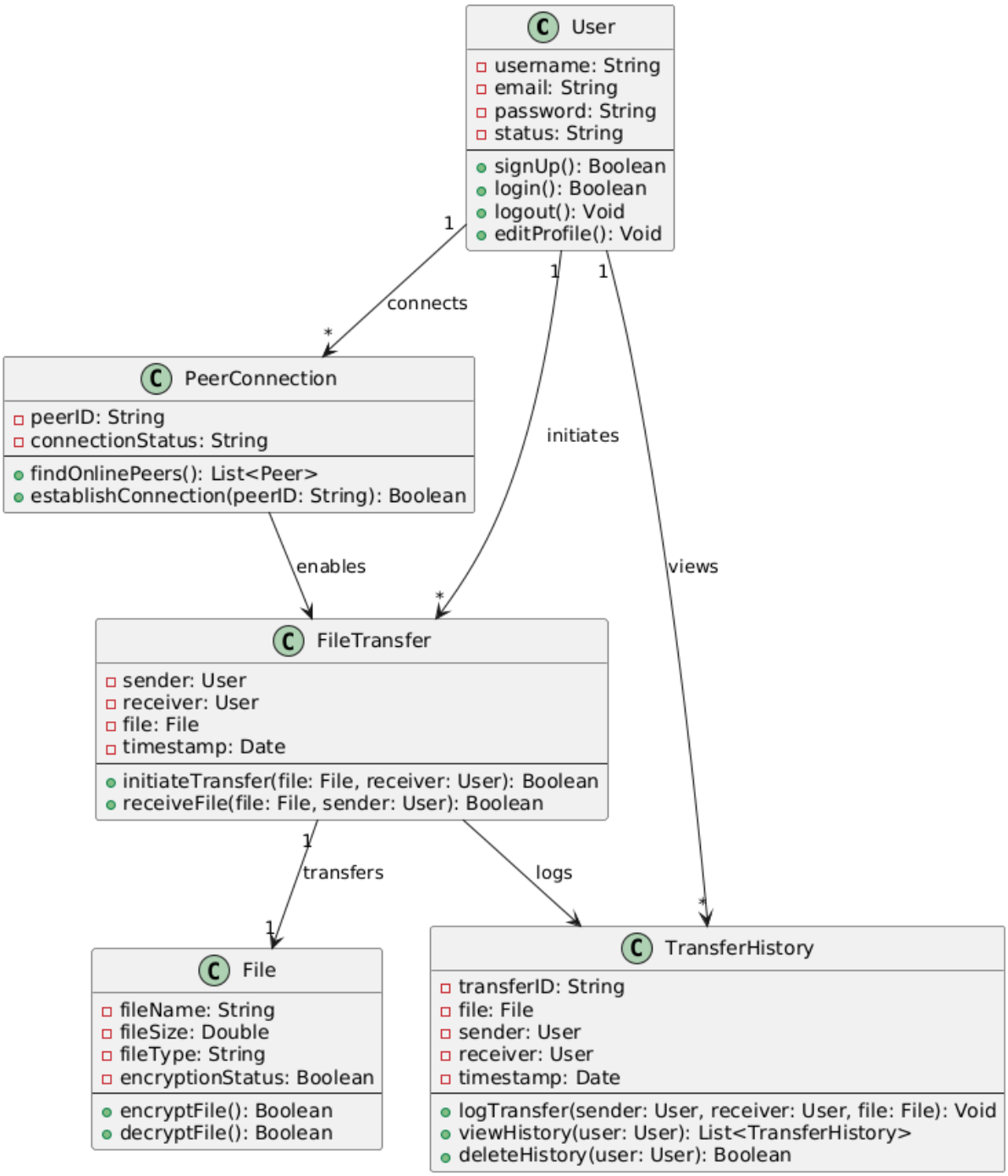
Structural View of P2P File Sharing System

1. Class Diagram

Diagram



Description

The **Class Diagram** provides a structural representation of the P2P File Sharing System. It highlights the key entities, their attributes, and the relationships between them.

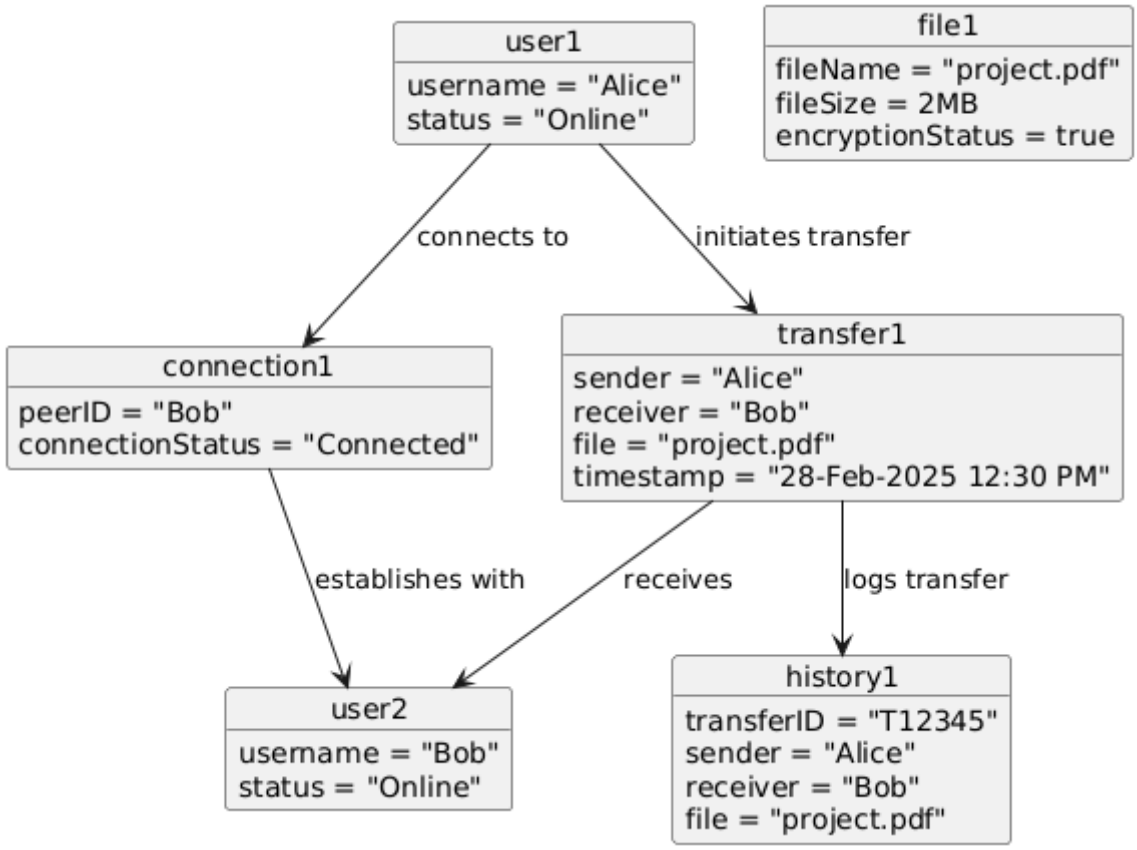
Classes & Their Roles

- **User**: Represents an authenticated individual interacting with the system. Users can sign up, log in, log out, and manage their profiles.
- **File**: Represents a digital file that is shared between users. It contains attributes like name, size, type, and encryption status.
- **PeerConnection**: Manages the connections between peers, allowing them to establish direct P2P communication.
- **FileTransfer**: Handles the process of sending and receiving files between users.
- **TransferHistory**: Stores records of past file transfers, allowing users to view and delete their transfer logs.

Relationships

- A **User** can initiate multiple **FileTransfers**.
- A **FileTransfer** is associated with a **File** being sent.
- A **FileTransfer** entry is logged into **TransferHistory**.
- A **User** connects with other users using **PeerConnection** before transferring files

Diagram



Description

The **Object Diagram** represents a real-world instance of the system. It shows how objects interact during a file-sharing event between two users.

Example Scenario

- **Alice** is logged into the system and connected to **Bob**.
- Alice selects a file named **"project.pdf"** (2MB, encrypted) for sharing.
- A **Peer-to-Peer connection** is established between Alice and Bob.
- Alice **initiates** the file transfer.
- Bob **receives** the file successfully.
- The transfer is **logged** into the history with details like sender, receiver, file name, and timestamp.

Objects Involved

- **user1 (Alice)**: Represents the sender.
- **user2 (Bob)**: Represents the receiver.
- **file1 (project.pdf)**: The file being transferred.
- **connection1**: The active peer-to-peer connection between Alice and Bob.
- **transfer1**: The file transfer instance that records sender, receiver, and file details.
- **history1**: Logs the transfer event for future reference.

Conclusion

The **Class Diagram** gives a **high-level structural view** of the P2P File Sharing System, showing the **static components**. The **Object Diagram**, on the other hand, provides a **real-world instance**, showing the **dynamic interaction** of objects during an actual file transfer. Together, they illustrate both **design and execution** perspectives of the system.