Group 7 CSE311.1

**ER Diagram and Functionality Document**: Barta

Chat Application Database System

CSE311 – Database Management System (Section 1)  
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**Introduction**

**“Barta”** is a secure, database-driven messaging system that supports private and group chats, user authentication, media attachments, and notifications. The system is designed to demonstrate advanced database modeling through a robust ER diagram structure

**Objectives**

* Enable communication through structured chat and message tables.
* Use wide range of ERD features like weak entities, ternary relationships, specialization and generalization.
* Allow media attachments, user profiles and notifications for richer interaction.
* Ensure secure user registration, login, and data handling.

**ERD Functional Description**

To demonstrate a wide range of ERD concepts, the messaging application design includes:

* **Strong and Weak Entities**: Entities such as User, Message, and Chat (representing both private and group conversations) are strong entities. Attachment is modelled as a weak entity that depends on the existence of a Message.
* **Relationship**s:

*One-to-One*: Each message will be exchanged from a sender to a receiver.

*One-to-Many*: A message can have one or multiple attachment.

*Many-to-Many*: Notification can include multiple chats and Chat can have multiple Notification.

* + **Ternary**:

A ternary relationship links User, Message, and Chat.

* **Role Participation**: A User plays dual roles as both sender and receiver of messages, supporting direct and group-based communication flows.
* **Attributes**:

***Composit****e*: Name is divided into First\_Name and Last\_Name.

***Derived*:** Age is derived from DOB.

***Simple***: Atomic attributes such as Username, Mobile\_no, and Password.

***Multivalued***: Multivalued attributes such as members from group chats.

* ***Specialization/Generalization***:

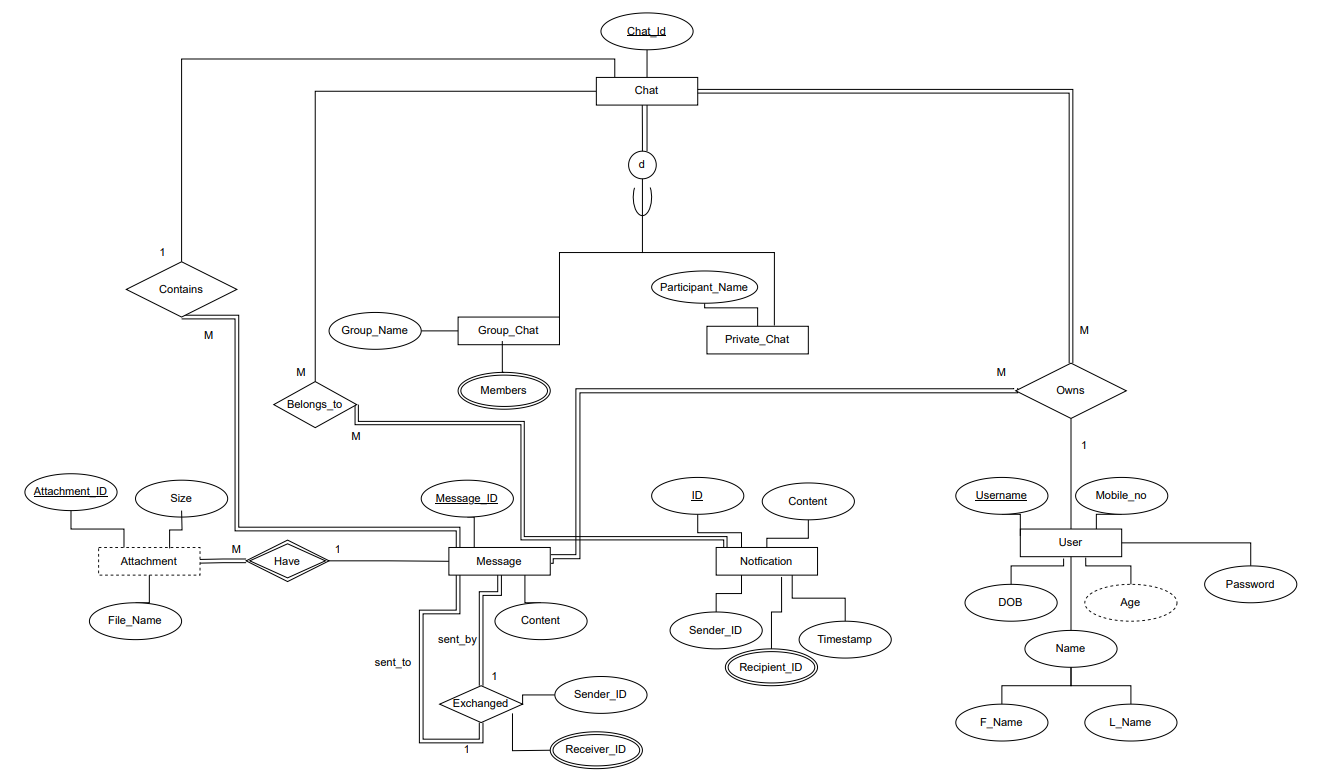
Chat entity is specialized into Group Chat entity and Private Chat entity

**Key Functionalities**

The **chat system** enables users to **login securely** and **create or join private and group chats**, manage participants, and securely access **conversation history**. Messages support both **text and media**, with **SQL-based timestamps** for proper ordering. Group management allows for **adding/removing members**, **broadcasting messages**, and storing relevant **group information**. The **notification system** delivers **alerts** for both group chat and private chat. For attachments, users can **upload media files**, with all **file metadata** (size) and **message-attachment** stored in SQL for efficient access

This design ensures rich coverage of key ERD features such as strong/weak entities, binary and ternary relationships, role participation, and various attribute types, making it well-suited for modelling real-world communication platforms**.**

**ER Diagram**

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