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Bases de Dados

Management of gaming streams

2MIEIC01 - Group 106

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Description

This project is based on the management of a gaming stream service, similar to *Twitch*.

The system is divided into eight classes, these classes are:

- **User:** it stores all data related to the user, like his id, username, password, profilePicture, birthDate, email and age. The **User** can send and receive a **Message**, he can follow multiple channels, own only one **Channel** and he can also follow a specific **Game**.

- **Stream:** the stream is the heart of this service, A stream is a live transmission made on a **Channel** owned by a **User** playing a **Game** for other users to watch. A Stream stores a title, startTime, uptime, ageRestriction and viewerCount. A **Stream** has one **Game** being played at a time, but the user can play multiple games over the course of the stream. A stream can also have Tags, describing what the stream is about, with all streams having at least one **Tag**.

- **Message:** it stores the data from messages sent by the **User**, storing the fields content and dateSent.

- **Channel:** a channel is owned by one user and it is where the user can create an **Stream**, the channel stores a biography and followerCount. A **Channel** can have multiple streams but all streams must be streamed on only one channel.

- **Game:** the game class stores all the information related to the games streamed on the platform, a game has a title, followerCount, description and totalViewers.

- **Tag:** a tag is used to describe a **Stream**, it only has a title field and the same tag can be used on multiple streams at the same time.

- **Viewership:** It is used to generate a list that contains the streams from a specific **Game** ranked in order based on the viewerCount from that **Game**.

- **Genres:** it is identical to the **Viewership** class, the only difference is that the ranking is based on a **Tag** instead of a **Game**.

Relational Diagram and Functional Dependencies

User *(userID, username, password, profilePicture, birthDate, email, age)*

1. {userID} -> {username, password, profilePicture, birthDate, email, age}

Message *(messageID, content, dateSent)*

1. {messageID} -> {*content, dateSent*}

Channel *(channelID, biography, followerCount)*

1. {channelID} -> {biography, followerCount}

Stream *(streamID, title, startTime, uptime, ageRestriction, viewerCount)*

1. {streamID} -> {title, startTime, uptime, ageRestriction, viewerCount}

Tag *(tagID, title)*

1. {tagID} -> {title}
2. {title} -> {tagID}

Game *(gameID, title, followerCount, description, totalViewers)*

1. {gameID} -> {title, followerCount, description, totalViewers}

Viewership *(gameID->Game, streamID->Stream, viewerCount, position)*

1. {streamID, gameID} -> {viewerCount, position}
2. {gameID, position} -> {id}

Genres *(genresID->Tag, streamID->Stream, viewerCount, position)*

1. {streamID, genresID} -> {viewerCount, position}
2. {genresID, position} -> {id}

Sends *(messageID->Message, userID->User)*

Receives *(messageID->Message, userID->User)*

Follows *(userID->User, channelID->Channel)*

Owns *(userID->User, channelID->Channel)*

ChannelStream *(channelID->Channel, streamID->Stream)*

StreamGame *(streamID->Stream, gameID->Game)*

StreamTag *(streamID->Stream, tagID->Tag)*

UserGame *(userID->User, gameID->Game)*

Normal Forms

To identify if there is a violation on the Third Normal Form we can check if the no transitivity rule is broken, in case it is there will be a violation on Boyce-Codd Normal Form as well, because BCNF is a more restrict version of 3NF.

To all enumerated relations there isn't any violation of the transitivity rule, and all the left side elements from the dependencies are super keys from the relational scheme. As such all relation oblige to the Third Normal Form and Boyce-Codd Normal Form.

Restrictions

The restrictions were used to maintain a secure and accurate database, the ones we used were FOREIGN KEY , NOT NUL and UNIQUE.

- **NOT NULL** was used in most essential attributes in order to maintain the database working correctly, some examples are:

1. The username attribute from the user class, were a user needs a username or else the system isn't able to identify him.
2. The pass attribute from the user class, were a user needs a password or else the user isn't able to be logged in the system.
3. The title attribute from stream, a stream needs to have a title to be able to be identified by viewers.
4. The userID attribute from channel, a channel must have a user that owns it and the userID serves to identify him.
5. All the ID attributes from the classes, all classes need an ID so that each unique entry is able to be identified even if it has the same values as another one.

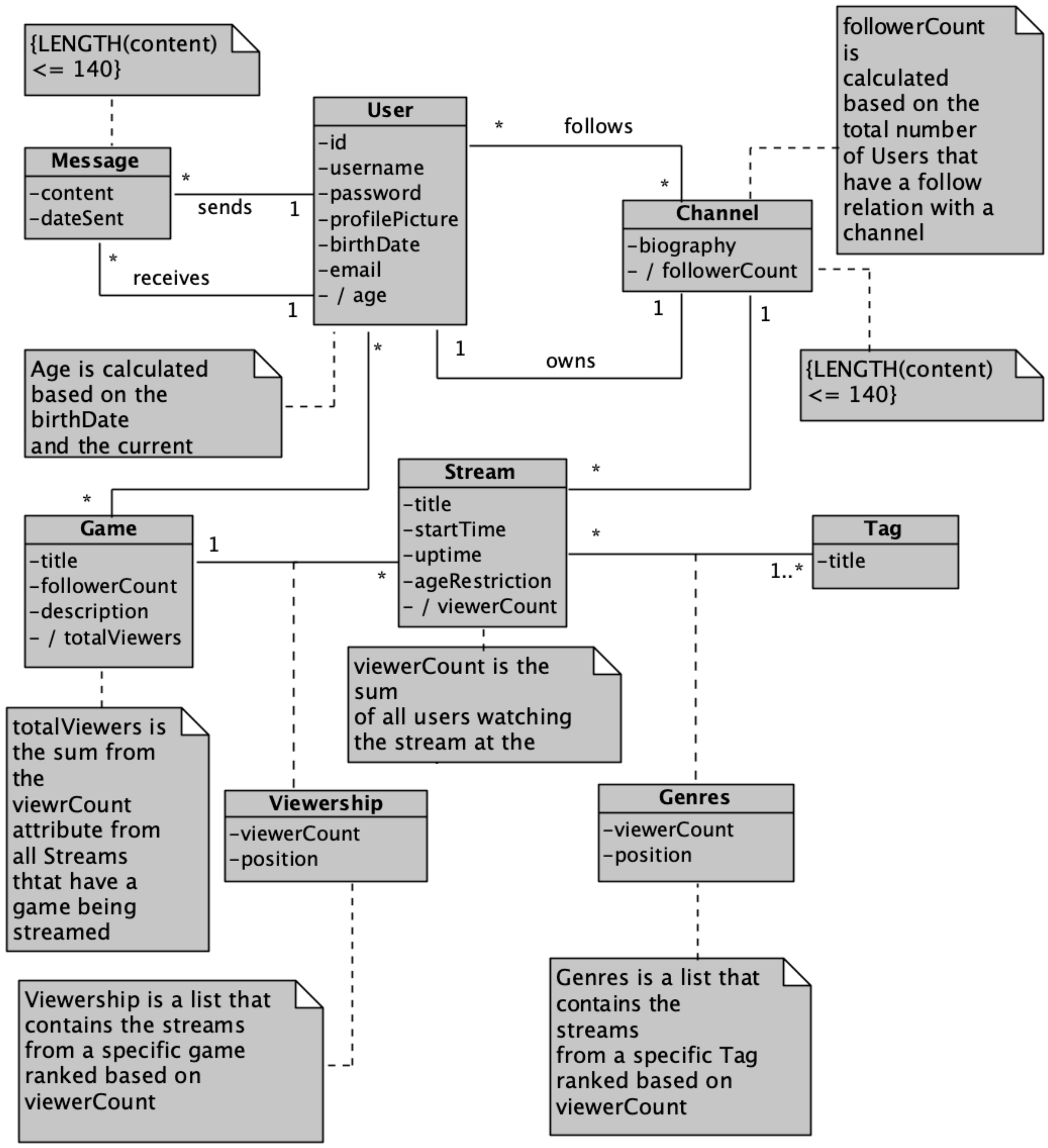
- **UNIQUE** was used in attributes that were used as keys in the class, some examples are:

1. The name attribute on a channel, each channel has to have a unique name.
2. The title attribute on a game, each game has to have a unique title.
3. The name attribute on a genre, each genre must have an unique name.
4. The username attribute on user, each username must be used by a single user.
5. The email attribute on user, each email must be used by a single user.

- **FOREIGN KEY** was used in attributes that were directly related to other classes and were their value was of use on another class, some examples are:

1. The userID attribute on the channel class, a channel must be owned by an existing user.
2. The channelID attribute on the stream class, a stream must have an existing channel to be streamed.
3. The gameID attribute on the stream class, a stream must have an existing game to be streamed.
4. The userID attribute on the sends class, a message must be sent by an existing user.
5. The streamID on the genres class, a genre must have an existing stream to be added to the genres class.

Class Diagram - UML


{LENGTH(content) <= 140}
Message
-content
-dateSent
User
-id
-username
-password
-profilePicture
-birthDate
-email
- / age
follows
sends
receives
owns
Channel
-biography
- / followerCount
followerCount is calculated based on the total number of Users that have a follow relation with a channel
{LENGTH(content) <= 140}
Age is calculated based on the birthDate and the current
Stream
-title
-startTime
-uptime
-ageRestriction
- / viewerCount
Game
-title
-followerCount
-description
- / totalViewers
Tag
-title
1..*
viewerCount is the sum of all users watching the stream at the
totalViewers is the sum from the viewrCount attribute from all Streams thtat have a game being streamed
Viewership
-viewerCount
-position
Genres
-viewerCount
-position
Viewership is a list that contains the streams from a specific game ranked based on viewerCount
Genres is a list that contains the streams from a specific Tag ranked based on viewerCount