Group 8

Enhanced Audio Log Experience

Akira Takada, Jason Chen, Luke Rogers, Julia Bechtel

takadaa1@tcnj.edu, chenj35@tcnj.edu, rogerl10@tcnj.edu, bechtej2@tcnj.edu

Inception: Summary

- **Need: the important stakeholders and market need your group identified**

As a whole, the Trenton Free Public Library site is solidly built and generally has a clean user friendly environment. However, just because something is good does not mean it's great. One aspect of the Trenton Free Public Library that we identified as particularly troubling was in the Trentoniana room which houses the Trentoniana collection. Particularly, we focused on the needs of the audio and visuals section. We identified several problems with the first being within the audio clips themselves. As a whole, society is constantly shifting and evolving. This ever changing landscape often leaves the old behind while embracing the new. Throughout the audio clips they often refer to old things that have been largely forgotten in the advance of technology. Such things, such as, for example, Woolworths (which was a store founded by Frank Winfield Woolworth on February 22, 1879, and closed after a long run of dominance in 1997). We believed that this gap in the ability to link information for the better understanding of the user to the audio clips was a key step in improving the overall site. We also addressed the user interface of the site.

- **Approach: your unique and defensible approach**

To address the above problems, we, over the course of one semester, developed a unique to implement a thumbnail for each separate interview to make it more appealing and also give it context that most users now cannot have. Perhaps most importantly, we developed a way to deliver wiki links to references during certain points in the interview when foreign material is mentioned such as the above example of Woolworths. In addition to the wiki links, we had images show up in real time to help aid the comprehension of the interview to listeners. Finally, to address the user interface and upgrade it, we separated the documents into related databases to make it easier to search through.

In terms of competition, there are other systems that are somewhat similar to how we approached the needs of the Trentoniana room. These include the American Archive of Public Broadcasting, which also has a visually pleasing look about it along with the the information is sorted nicely with thumbnails and descriptions, the Louisiana Digital Media Archive, which also has a much more completed design and includes useful information of their archives to the user, and finally, the North Carolina Folklife Center, which is very well designed and features online exhibits that users can visit. Additionally, with regard to the North Carolina Folklife center, they also stay up to date with a lot of information and include contact links so that the user can reach out if needed. Despite the competition, we believe our approach offers a unique and performance driven path to success.

- **Benefits: the value of your product when compared to the status quo or alternative**

There are many benefits to our approach on improving the Trentoniana room. These include: the website will have an improved and organized database of their archived documents,

an improved user interface and user experience will lead to more traffic on the website and possibly more returning users,a safely and securely designed database structure, improved visuals of the website from an otherwise bland look, and unique database queries to help retrieve the needed data and information. Overall, our addition of links and thumbnails will improve on the overall user interface and appearance of the site, making it more friendly and interesting then the bland look it has now while also improving on the ways to sort through the collection, and adding a more indepth experience to the audio clips. .

- **Cost: the stakeholder cost to implement, e.g. would your approach replace an existing website, be an extension to an existing website, or be a separate new website?**

In terms of cost, our implementation is extremely low. Our solution is mainly a branching off point that extends the range of the already existing Audio and Visual section in the Trentoniana room. As such, we view our implementation as an enhancement and not as a replacement to the existing site and besides the cost of labor, the monetary cost will be low.

Elaboration: Project Proposal and Specifications: Original

• **Problem statement**: Audio clips from the Trentoniana room (Trenton Free Public Library) often refer to photos, but listeners can't see them or get a visual representation of them. The library has an online resource to view photos from the time span many of the interviews discuss; however, this section is entirely separate from the interviews, making it a pain for listeners to find photos relevant to each interview. The lack of photos, especially ones referenced in each interview, is a big issue as it threatens a listener's ability to engage with and imagine Trenton in older eras. Visuals help keep the viewer's attention, and should be integrated into the interviews.

Another problem of the current website is in the fact that the interviewers and interviewees often refer to old companies (i.e. Woolworths) which do not exist anymore, have changed substantially, or are otherwise not relevant. This presents a problem, especially to younger listeners, who may find references to such companies confusing. As a documentation of Trenton through the years, it should be important for the project to try and engage young people.

• **Objective of the module:** The objective would be to add a thumbnail to each interview to make the interview more appealing instead of the dull view it is now. We could also have images pop up when the speaker mentions certain things. Also, we could hyperlink to a brief explanation when the speaker refers to older topics (i.e. Woolworths).

• **Description of the desired end product, and the part you will develop for this class:** The desired end product is an enhanced version of the already existent audio library with the addition of possible real-time delivery of references (imgs, hyperlinks, short descriptions) relating to timestamps in a specific audio file. We will be primarily focusing on the additions of such files and data into the database of the website application and how we would query them and present them to end-users.

• **Description of the importance and need for the module, and how it addresses the problem:** The implementation proposed should enhance the user experience for the Trentoniana website application. By implementing real-time or files (img, hyperlinks, short descriptions) we can have a more enjoyable experience for users.

• **Plan for how you will research the problem domain and obtain the data needed:** to research the problem domain we will need to look further into the Trentoniana website and the audio and transcript files to get a better understanding of how we can improve the interface for the user. To do this, we will need to obtain data such as audio quality, visual quality(if applicable), accessibility of the website, and overall usability of the functions of the website. Additionally, looking at other systems which seek to display similar information will be important in describing the optimal system for the Trentoniana collection. NPR, The American Archive of

Public Broadcasting, and the Louisiana Digital Media Archive are all examples of systems that are set to display audio information, and each one has features that could be useful and will be further described below.

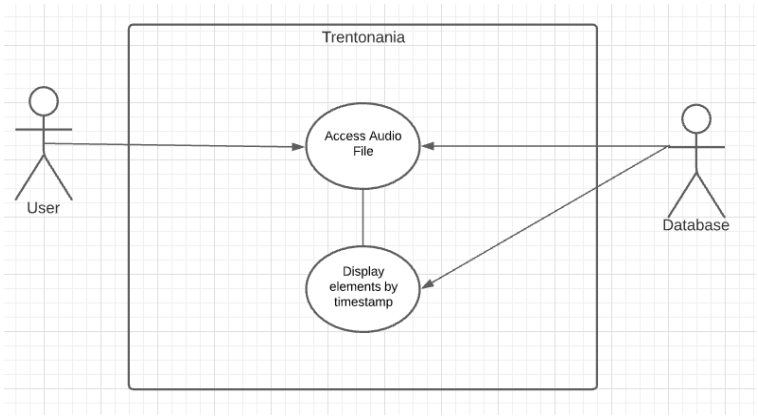
• Other similar systems / approaches that exist, and how your module is different or will add to the existing system:
We looked at several similar websites in the process of describing an optimal system for the Trentoniana collection. The American Archive of Public Broadcasting displays several features that make user interaction more meaningful. For example, audio clips are often accompanied by pictures (when available), along with having easy-to-read and relevant titles. Additionally, all files' thumbnails have underneath a quick description, which could be useful in our project.
We also looked at the Louisiana Digital Media Archive, which has a similar format to the above system, notably in each file having a useful description for its viewers. This system, however, has "playlists" of relevant and similar files on its homepage. For example, they have one called "Black History Month." When clicking on the link, it shows users a series of audio and video clips relevant to Black history. There are others for things like the environment, women's history, hurricanes, French history, etc.

• Possible other applications of the system (how it could be modified and reused.):
Mainly working with the individual audio files themselves, we are planning to use it as a base and enhance it. A possible additional application could be to have administrator accounts that are able to add, delete, or modify such files on the individual audio files without having to directly access the database.

• Performance – specify how and to what extent you will address this. • Security – specify how and to what extent you will provide security features. • Backup and recovery – specify how and to what extent you will implement this:
Performance: We will need to carefully consider how we would move forward with designing the database with the extra implementations. As these files on the database would be accessed multiple times per day, we cannot have it take too much time querying when the user loads an audio file.
Security: Precautions made so that none of the database could be modified or accessed by normal users. Security faults such as database injections could be focused on as well. Administrator accounts will be made to handle such actions.
Backup and recovery: Implementing timed automatic backups will allow us to maintain backups of the database in the case of a corruption.

• Technologies and database concepts the team will need to learn, and a plan for learning these: To implement these solutions we will be using PostgreSQL (a free and open-source relational database management system). In addition, we will be working closely with the Trenton Free Public Library website (specifically the Trentoniana room page).

• A diagrammatic representation of the system boundary that specifies what data you will model and which queries you will implement:



Audio

ID	Audiofile	Date	Speakers
0	0.mp3	1/1/1999	John J
1	1.mp3	2/2/1987	Bob B
2	2.mp3	3/3/2010	Alpha A

Subfile

ID	Timestamp	FileFormat	File
0	0:21	img	1.png
0	0.41	txt	2.txt
1	1:11	img	2.png

• 1-page quad chart; see: Quad_instructions_template.ppt in the Canvas files section

Akira Takada, Jason Chen, Luke Rogers, Julia Bechtel

Need: ● Improvement to the user interface of the website ● Need visuals to help make it more visually appealing ● Improved accessibility for the archived documents to help make finding specific documents easier ● A better navigation system ● A database that contains descriptions of old/not as relevant information that is mentioned	**Approach:** ● Implement a thumbnail for each separate interview to make it more appealing and also give context to its content ● Delivering links to references during certain points of the interview when foreign material is mentioned ● Having images show up in real time to help aid the comprehension of the interview to listeners ● Separating the documents into related databases
Benefit: ● The website will have an improved and organized database of their archived documents ● An improved user interface and user experience will lead to more traffic on the website and possibly more returning users	**Competition:** ● More security guaranteed with our database as we will make it a big priority ● Unique database queries to help retrieve the needed data and information ● Big focus on user experience as it will

● A safely and securely designed database structure ● Improved visuals of the website from an otherwise bland look	help increase the traffic on the website and the functionality
2/10/2021	

Elaboration: Project Proposal and Specifications: Revised

Note: revisions are shown in red

• **Problem statement**: Audio clips from the Trentoniana room (Trenton Free Public Library) often refer to photos, but listeners can't see them or get a visual representation of them. The library has an online resource to view photos from the time span many of the interviews discuss; however, this section is entirely separate from the interviews, making it a pain for listeners to find photos relevant to each interview. The lack of photos, especially ones referenced in each interview, is a big issue as it threatens a listener's ability to engage with and imagine Trenton in older eras. Visuals help keep the viewer's attention, and should be integrated into the interviews.

Another problem of the current website is in the fact that the interviewers and interviewees often refer to old companies (i.e. Woolworths) which do not exist anymore, have changed substantially, or are otherwise not relevant. This presents a problem, especially to younger listeners, who may find references to such companies confusing. As a documentation of Trenton through the years, it should be important for the project to try and engage young people.

• **Objective of the module:** The objective would be to design a large database system as well as improving the user experience and interface. To do this we can add a thumbnail to each interview to make the interview more appealing instead of the dull view it is now. We could also have images pop up when the speaker mentions certain things. Also, we could hyperlink to a brief explanation when the speaker refers to older topics (i.e. Woolworths).

• **Description of the desired end product, and the part you will develop for this class:** The desired end product is an enhanced version of the already existent audio library with the addition of possible real-time delivery of references (imgs, hyperlinks, short descriptions) relating to timestamps in a specific audio file. We will be primarily focusing on the additions of such files and data into the database of the website application and how we would query them and present them to end-users.

• **Description of the importance and need for the module, and how it addresses the problem:** The implementation proposed should enhance the user experience for the Trentoniana website application. By implementing real-time or files (img, hyperlinks, short descriptions) we can have a more enjoyable experience for users.

• **Plan for how you will research the problem domain and obtain the data needed:** to research the problem domain we will need to look further into the Trentoniana website and the audio and transcript files to get a better understanding of how we can improve the interface for

the user. To do this, we will need to obtain data such as audio quality, visual quality(if applicable), accessibility of the website, and overall usability of the functions of the website. Additionally, looking at other systems which seek to display similar information will be important in describing the optimal system for the Trentoniana collection. NPR, The American Archive of Public Broadcasting, and the Louisiana Digital Media Archive are all examples of systems that are set to display audio information, and each one has features that could be useful and will be further described below.

• Other similar systems / approaches that exist, and how your module is different or will add to the existing system:
We looked at several similar websites in the process of describing an optimal system for the Trentoniana collection. The American Archive of Public Broadcasting displays several features that make user interaction more meaningful. For example, audio clips are often accompanied by pictures (when available), along with having easy-to-read and relevant titles. Additionally, all files' thumbnails have underneath a quick description, which could be useful in our project.
We also looked at the Louisiana Digital Media Archive, which has a similar format to the above system, notably in each file having a useful description for its viewers. This system, however, has "playlists" of relevant and similar files on its homepage. For example, they have one called "Black History Month." When clicking on the link, it shows users a series of audio and video clips relevant to Black history. There are others for things like the environment, women's history, hurricanes, French history, etc.

• Possible other applications of the system (how it could be modified and reused.):
Mainly working with the individual audio files themselves, we are planning to use it as a base and enhance it. A possible additional application could be to have administrator accounts that are able to add, delete, or modify such files on the individual audio files without having to directly access the database.

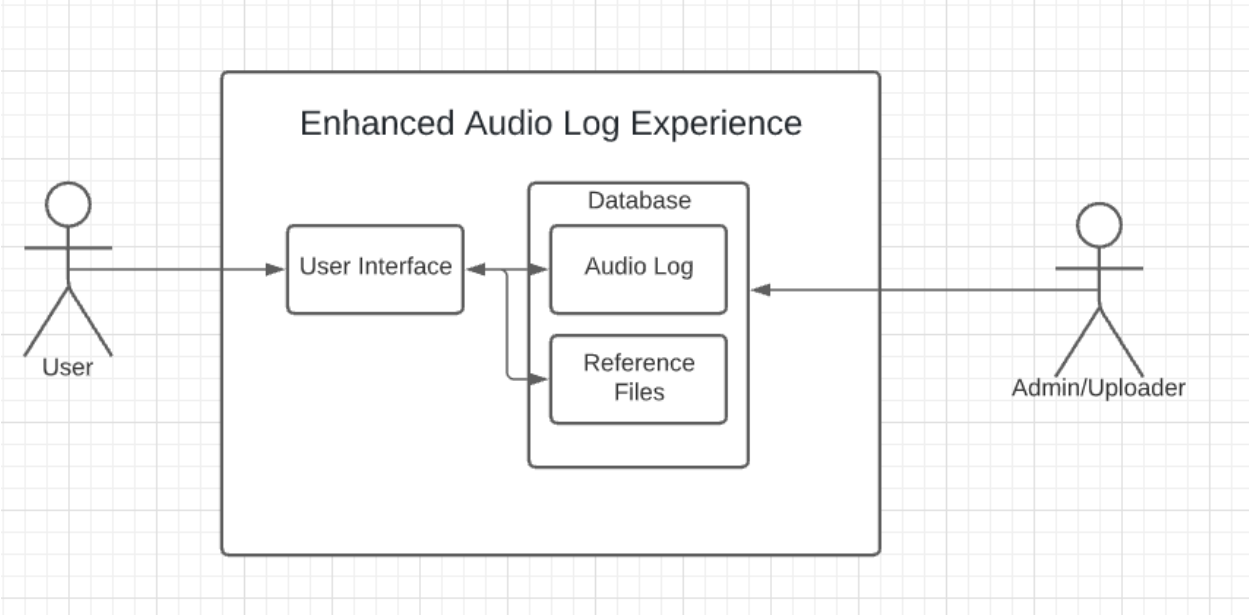
• Performance – specify how and to what extent you will address this. • Security – specify how and to what extent you will provide security features. • Backup and recovery – specify how and to what extent you will implement this:
Performance: We will need to carefully consider how we would move forward with designing the database with the extra implementations. As these files on the database would be accessed multiple times per day, we cannot have it take too much time querying when the user loads an audio file.
Security: Precautions made so that none of the database could be modified or accessed by normal users. Security faults such as database injections could be focused on as well. Administrator accounts will be made to handle such actions.
Backup and recovery: Implementing timed automatic backups will allow us to maintain backups of the database in the case of a corruption.

• Technologies and database concepts the team will need to learn, and a plan for learning these: To implement these solutions we will be using PostgreSQL (a free and open-source

relational database management system). In addition, we will be working closely with the Trenton Free Public Library website (specifically the Trentoniana room page).

• A diagrammatic representation of the system boundary that specifies what data you will model and which queries you will implement:

Diagrammatic representation modified to represent system boundary



• 1-page quad chart; see: Quad_instructions_template.ppt in the Canvas files section

Akira Takada, Jason Chen, Luke Rogers, Julia Bechtel

Need: • Improvement to the user interface of the website • Need visuals to help make it more visually appealing • Improved accessibility for the archived documents to help make finding specific documents easier • A better navigation system • A database that contains descriptions of old/not as relevant information that is mentioned	**Approach:** • Implement a thumbnail for each separate interview to make it more appealing and also give context to its content • Delivering links to references during certain points of the interview when foreign material is mentioned • Having images show up in real time to help aid the comprehension of the interview to listeners • Separating the documents into related databases
Benefit:	**Competition:**

• The website will have an improved and organized database of their archived documents • An improved user interface and user experience will lead to more traffic on the website and possibly more returning users • A safely and securely designed database structure • Improved visuals of the website from an otherwise bland look • Unique database queries to help retrieve the needed data and information	• Other systems such as the American Archive of Public Broadcasting has much more pleasing look to it and the information is sorted nicely with thumbnails and descriptions • Louisiana Digital Media Archive also has a much more completed design and includes useful information of their archives to the user • The North Carolina Folk Life Center is very well designed and features online exhibits that users can visit. They also stay up to date with a lot of information and include contact links so that the user can reach out if needed
2/10/2021	

Elaboration: Design (Database Model): Original

ER Diagram

Entities:

Interview

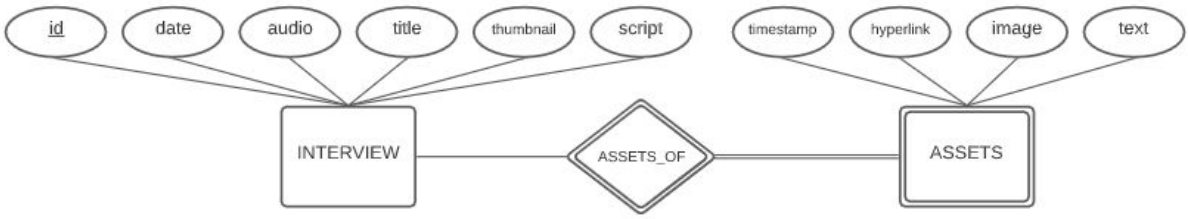
- Id (Primary Key)
- Title
- Thumbnail
- Audio
- Script
-

Assets

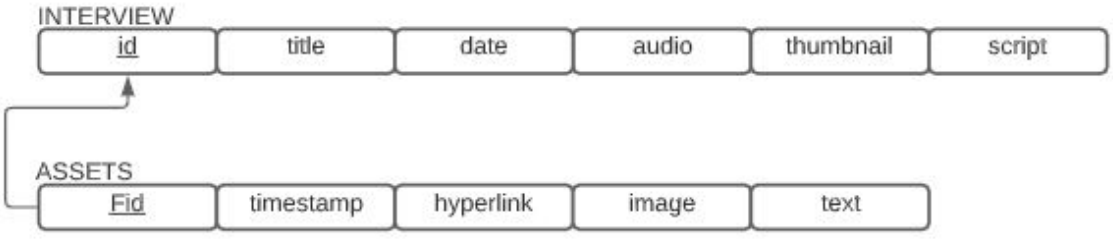
- Hyperlinks
- Timestamps
- Images

Relationships:

- ASSETS_OF



Relational Schema



Initial Database Size? (Approx # of records)

INTERVIEW: ~100 rows (100 Interviews)

ASSETS: 100 * 10 = 1000 rows (Average 10 assets per interview)

Types and Average Number of Searches

Types: Content related searches, date related searches, searches for the interviewee or interviewer, multiple searches per interview (assets for specific timestamps)
Searches: On average, more than 10x the searches compared to the original when taking account of the addition of assets and more information per interview.

Elaboration: Design (Database Model): Revised

ER Diagram

Entities:

Interview

- Id (Primary Key)
- Title
- Thumbnail
- Audio
- Script

Assets

- Hyperlinks
- Timestamps
- Images

Implemented more entities:

User

- Id (Primary Key)
- Username
- Password

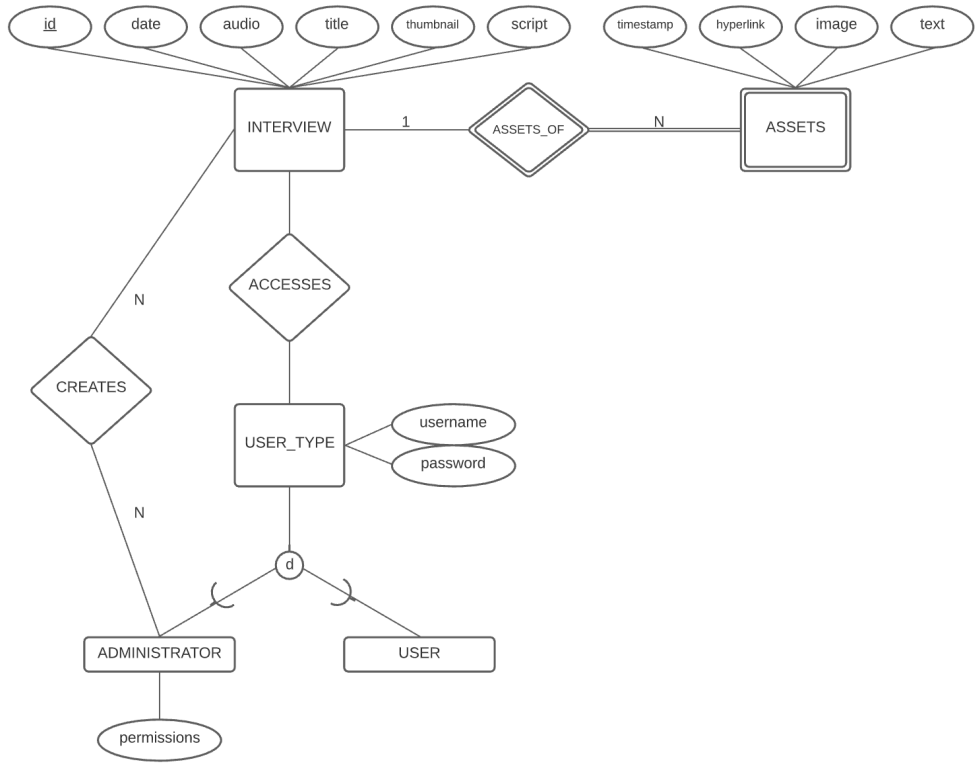
Administrator

- userId (foreign key)
- permissions

Relationships:

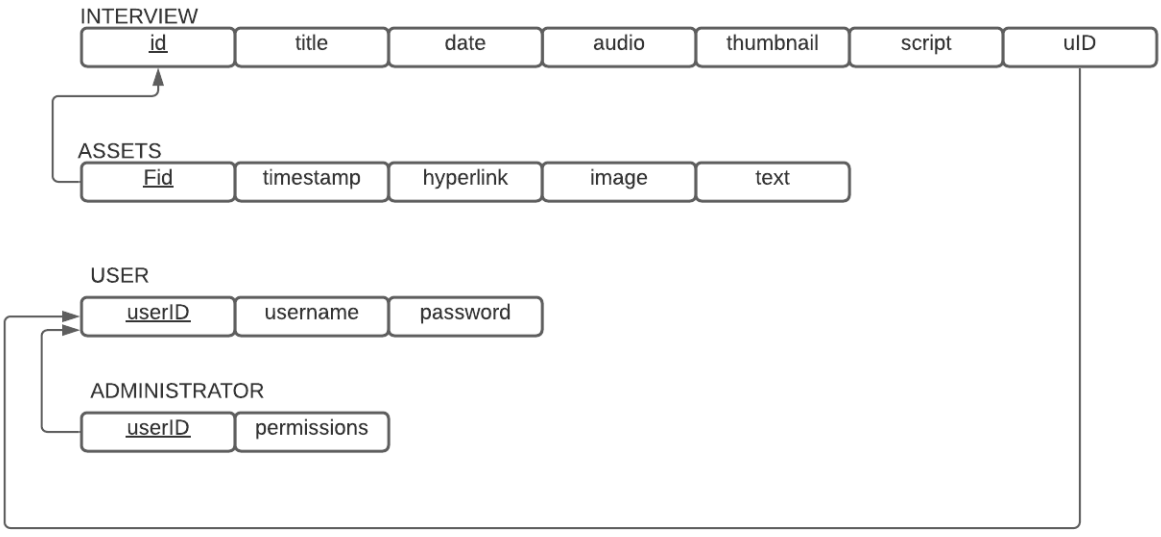
- ASSETS_OF
- ACCESSES
- CREATES

Revised ER diagram to include newly implemented entities



Relational Schema

Revised relational schema to include newly implemented entities



Initial Database Size? (Approx # of records)

INTERVIEW: ~100 rows (100 Interviews)

ASSETS: 100 * 10 = 1000 rows (Average 10 assets per interview)

Types and Average Number of Searches
Types: Content related searches, date related searches, searches for the interviewee or interviewer, multiple searches per interview (assets for specific timestamps)
Searches: On average, more than 10x the searches compared to the original when taking account of the addition of assets and more information per interview.

Elaboration: Design (Design): Original

Demonstrate that all the relations in the relational schema are normalized to Boyce–Codd normal form (BCNF).

- INTERVIEW Table:
    - This table is in BCNF because we have the primary key id which all of the other attributes depend on, meaning we would not know what the title or audio for example of an interview is without the id. The conditions below are also all satisfied:
    - 1NF: All attributes (title, date, audio, thumbnail, script, uID) depend on the id primary key
    - 2NF: Being the only single primary key, it does not have multiple attributes.
    - 3NF: All the nonkey attributes do not depend on each other aside from the primary key, id (i.e date does not depend on the audio nor the thumbnail, etc.)
- ASSETS Table:
    - ASSETS table is in BCNF because all the conditions below are satisfied:
    - 1NF: The attributes timestamp, hyperlink, image, and text all depend of the primary key fid
    - 2NF: The candidate key {Fid, timestamp} is depended on by all nonkey attributes. The nonkey attributes need the timestamp key as well to determine which time under the specific interview id it is relevant to. Having Fid as the sole key will not help determine which tuple the nonkey attributes are related to.
    - 3NF: All of the nonkey attributes only depend on the keys in the table and not on each other, the other nonkey attributes
    - BCNF: {Fid, timestamp} are prime attributes and is a functional dependency of all the nonkey attributes and {Fid, timestamp} is also a superkey therefore it is in BCNF
- USER
    - 1NF: Both attributes username and password depend on the key userID
    - 2NF: All the nonkey attributes depend on the whole key as there is no partial key dependencies
    - 3NF: Username and password attributes do not depend on each other and only depend on the key userID
    - BCNF: being that username and password only depend on the one key userID, this design also fulfills BCNF
- ADMINISTRATOR
    - 1NF: The nonkey attribute permissions depend on the userID
    - 2NF: There are no multi-attribute keys in this relation
    - 3NF: There is only a single nonkey attribute that depends on the key, userID
    - BCNF: permissions are the only nonkey attribute which solely relies on the primary key userID
- CREATES

- 1NF: Since the attributes of CREATES all depend on the key then it is in 1NF
- 2NF: There are no partial key dependencies with the attributes in this table
- 3NF: Similar to both the USER and ADMINISTRATOR tables, all the nonkey attributes cannot depend on each other but rather only on the key
- BCNF: permissions are the only nonkey attribute which solely relies on the primary key userID

Define the different views (virtual tables) required. For each view list the data and transaction requirements. Give a few examples of queries, in English, to illustrate.

- A view called *interview_view* that fetches the assets from the ASSETS table which includes fid, timestamp, hyperlink, image, and text for a given interview. This creates a view of all the assets that are related to the selected interview. An example query is to create the *interview_view* query that selects the attributes timestamp, hyperlink, image, and text from the ASSETS table for the interview with ID as 0. This will list all of that specific interview's corresponding assets
- A view called *admin_info_view* that fetches the username and userID. This creates the view of all the usernames and IDs of all administrators. An example query is to create the *admin_info_view* view that uses the attributes userID and username from the USER table and right join it with ADMINISTRATOR. This results in the view of username and ID of all valid administrators

Design a complete set of SQL queries to satisfy the transaction requirements identified in the previous stages, using the relational schema and views defined in tasks 2 and 3 above.

```
CREATE VIEW   interview_view   AS
SELECT        Fid, timestamp, hyperlink, image, text
FROM          ASSETS
WHERE         Fid=0;

CREATE VIEW   admin_info_view AS
SELECT        userID, username
FROM          USER
RIGHT JOIN    ADMINISTRATOR
ON USER.userID = ADMINISTRATOR.userID
```

Elaboration: Design (Design): Revised

Demonstrate that all the relations in the relational schema are normalized to Boyce–Codd normal form (BCNF).

- INTERVIEW Table:
    - This table is in BCNF because we have the primary key id which all of the other attributes depend on, meaning we would not know what the title or audio for example of an interview is without the id. The conditions below are also all satisfied:
    - 1NF: All attributes (title, date, audio, thumbnail, script, uID) depend on the id primary key
    - 2NF: Being the only single primary key, it does not have multiple attributes.
    - 3NF: All the nonkey attributes do not depend on each other aside from the primary key, id (i.e date does not depend on the audio nor the thumbnail, etc.)
- ASSETS Table:
    - ASSETS table is in BCNF because all the conditions below are satisfied:
    - 1NF: The attributes timestamp, hyperlink, image, and text all depend of the primary key fid
    - 2NF: The candidate key {Fid, timestamp} is depended on by all nonkey attributes. The nonkey attributes need the timestamp key as well to determine which time under the specific interview id it is relevant to. Having Fid as the sole key will not help determine which tuple the nonkey attributes are related to.
    - 3NF: All of the nonkey attributes only depend on the keys in the table and not on each other, the other nonkey attributes
    - BCNF: {Fid, timestamp} are prime attributes and is a functional dependency of all the nonkey attributes and {Fid, timestamp} is also a superkey therefore it is in BCNF
- USER
    - 1NF: Both attributes username and password depend on the key userID
    - 2NF: All the nonkey attributes depend on the whole key as there is no partial key dependencies
    - 3NF: Username and password attributes do not depend on each other and only depend on the key userID
    - BCNF: being that username and password only depend on the one key userID, this design also fulfills BCNF
- ADMINISTRATOR
    - 1NF: The nonkey attribute permissions depend on the userID
    - 2NF: There are no multi-attribute keys in this relation
    - 3NF: There is only a single nonkey attribute that depends on the key, userID
    - BCNF: permissions are the only nonkey attribute which solely relies on the primary key userID
- CREATES

- 1NF: Since the attributes of CREATES all depend on the key then it is in 1NF
- 2NF: There are no partial key dependencies with the attributes in this table
- 3NF: Similar to both the USER and ADMINISTRATOR tables, all the nonkey attributes cannot depend on each other but rather only on the key
- BCNF: permissions are the only nonkey attribute which solely relies on the primary key userID

Define the different views (virtual tables) required. For each view list the data and transaction requirements. Give a few examples of queries, in English, to illustrate.

- A view called *interview_view* that fetches the assets from the ASSETS table which includes fid, timestamp, hyperlink, image, and text for a given interview. This creates a view of all the assets that are related to the selected interview. An example query is to create the *interview_view* query that selects the attributes timestamp, hyperlink, image, and text from the ASSETS table for the interview with ID as 0. This will list all of that specific interview's corresponding assets
- A view called *admin_info_view* that fetches the username and userID. This creates the view of all the usernames and IDs of all administrators. An example query is to create the *admin_info_view* view that uses the attributes userID and username from the USER table and right join it with ADMINISTRATOR. This results in the view of username and ID of all valid administrators

```
CREATE VIEW   interview_view   AS
SELECT            Fid, timestamp, hyperlink, image, text
FROM              ASSETS
WHERE             Fid=0;

CREATE VIEW   admin_info_view AS
SELECT        userID, username
FROM          USER
RIGHT JOIN    ADMINISTRATOR
ON USER.userID = ADMINISTRATOR.userID
```

Design a complete set of SQL queries to satisfy the transaction requirements identified in the previous stages, using the relational schema and views defined in tasks 2 and 3 above. Modified original response to now include a full set of queries

```
CREATE TABLE users (
userID serial PRIMARY KEY,
username VARCHAR(250),
password VARCHAR(250)
);

CREATE TABLE administrator (
userID INT NOT NULL,
permissions BOOLEAN DEFAULT TRUE,
FOREIGN KEY(userID)
    REFERENCES users (userID)
);
```

```
CREATE TABLE interview (
id serial PRIMARY KEY,
title VARCHAR(250) NOT NULL,
date DATE NOT NULL,
audio TEXT NOT NULL,
thumbnail TEXT NOT NULL,
script TEXT,
uID INT NOT NULL,
FOREIGN KEY (uID)
    REFERENCES users (userID)
);

CREATE TABLE assets (
FiD INT NOT NULL,
timestamp VARCHAR(8),
hyperlink TEXT,
image TEXT,
text TEXT,
FOREIGN KEY (FiD)
    REFERENCES interview (id)
);


INSERT INTO users (username,password) VALUES ('george123','monke123');
INSERT INTO users (username,password) VALUES ('dwarfhamsters','112233');
INSERT INTO users (username,password) VALUES ('johnnyboy','imcool');
INSERT INTO users (username,password) VALUES ('muffinman','dogsncats');

INSERT INTO administrator (userID) VALUES (1);
INSERT INTO administrator (userID) VALUES (2);
INSERT INTO administrator (userID) VALUES (3);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES ('Finkle, Herman
Humpsy','2003-10-06','https://archive.org/download/JHS10SideA/JHS%2010-%20side%20A.ogg','https://static.timeso
fisrael.com/njjewishnews/uploads/2018/03/TrentonFinkleStoreP-640x400.jpg',1);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES ('Millner,
Joel','1995-05-31','https://ia601203.us.archive.org/7/items/JHS13SideA/JHS%2013-%20side%20A.ogg','https://i.vime
ocdn.com/portfolio_header/24701_402',1);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES ('Dr. Paul Loser',
'1976-08-12','https://ia802908.us.archive.org/0/items/OralHistroyWithDr.PaulLoserSideA/Oral%20Histroy%20with%20
Dr.%20Paul%20Loser%20-%20side%20A.ogg','https://bloximages.chicago2.vip.townnews.com/trentonian.com/conte
nt/tncms/assets/v3/editorial/f/5c/f5ce912f-0051-580c-bcca-4abf595605c2/5bbb97a886fa0.image.jpg',2);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES ('Garfing, Arthur
(JHS16)','1995-02-07','https://ia801207.us.archive.org/18/items/JHS16SideA/JHS%2016-%20side%20A.ogg','https://
unitedmeatco.com/wp-content/uploads/2020/12/united.png',3);

INSERT INTO assets (FiD, timestamp, hyperlink, image, text)
SELECT
Id,
'00:02:31',
'https://en.wikipedia.org/wiki/Nazi_Party',
```

'https://upload.wikimedia.org/wikipedia/commons/thumb/9/92/Parteiadler_Nationalsozialistische_Deutsche_Arbeiterpartei_%281933%E2%80%931945%29.svg/1280px-Parteiadler_Nationalsozialistische_Deutsche_Arbeiterpartei_%281933%E2%80%931945%29.svg.png',
'Garfing's father left Vilna and was killed by the Germans in 1940'
FROM interview
WHERE title like 'Garfing%';

INSERT INTO assets (FiD, timestamp, hyperlink, image, text)
SELECT
Id,
'00:02:14',
'https://en.wikipedia.org/wiki/Vilnius',
'https://upload.wikimedia.org/wikipedia/commons/thumb/1/11/Flag_of_Lithuania.svg/188px-Flag_of_Lithuania.svg.png',
'He left his family in Europe - discusses his Mother's death in 1937 in Vilna, capital of Lithuania'
FROM interview
WHERE title like 'Garfing%';

INSERT INTO assets (FiD, timestamp, hyperlink, image, text)
SELECT
Id,
'00:02:34',
'https://en.wikipedia.org/wiki/The_Holocaust',
'https://upload.wikimedia.org/wikipedia/commons/thumb/3/3b/Selection_on_the_ramp_at_Auschwitz-Birkenau%2C_1944_%28Auschwitz_Album%29_1a.jpg/435px-Selection_on_the_ramp_at_Auschwitz-Birkenau%2C_1944_%28Auschwitz_Album%29_1a.jpg',
'6,500 Jews were killed in 7 days and Arthur did not know for 2-3 years that his father had been killed.'
FROM interview
WHERE title like 'Garfing%';

Construction: Tables, Queries, and User Interface: Original

1. Write and execute SQL data definition language(DDL) commands to create the tables and views in PostgreSQL. Ensure that all constraints are specified.

```
CREATE TABLE users (
userID serial PRIMARY KEY,
username VARCHAR(250) ,
password VARCHAR(250)
);

CREATE TABLE administrator (
userID INT NOT NULL,
permissions BOOLEAN DEFAULT TRUE,
FOREIGN KEY(userID)
    REFERENCES users (userID)
);

CREATE TABLE interview (
id serial PRIMARY KEY,
title VARCHAR(250) NOT NULL,
date DATE NOT NULL,
audio TEXT NOT NULL,
thumbnail TEXT NOT NULL,
script TEXT,
uID INT NOT NULL,
FOREIGN KEY (uID)
    REFERENCES users (userID)
);

CREATE TABLE assets (
FiD INT NOT NULL,
timestamp VARCHAR(8),
hyperlink TEXT,
image TEXT,
text TEXT,
FOREIGN KEY (FiD)
    REFERENCES interview (id)
);
```

2. Write scripts / programs that may be required to obtain and format the data.
3. Populate the tables with valid data, with all constraints being enforced.

```
INSERT INTO users (username,password) VALUES (‘george123’,‘monke123’);
INSERT INTO users (username,password) VALUES (‘dwarfhamsters’,‘112233’);
INSERT INTO users (username,password) VALUES (‘johnnyboy’,‘imcool’);
INSERT INTO users (username,password) VALUES (‘muffinman’,‘dogsncats’);

INSERT INTO administrator (userID) VALUES (1);
INSERT INTO administrator (userID) VALUES (2);
INSERT INTO administrator (userID) VALUES (3);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES (‘Finkle, Herman
Humpsy’,’2003-10-06’,’https://archive.org/download/JHS10SideA/JHS%2010-%20side%
20A.ogg’,’https://static.timesofisrael.com/njjewishnews/uploads/2018/03/TrentonFinkleSt
oreP-640x400.jpg’,1);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES (‘Millner,
Joel’,’1995-05-31’,’https://ia601203.us.archive.org/7/items/JHS13SideA/JHS%2013-%20
side%20A.ogg’,’https://i.vimeocdn.com/portfolio_header/24701_402’,1);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES (‘Dr. Paul Loser’,
‘1976-08-12’,’https://ia802908.us.archive.org/0/items/OralHistroyWithDr.PaulLoserSideA/
Oral%20Histroy%20with%20Dr.%20Paul%20Loser%20-%20side%20A.ogg’,’https://bloxi
mages.chicago2.vip.townnews.com/trentonian.com/content/tncms/assets/v3/editorial/f/5
c/f5ce912f-0051-580c-bcca-4abf595605c2/5bbb97a886fa0.image.jpg’,2);

INSERT INTO interview (title, date, audio, thumbnail, uID) VALUES (‘Garfing, Arthur
(JHS16)’,’1995-02-07’,’https://ia801207.us.archive.org/18/items/JHS16SideA/JHS%2016
-%20side%20A.ogg’,’https://unitedmeatco.com/wp-content/uploads/2020/12/united.png’,
3);


INSERT INTO assets (FiD, timestamp, hyperlink, image, text) VALUES (5,
‘00:02:34’,’https://en.wikipedia.org/wiki/The_Holocaust’,’https://upload.wikimedia.org/wiki
pedia/commons/thumb/3/3b/Selection_on_the_ramp_at_Auschwitz-Birkenau%2C_1944
_%28Auschwitz_Album%29_1a.jpg/435px-Selection_on_the_ramp_at_Auschwitz-Birken
au%2C_1944_%28Auschwitz_Album%29_1a.jpg’,’6,500 Jews were killed in 7 days and
Arthur did not know for 2-3 years that his father had been killed.’);

INSERT INTO assets (FiD, timestamp, hyperlink, image, text)
SELECT
        Id,
        ’00:02:31’,
        ‘https://en.wikipedia.org/wiki/Nazi_Party’,’https://upload.wikimedia.org/wikipedia/c
        ommons/thumb/9/92/Parteiadler_Nationalsozialistische_Deutsche_Arbeiterpartei
```

```
        _%281933%E2%80%931945%29.svg/1280px-Parteiadler_Nationalsozialistische
        _Deutsche_Arbeiterpartei_%281933%E2%80%931945%29.svg.png',
        'Garfing's father left Vilna and was killed by the Germans in 1940'
FROM interview
WHERE title like 'Garfing%';

INSERT INTO assets (FiD, timestamp, hyperlink, image, text)
SELECT
        Id,
        '00:02:14',
        'https://en.wikipedia.org/wiki/Vilnius','https://upload.wikimedia.org/wikipedia/com
        mons/thumb/1/11/Flag_of_Lithuania.svg/188px-Flag_of_Lithuania.svg.png',
        'He left his family in Europe - discusses his Mother's death in 1937 in Vilna,
capital of Lithuania'
FROM interview
WHERE title like 'Garfing%';

INSERT INTO assets (FiD, timestamp, hyperlink, image, text)
SELECT
        Id,
        '00:02:34',
        'https://en.wikipedia.org/wiki/The_Holocaust',
        'https://upload.wikimedia.org/wikipedia/commons/thumb/3/3b/Selection_on_the_r
        amp_at_Auschwitz-Birkenau%2C_1944_%28Auschwitz_Album%29_1a.jpg/435p
        x-Selection_on_the_ramp_at_Auschwitz-Birkenau%2C_1944_%28Auschwitz_Al
        bum%29_1a.jpg',
        '6,500 Jews were killed in 7 days and Arthur did not know for 2-3 years that his
        father had been killed.'
FROM interview
WHERE title like 'Garfing%';
```

4. Write SQL data manipulation language(DML) commands that were designed in the previous stages. The queries must be elegant and make effective use of complex query constructs such as subqueries. Execute and test these queries to ensure that they work correctly. Examine the outputs carefully to verify that the queries do not return spurious tuples.

```
CREATE VIEW   interview_view   AS
SELECT                Fid, timestamp, hyperlink, image, text
FROM                  ASSETS
WHERE                 Fid =    (
  SELECT id
  FROM interview
  WHERE title LIKE 'Garfing%'
);
```

```
CREATE VIEW   admin_info_view AS
SELECT        users.userID, username
FROM          USERS
RIGHT JOIN    ADMINISTRATOR
ON USERS.userID = ADMINISTRATOR.userID
```

\