Microblog

Microblog is a role-based blogging platform built with **Flask 3.1.1**, **SQLAlchemy 2.0.42**, **Bootstrap**, and **SQLite**.
It allows users to create posts, comment, follow other users, and interact in a simple social environment. The platform also provides administrative and analytical tools for managing users, posts, and reports.

Features

🌐 Public Access

- Explore page available without login (lists all approved posts).

🔑 User Roles

- **User:** Can create posts (requires admin approval), follow other users, and comment on posts.
- **Admin:** Full control of the system. Can approve posts, manage users, delete posts, and access analytics/reports.
- **Analyst:** Read-only access to analytics and reporting tools (no user or post management).

📝 Posts & Comments

- Users can create posts with optional images.

- Posts require admin approval before appearing on the public feed.
- Users can comment on posts, with each comment tied to one user and one post.

👥 Followers

- Users can follow each other to see posts in their personal feed.

🛠️ Admin Dashboard

- Manage pending posts, users, and roles.
- Ensure at least one admin always exists (original admin cannot be deleted).
- Export posts and user data to CSV.
- Filter and search for specific posts or users.

🛡️ Role-based Access Control

- Access to pages and functionality differs based on role.
- Single login form for all roles; landing pages differ by role.

📊 Analytics & Reporting

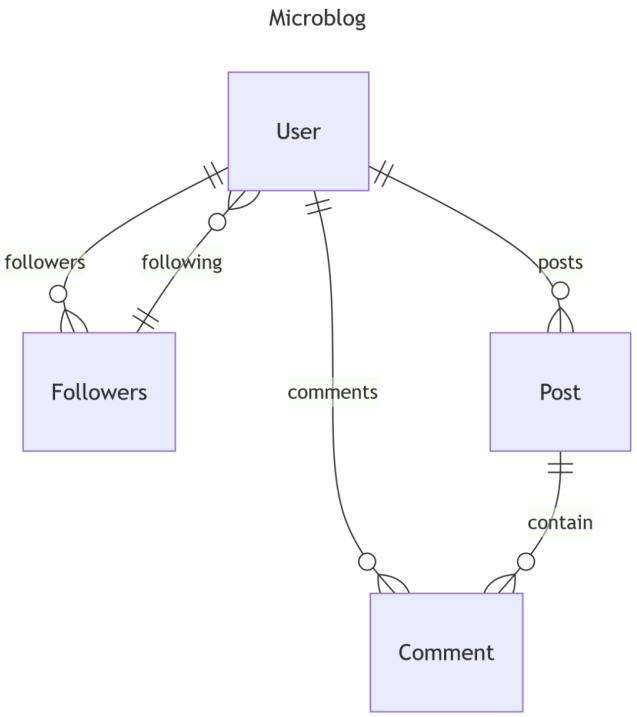
Microblog provides powerful reporting tools for admins and analysts:

- 📄 **Reports**
  - View all posts or users in a searchable and filterable table.
  - Filter posts by status (approved/pending), title, or author.
  - Filter users by role or username.
  - Pagination for large datasets.
- 📈 **Analytics**
  - Summary metrics such as:
    - Total posts
    - Pending posts
    - Total users
    - Posts with images
  - Visual representation of user engagement and user activity.
- 💾 **Export**
  - Both posts and users can be exported to CSV files.
  - Exports respect applied filters.
  - Admins and analysts can download full datasets for offline analysis.

    ⚠️ *Note: Only admins can manage posts, users, and roles. Analysts have read-only access to reporting and analytics.*

🗄️ Database Structure

The application uses SQLite by default with SQLAlchemy ORM for database management.



ERD of Microblog

The schema consists of four main tables:

- **User**
  - `id`, `username`, `email`, `password_hash`, `about_me`, `last_seen`, `role`
  - Relationships:
    - One-to-many with Post
    - One-to-many with Comment
    - Many-to-many (self-referential) via Followers
- **Post**
  - `id`, `title`, `body`, `timestamp`, `user_id`, `is_approved`, `image`
  - Relationships:
    - Belongs to one User
    - One-to-many with Comment
- **Comment**
  - `id`, `body`, `timestamp`, `user_id`, `post_id`
  - Relationships:

        - Belongs to one User
        - Belongs to one Post
- **Followers**
    - `follower_id`, `following_id`
    - Self-referential relationship enabling users to follow each other

💻 Installation & Setup

Prerequisites

- Python 3.10+
- Virtual environment (recommended)

Steps

1. **Clone the repository**

   ```
   git clone https://github.com/khantthureinzaw/flask-microblog.git
   cd microblog
   ```

2. **Create and activate a virtual environment**

   ```
   python3 -m venv venv
   source venv/bin/activate   # On Linux/Mac
   venv\Scripts\activate      # On Windows
   ```

3. **Install dependencies**

   ```
   pip install -r requirements.txt
   ```

4. **Initialize the database**

   ```
   flask db upgrade
   ```

   ⚠️ *The migrations/ folder already includes the initial migration, so running flask db upgrade is enough. If starting fresh without migrations, run* `flask db init` *and* `flask db migrate -m "Initial migration"` *first.*

5. **Run the application**

   ```
   flask run
   ```

6. **Access the app**

   Open your browser and go to: http://127.0.0.1:5000/

🔑 Default Credentials

- Username: admin
- Password: admin
- Email: admin@example.com

⚠️ *The login form is the same for all roles. After logging in, the available pages differ based on the user's role (User, Analyst, Admin).*

👤 Roles & Permissions

Microblog has three types of users, each with different access levels:

- **User**
  - Can view the explore page and posts from followed users.
  - Can create posts (require admin approval before being public).
  - Can comment on posts.
  - Can follow or unfollow other users.
- **Analyst**
  - Has all permissions of a regular user.
  - Can access Report and Analytics pages with full filtering and CSV export.
  - Cannot manage users or approve posts.
- **Admin**
  - Has all permissions of an analyst.
  - Can access the Admin Dashboard.
  - Can view and approve pending posts.
  - Can view all users and posts.
  - Can create new users with any role (User, Analyst, Admin).
  - Can delete users (except the original admin).
  - Can access Report and Analytics pages with full filtering and CSV export.

🗂️ Project Structure

```
microblog/
├── app/
│   ├── admin/          # Admin blueprints (forms, routes)
│   ├── auth/           # Authentication blueprints
│   ├── main/           # Core app routes and forms
│   ├── models.py       # Database models
│   ├── templates/      # HTML templates
│   └── static/         # CSS, JS, images, uploads
├── migrations/         # Database migration files
├── tests.py            # Test scripts
├── microblog.py        # App entry point
├── requirements.txt
└── config.py
```

ℹ️ Additional Information

Virtual Environment

Always run the app inside a virtual environment to manage dependencies safely.

Database Initialization

Make sure to run `flask db upgrade` before starting the application to create the SQLite database and tables.

Role-based Access

- Users, analysts, and admins share the same login form.
- After login, the landing page and available features depend on the user's role.

Personal / Educational Use

- This project is intended for personal learning and experimentation.
- No license is included.