



Connect Hub

Objective

The goal of this project is to develop **Connect Hub**, a foundational social networking platform entirely in **Java**, using **Swing** for the frontend and core Java for the backend. The platform will enable users to manage accounts, create posts and stories, manage friendships, and update profiles. A file-based database will be used for simplicity, with emphasis on security, usability, and collaborative development.

Requirements

1. User Account Management

Backend (Java):

- Implement user signup, login, and logout functionalities.
- Validate user input:
 - Check email format.
 - Ensure all required fields are provided.
- Use **hashed passwords** (e.g., with MessageDigest or java.security).
- Track user status (online or offline).
 - Update status to **offline** when the user logs out.

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- Maintain the following user attributes in a file-based database:
 - **userId**: A unique identifier for each user.
 - **email**: The user's email address.
 - **username**: A name chosen by the user to identify themselves in the system.
 - **password**: The user's hashed password.
 - **dateOfBirth**: Date of birth.
 - **status**: Online or offline.

Frontend (Swing):

- Create a **signup form** to collect and validate user details.
- Provide a **login form** with error handling for incorrect credentials.
- Add a **logout button** to update the user's status to **offline** and close the session.
- Display the user's online/offline status on the **newsfeed page** for all friends.

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2. Profile Management

Backend (Java):

- Enable users to update their profiles:
 - **Profile photo** and **cover photo** (store file paths in the database).
 - **Bio**.
 - **Password** (with hashed storage).
 - Save updated user details in the database

View own posts and friends:

- Fetch and serve a list of the user's own posts with timestamps and any attached images.
- Fetch and serve a list of the user's friends, including their status (online/offline).

Frontend (Swing):

- **Profile Management Page:**
 - Allow users to view and edit their profile details:
 - Change **profile photo** and **cover photo** using an upload feature
 - Edit their **bio**.
 - Update their **password**.
 - Display the user's posts in a section, showing the content and images.
 - Display the user's friends list, indicating their online/offline status.

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3. Content Creation (Posts and Stories)

Backend (Java):

- Allow users to create posts and stories:
 - **Posts:** Permanent content.
 - **Stories:** Temporary content that disappears after 24 hours.
- Store the following attributes for posts and stories:
 - **contentId:** Unique identifier for each content.
 - **authorId:** Reference to the user who created it.
 - **content:** Text with optional images (store image paths in the database).
 - **timestamp:** Creation time.
- Automatically delete expired stories from the file-based database.

Frontend (Swing):

- Add a section on the **newsfeed page** for:
 - Creating posts with text and optional images.
 - Creating stories with similar options.

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4. Friend Management

Backend (Java):

- Implement friend request functionality:
 - Allow users to send **friend requests**, which are marked as **Pending**.
 - Enable receivers to **accept** or **decline** requests.
- Suggest friends who are not already in the user's friend list.
- Allow users to block or remove friends:
 - **Block**: Prevent interaction, including viewing posts, stories, and statuses.
 - **Remove**: Ends the friendship but allows users to reappear in friend suggestions.
- Display friend statuses (online/offline) in the **newsfeed page**.

Frontend (Swing):

- Create a **friend management interface** to:
 - View and respond to friend requests.
 - View and manage the friend list.
 - View and send friend suggestions.
 - Block or remove friends.
- Show online/offline status of friends on the **newsfeed page**.

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5. Newsfeed Page

Backend (Java):

- Provide backend support to fetch and serve the following:
 - **Posts and stories** from friends.
 - **List of friends**, including their statuses (online/offline).
 - **Friend suggestions**.

Frontend (Swing):

- Design a **newsfeed page** with the following features:
 - **Posts and Stories:** Show recent posts and active stories from friends.
 - **Friend List:** Indicate which friends are online or offline.
 - **Friend Suggestions:** A section to display potential new friends.
 - **Content Creation Area:** A form for creating new posts or stories.
 - A **refresh button** to manually reload the page and fetch updates (new posts, stories, friend requests, etc.).

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Security and Database Management

Security:

- Store user passwords using secure hashing techniques (e.g., SHA-256 or bcrypt).
- Validate input for all forms.
- Implement proper error handling for failed login attempts.

Database Management (File-Based)

For simplicity, we will use a **file-based database** to manage the data of the social media application. The data will be stored in **JSON format** for easy access and manipulation. This format provides flexibility and readability while being lightweight for file storage.

Guidelines for Designing JSON Structures:

- Feel free to **design your own file structures** based on the application requirements.
- Consider **optimization techniques** to ensure the files are structured in a way that minimizes redundant data and improves access speed.
- Think about **relationships** between users and content when designing the file formats (e.g., linking user IDs to their content or friend relationships).
- Ensure the files are structured to accommodate features like filtering expired stories, managing friend requests, and fetching user statuses efficiently.

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- Examples of JSON Structure:

```
{  
  "FirstName": "Ken",  
  "MiddleName": "J",  
  "LastName": "Sánchez",  
  "JobTitle": "Chief Executive Officer",  
  "PhoneNumber": "697-555-0142",  
  "PhoneNumberType": "Cell",  
  "EmailAddress": "ken@adventure-works.com",  
  "EmailPromotion": 0  
},
```

GitHub and Team Collaboration

GitHub Workflow:

- Use GitHub for version control and collaboration.
- Create branches for tasks (e.g., feature-login, feature-profile-update).
- Submit **pull requests** for review before merging changes.
- Each pull request should be reviewed by at least one team member.

Team Roles:

- This project will be developed by a **team of four members**.
- Regular communication and code reviews are required for maintaining quality.

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Diagrams

The following diagrams must be created for the project:

1. **Use Case Diagram:**

- Highlight user interactions, such as creating posts, managing friends, and editing profiles.

2. **State Diagram:**

- Illustrate the different states of users (e.g., online, offline, blocked) and transitions between them.

3. **Sequence Diagram:**

- Show interactions between the frontend and backend for major operations like login, content creation, and friend requests.

4. **Class Diagram:**

- Depict the structure of the system, including classes for users, content, and friendships, along with their relationships.
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Additional Requirements

1. The project should follow **SOLID principles**.
2. The implementation must include creational **design patterns**.

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Submission Requirements and Policies

Required:

- You are required to solve the above project and deliver a **zipped file** containing all the .java files.
- The **deadline for delivery is Friday, December 6, 2024, at 11:59 PM.**

Policy:

- Your code should be **clean, readable, and well-commented.**
- You must work in a group of 4 (**Mandatory**).
- Delivering a **copied submission** will be **severely penalized for both parties.** Submitting nothing is better than submitting a copy.
- **No late submissions** will be accepted.

This ensures fairness and upholds the integrity of the project development process.

Be creative! The required features are only the beginning of what you can do, add more features or spice up the required ones.

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