* One constituency can have many locations.

11. Publisher

* One publisher can publish many books.

12. Vehicles

* One vehicle can be associated with many libraries, but one library can have one vehicle.

13. Loans

* One visitor can have multiple loans but each loan can involve one book.

14. Events

* One library can host many events.
* One event can have many visitors, and one visitor can attend many events.
* One event can have many vehicles, and one vehicle can be used for many events.

15. Users

* One user can be associated with one visitor.

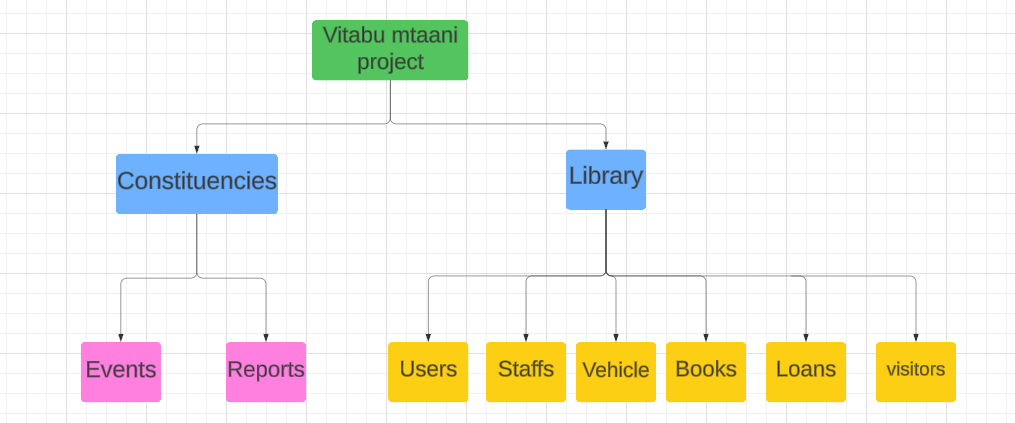
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Fig 2. Conceptual model

Identified the main concepts and sub-concepts.

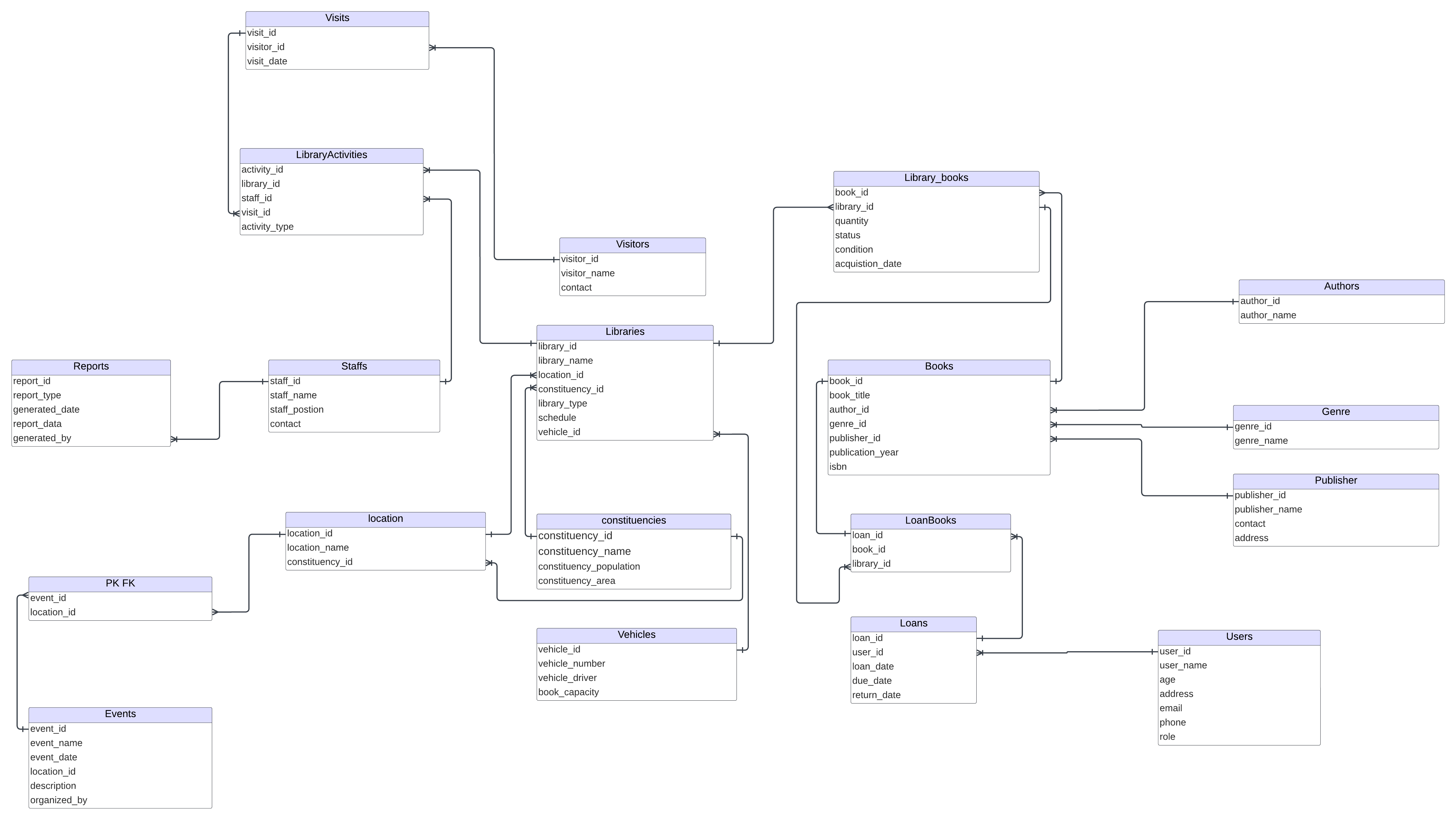
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Fig 3. Logical model

Identified entities’ attributes

1. Visits

* visit\_id (PK)
* visitor\_id (FK)
* visit\_date

2. LibraryActivities

* activity\_id (PK)
* library\_id (FK)
* staff\_id (FK)
* visit\_id (FK)
* activity\_type

3. Visitors

* visitor\_id (PK)
* visitor\_name
* contact

5. Authors

* author\_id (PK)
* author\_name

6. Reports

* report\_id (PK)
* report\_type
* generated\_date
* report\_data
* generated\_by (FK)

7. Staffs

* staff\_id (PK)
* staff\_name
* staff\_position
* contact

8. Libraries

* library\_id (PK)
* library\_name
* location\_id (FK)
* constituency\_id (FK)
* library\_type
* schedule
* vehicle\_id (FK)

9. Books

* book\_id (PK)
* book\_title
* author\_id (FK)
* genre\_id (FK)
* publisher\_id (FK)
* publication\_year
* isbn

10. Genre

* genre\_id (PK)
* genre\_name

11. Location

* location\_id (PK)
* location\_name
* constituency\_id (FK)

14. Constituencies

* constituency\_id (PK)
* constituency\_name
* constituency\_population
* constituency\_area

15. Publisher

* publisher\_id (PK)
* publisher\_name
* contact
* address

16. Vehicles

* vehicle\_id (PK)
* vehicle\_number
* vehicle\_driver
* book\_capacity

17. Loans

* loan\_id (PK)
* user\_id (FK)
* loan\_date
* due\_date
* return\_date

18. Events

* event\_id (PK)
* event\_name
* event\_date
* location\_id (FK)
* description
* organized\_by (FK)

19. Users

* user\_id (PK)
* user\_name
* age
* address
* email
* phone
* role

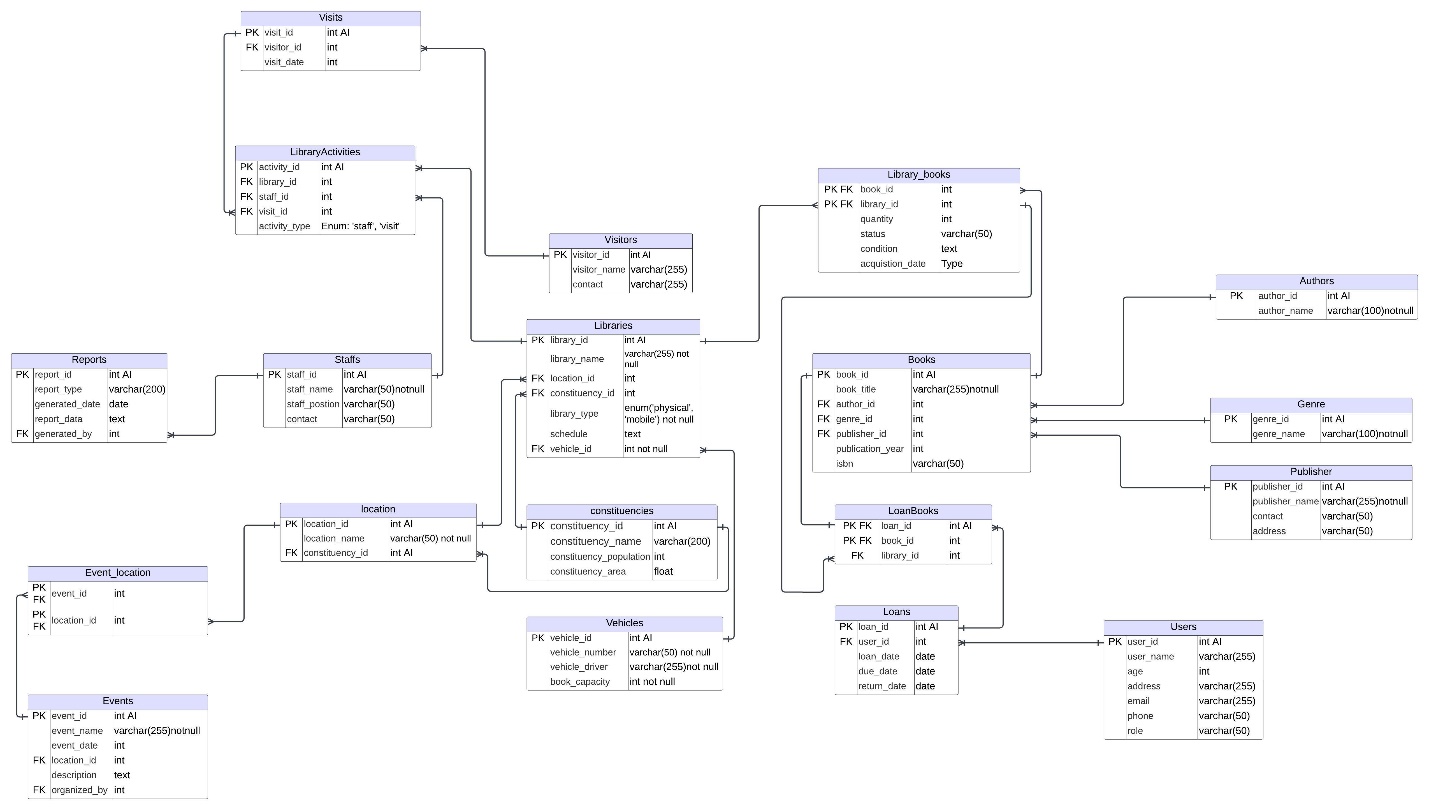


Fig 4. Physical model

* Defined attribute’s specific data types.
* Identified many to many relationships and implemented junction tables.

They include:

1. Library\_books
2. Library\_activities
3. Loan\_books
4. Event\_location

Their relationships with the other tables:

* A book can be available in multiple libraries, and a library can have multiple books.
* A visitor can participate in multiple activities at multiple libraries, and a library can host multiple visitors engaging in different activities.
* A loan can include multiple books, and a book can be included in multiple loans over time.
* An event can be held at multiple locations, and a location can host multiple events.
* Created database constraints, indices, triggers and other database specific objects.

Below are the SQL queries for creating the database schema:

--created constituencies table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** constituencies\_tbl (

constituency\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

constituency\_name **VARCHAR**(200) **NOT** **NULL**,

constituency\_population **INTEGER**,

constituency\_area **FLOAT**

);

--created libraries table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** libraries\_tbl (

library\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

library\_name **VARCHAR**(200) **NOT** **NULL** **UNIQUE**,

location\_id **INTEGER**,

constituency\_id **INTEGER**,

library\_type TEXT **CHECK**(library\_type **IN** (**'physical'**, **'mobile'**)) **NOT** **NULL**,

schedule TEXT,

vehicle\_id **INTEGER**,

**FOREIGN** **KEY**(location\_id) **REFERENCES** locations\_tbl(location\_id),

**FOREIGN** **KEY**(vehicle\_id) **REFERENCES** vehicles\_tbl(vehicle\_id),

**FOREIGN** **KEY**(constituency\_id) **REFERENCES** constituencies\_tbl(constituency\_id)

);

--created events table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** events\_tbl (

event\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

event\_name **VARCHAR**(100) **NOT** **NULL**,

event\_date **DATE** **NOT** **NULL**,

event\_time **TIME** **NOT** **NULL**,

location **VARCHAR**(100) **NOT** **NULL**,

description TEXT,

organized\_by **INTEGER**,

**FOREIGN** **KEY**(organized\_by) **REFERENCES** staff\_tbl(staff\_id)

**FOREIGN** **KEY**(location)**REFERENCES** locations\_tbl(location\_name)

);

--created event\_locations table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** event\_location\_tbl(

event\_id **INTEGER** ,

location\_id **INTEGER**,

**PRIMARY** **KEY**(event\_id,location\_id),

**FOREIGN** **KEY**(event\_id) **REFERENCES** events\_tbl(event\_id),

**FOREIGN** **KEY**(location\_id) **REFERENCES** locations\_tbl(location\_id)

);

--created users table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** users\_tbl (

user\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

user\_name **VARCHAR**(200) **NOT** **NULL**,

age **INTEGER**,

address **VARCHAR**(200),

email **VARCHAR**(255),

phone **VARCHAR**(50),

user\_role TEXT **CHECK**(user\_role **IN** (**'visitor'**, **'staff'**, **'volunteer'**, **'admin'**)) **NOT** **NULL**

);

--created loans table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** loans\_tbl (

loan\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

user\_id **INTEGER**,

loan\_date **DATE**,

due\_date **DATE**,

return\_date **DATE**,

**FOREIGN** **KEY**(user\_id) **REFERENCES** users\_tbl(user\_id)

);

--created loan\_books table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** loan\_books\_tbl(

loan\_id **INTEGER**,

book\_id **INTEGER**,

library\_id **INTEGER**,

**PRIMARY** **KEY**(loan\_id,book\_id),

**FOREIGN** **KEY**(library\_id) **REFERENCES** libraries\_tbl(library\_id)

);

--created books table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** books\_tbl (

book\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

book\_title **VARCHAR**(200) **NOT** **NULL**,

author\_id **INTEGER**,

genre\_id **INTEGER**,

publisher\_id **INTEGER**,

publication\_year **INTEGER**,

isbn **VARCHAR**(50),

**FOREIGN** **KEY**(author\_id) **REFERENCES** authors\_tbl(author\_id),

**FOREIGN** **KEY**(genre\_id) **REFERENCES** genres\_tbl(genre\_id),

**FOREIGN** **KEY**(publisher\_id) **REFERENCES** publishers\_tbl(publisher\_id)

);

--created library\_books table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** library\_books\_tbl (

book\_id **INTEGER**,

library\_id **INTEGER**,

quantity **INTEGER**,

status **VARCHAR**(50),

book\_condition TEXT,

acquistion\_date **DATE**,

**PRIMARY** **KEY** (book\_id,library\_id),

**FOREIGN** **KEY**(book\_id) **REFERENCES** books\_tbl(book\_id),

**FOREIGN** **KEY**(library\_id) **REFERENCES** libraries\_tbl(library\_id)

);

--created publishers table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** publishers\_tbl (

publisher\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

publisher\_name **VARCHAR**(255) **NOT** **NULL**,

contact **VARCHAR**(50),

address **VARCHAR**(50)

);

--created genres table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** genres\_tbl (

genre\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

genre\_name **VARCHAR**(255) **NOT** **NULL**

);

--created visitors table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** visitors\_tbl (

visitor\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

visitor\_name **VARCHAR**(255) **NOT** **NULL**,

contact **VARCHAR**(50)

);

--created staffs table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** staffs\_tbl (

staff\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

staff\_name **VARCHAR**(255) **NOT** **NULL**,

staff\_position **VARCHAR**(50),

contact **VARCHAR**(50)

);

--created reports table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** reports\_tbl (

report\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

report\_type **VARCHAR**(100) **NOT** **NULL**,

generated\_date **DATE** **NOT** **NULL**,

report\_data TEXT,

generated\_by **INTEGER**,

**FOREIGN** **KEY**(generated\_by) **REFERENCES** staff\_tbl(staff\_id)

);

--created libraryactivities table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** libraryactivities\_tbl(

activity\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

library\_id **INTEGER**,

staff\_id **INTEGER**,

visit\_id **INTEGER**,

activity\_type TEXT **CHECK**(activity\_type **IN** (**'staff'**,**'visit'**)) **NOT** **NULL**,

**FOREIGN** **KEY**(library\_id)**REFERENCES** libraries\_tbl(library\_id),

**FOREIGN** **KEY**(staff\_id)**REFERENCES** staff\_tbl(staff\_id),

**FOREIGN** **KEY**(visit\_id)**REFERENCES** visits\_tbl(visit\_id)

);

--created vehicles table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** vehicles\_tbl (

vehicle\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

vehicle\_number **VARCHAR**(255) **NOT** **NULL**,

vehicle\_driver **VARCHAR**(255) **NOT** **NULL**,

book\_capacity **INTEGER** **NOT** **NULL**

);

--created locations table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** locations\_tbl (

location\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

location\_name **VARCHAR**(255) ,

constituency\_id **INTEGER**,

**FOREIGN** **KEY**(constituency\_id) **REFERENCES** constituencies\_tbl(constituency\_id)

);

--created visits table and added its attributes.

**CREATE** **TABLE** **IF** **NOT** **EXISTS** visits\_tbl (

visit\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

visitor\_id **INTEGER**,

visit\_date **DATE**,

**FOREIGN** **KEY**(visitor\_id) **REFERENCES** visitors\_tbl(visitor\_id)

);

--created authors table and added its attributes.

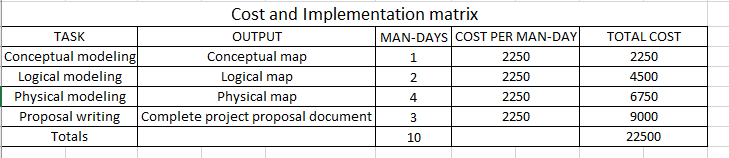
**CREATE** **TABLE** **IF** **NOT** **EXISTS** authors\_tbl(

author\_id **INTEGER** **PRIMARY** **KEY** AUTOINCREMENT,

author\_name **VARCHAR**(255)

);

**COST AND IMPLEMENTATION MATRIX**

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