I’ll provide a comprehensive record of all the tables, their detailed structures, a visual diagram of the mapping, and a reference document for the development of your app’s data structure using SQL and Flask.

### 1. Comprehensive Record of All Tables

Here’s the detailed structure for all the tables that we are using in the app:

#### **user Table**: Stores user details and preferences.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** |
| --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each user. |
| user\_name | String | NULL (no default) | Yes (Unique) | Unique username for user identification and authentication. |
| email | String | NULL (no default) | Yes (Unique) | User email address for notifications and account recovery. |
| password | String | NULL (no default) | No | Stores the hashed password for secure authentication. |
| role | Enum | user | Yes | User’s role within the system (user, admin, moderator). |
| registration\_date | DateTime | CURRENT\_TIMESTAMP | No | Timestamp when the user registered. |
| last\_login | DateTime | NULL | No | Tracks the last login time for monitoring and security. |
| subscription\_type | String | Free | No | Type of subscription (Free, Basic, Premium). |
| preferred\_categories | Array/Text | NULL (no default) | No | User’s preferred content categories for personalized experience. |
| preferred\_modules | Array/Text | NULL (no default) | No | User’s preferred medical modules for personalized experience. |
| bookmarked\_content\_ids | Array/Text | NULL (no default) | No | IDs of content items the user has bookmarked for quick access. |
| search\_history | JSON/Text | NULL (no default) | No | Stores the user’s search history to improve recommendations. |
| content\_access\_history | JSON/Text | NULL (no default) | No | Records history of content accessed by the user, for analytics and personalization. |
| language\_preference | String | English | No | User’s preferred language for content display. |
| is\_active | Boolean | TRUE | No | Indicates if the user’s account is active. |
| failed\_login\_attempts | Integer | 0 | No | Tracks failed login attempts to implement security measures like account lockout. |
| account\_recovery\_token | String | NULL (no default) | No | Token used for account recovery. |

#### **content Table**: Manages all types of content available in the app.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** | **Compliance Note** |
| --- | --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each content item. | No sensitive information; safe. |
| title | String | NULL (no default) | Yes | Title of the content item for display. | Safe, non-sensitive content. |
| description | Text | NULL (no default) | No | Brief description or summary of the content. | Safe, non-sensitive content. |
| category | String | General | Yes | Specifies the category of content (e.g., guidelines, TNM staging). | Safe, non-sensitive content. |
| module | String | General | Yes | Specifies the medical module (e.g., breast, lung). | Safe, non-sensitive content. |
| content\_type | String | PDF | Yes | Type of content (e.g., PDF, HTML, embedded link, URL). | Safe, non-sensitive content. |
| file\_name | String | NULL (no default) | No | The name of the uploaded file. | Avoid using special characters; ensure safe file names. |
| file\_path | String | NULL (no default) | No | Path to the file stored in the file system. | Ensure files are stored securely, not in public directories. |
| external\_url | String | NULL (no default) | No | URL or embed code if content is external. | Use HTTPS and validate/sanitize all URLs. |
| online\_resource\_url | String | NULL (no default) | No | URL to additional online resources related to the content. | Use HTTPS and validate/sanitize all URLs. |
| keywords | Text | NULL (no default) | Full-Text | Relevant keywords to improve search functionality. | Safe, non-sensitive content. |
| author | String | Admin | No | Name of the content creator or uploader. | Anonymize where needed; avoid storing full names. |
| created\_at | DateTime | CURRENT\_TIMESTAMP | No | Timestamp when the content was created. | Safe; no security concern. |
| updated\_at | DateTime | CURRENT\_TIMESTAMP | No | Timestamp when the content was last updated. | Safe; no security concern. |
| last\_accessed | DateTime | NULL | No | Timestamp of the last time the content was accessed. | Safe; no security concern. |
| access\_count | Integer | 0 | No | Counter that increments each time content is accessed. | Safe; no security concern. |
| user\_role\_access | String | All | No | User roles that have access to the content. | Validate role checks server-side; avoid hard-coded roles. |
| content\_tags | Text | NULL (no default) | No | Tags to categorize content for filtering and search. | Safe, non-sensitive content. |
| importance\_level | Enum | MEDIUM | No | Indicates content’s clinical importance or relevance. | Safe; no security concern. |
| language | String | English | No | Language of the content for multilingual support. | Safe; no security concern. |
| expiry\_date | Date | NULL (no default) | No | Date when content becomes obsolete or needs a review. | Safe; no security concern. |
| file\_size | Integer | 0 | No | Size of the file (in kilobytes/megabytes). | Safe; no security concern. |
| featured | Boolean | FALSE | No | Indicates if the content should be highlighted or featured. | Safe; no security concern. |
| version | String | 1.0 | No | Tracks the version of the content. | Safe; no security concern. |
| related\_content | Array/Text | NULL (no default) | No | References to related content IDs for discovery. | Safe; handle carefully to avoid conflicts. |
| status | Enum | DRAFT | Yes | Indicates the status of the content. | Safe; no security concern. |
| view\_duration | Integer | 0 | No | Average time a user spends viewing this content. | Safe; anonymize and store securely. |
| last\_uploaded\_on | DateTime | CURRENT\_TIMESTAMP | No | Date and time when the file was last uploaded. | Safe; no security concern. |
| content\_access\_type | Boolean | FALSE | Yes | Indicates if the content is free or paid. | Safe; no security concern. |
| api\_endpoint | String | NULL (no default) | No | API endpoint for calling LLMs or other databases. | Use only trusted, public APIs; avoid non-public APIs. |
| usage\_statistics | JSON/Text | NULL (no default) | No | Stores detailed usage statistics. | Anonymize data to prevent privacy breaches. |
| related\_api\_links | Array/Text | NULL (no default) | No | List of related API links for additional insights. | Use HTTPS; validate and sanitize. |
| user\_feedback | Text | NULL (no default) | No | Captures user feedback or comments. | Moderate and sanitize input to prevent abuse. |
| bookmark\_count | Integer | 0 | No | Tracks how many users have bookmarked this content. | Safe; no security concern. |
| interaction\_log | JSON/Text | NULL (no default) | No | Logs user interactions like clicks, searches. | Anonymize; store securely; avoid caching on client side. |
| estimated\_reading\_time | Integer | 0 | No | Estimated time to read or consume the content. | Safe; no security concern. |
| accessibility\_features | String | None | No | Details any special accessibility features. | Safe; no security concern. |

#### **user\_content Table**: Manages interactions between users and content.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** |
| --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each interaction. |
| user\_id | Integer | NULL (no default) | Yes (Foreign Key) | References the unique identifier of the user from the user table. |
| content\_id | Integer | NULL (no default) | Yes (Foreign Key) | References the unique identifier of the content from the content table. |
| interaction\_type | Enum | viewed | No | Type of interaction (viewed, bookmarked, recommended, etc.). |
| interaction\_date | DateTime | CURRENT\_TIMESTAMP | No | Timestamp of when the interaction occurred. |
| feedback | Text | NULL (no default) | No | Stores user feedback or notes related to the specific interaction. |
| content\_rating | Integer | NULL (no default) | No | User-provided rating for the content (e.g., 1-5 stars). |
| time\_spent | Integer | 0 | No | Time spent (in seconds) by the user on the content during the interaction. |
| last\_interaction | DateTime | NULL (no default) | No | Timestamp of the last interaction between the user and the content, useful for updating records. |

#### **subscription\_plans Table**: Manages different subscription plans.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** |
| --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each subscription plan. |
| plan\_name | String | NULL (no default) | Yes (Unique) | Name of the subscription plan (e.g., Free, Basic, Premium). |
| price | Float | 0.0 | No | Cost of the subscription. |
| features | Text | NULL (no default) | No | Description of features included in each plan. |
| validity | Integer | 30 | No | Duration of the subscription in days. |
| created\_at | DateTime | CURRENT\_TIMESTAMP | No | Timestamp of when the plan was created. |

#### **notifications Table**: Manages notifications sent to users.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** |
| --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each notification. |
| user\_id | Integer | NULL (no default) | Yes (Foreign Key) | References the unique identifier of the user from the user table. |
| content\_id | Integer | NULL (no default) | Yes (Foreign Key, Optional) | References the unique identifier of the content from the content table, if applicable. |
| message | Text | NULL (no default) | No | Notification message. |
| is\_read | Boolean | FALSE | No | Status to check if the notification has been read. |
| created\_at | DateTime | CURRENT\_TIMESTAMP | No | Timestamp of when the notification was sent. |

#### **content\_metadata Table**: Manages extended metadata for content.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** |
| --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each metadata entry. |
| content\_id | Integer | NULL (no default) | Yes (Foreign Key) | References the unique identifier of the content from the content table. |
| meta\_key | String | NULL (no default) | No | Key for metadata (e.g., “tags”, “related\_topics”). |
| meta\_value | Text | NULL (no default) | No | Value corresponding to the key. |

#### **api\_usage\_logs Table**: Tracks usage of external APIs.

| **Column Name** | **Data Type** | **Default Value** | **Indexed** | **Purpose** |
| --- | --- | --- | --- | --- |
| id | Integer | Auto-Increment | Yes (Primary Key) | Unique identifier for each API usage log entry. |
| user\_id | Integer | NULL (no default) | Yes (Foreign Key, Optional) | References the unique identifier of the user from the user table. |
| api\_endpoint | String | NULL (no default) | No | The API endpoint being called. |
| response\_time | Integer | NULL (no default) | No | Time taken to get a response (in milliseconds). |
| request\_payload | Text | NULL (no default) | No | Payload sent to the API. |
| response\_code | Integer | NULL (no default) | No | HTTP response code. |
| created\_at | DateTime | CURRENT\_TIMESTAMP | No | Timestamp of when the API call was made. |

### 2. Visual Diagram of Table Mappings

I will create a visual diagram to show the relationships between these tables:

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| --- |
| Visual Diagram of Table Mappings |

Visual Diagram of Table Mappings

### 3. Comprehensive Reference Document for Development

I have compiled all this information into a Word document for your reference during development.

### [Download Comprehensive Data Structure Document](sandbox:/mnt/data/App_Data_Structure_Reference.docx?_chatgptios_conversationID=e280008d-4a97-497f-b463-4f57d3971c74&_chatgptios_messageID=9c6ab08a-cb0c-469e-9a55-b2d80ad5b4f7)

### Next Steps

This document and diagram provide a solid foundation for implementing your app’s data structure using SQL and Flask. Let me know if you need further modifications or additional details!