UML Diagram

Users
- <u>User_ID</u>
- Username
- Age
- Gender

Drug Review
- <u>Review_ID</u>
- User_ID
- Drug_ID
- Comment
- Rating

Each user writes reviews — 1..1 / 1..*

Each drug will have review for it — 1..1 / 1..*

Drug_Disease
- Disease_ID
- Drug_ID

Drugs
- <u>Drug_ID</u>
- Name
- Type

Maps drugs to diseases — *..* / *..1

Maps diseases to drugs — *..* / 1..*

Diseases
- <u>Disease_ID</u>
- Disease_Name

Drugs treat a disease — 1..* / 1..*

Symptoms
- <u>Symptom_ID</u>
- Symptom_Name
- Symptom_Description

Disease_Symptom
- Disease_ID
- Symptom_ID

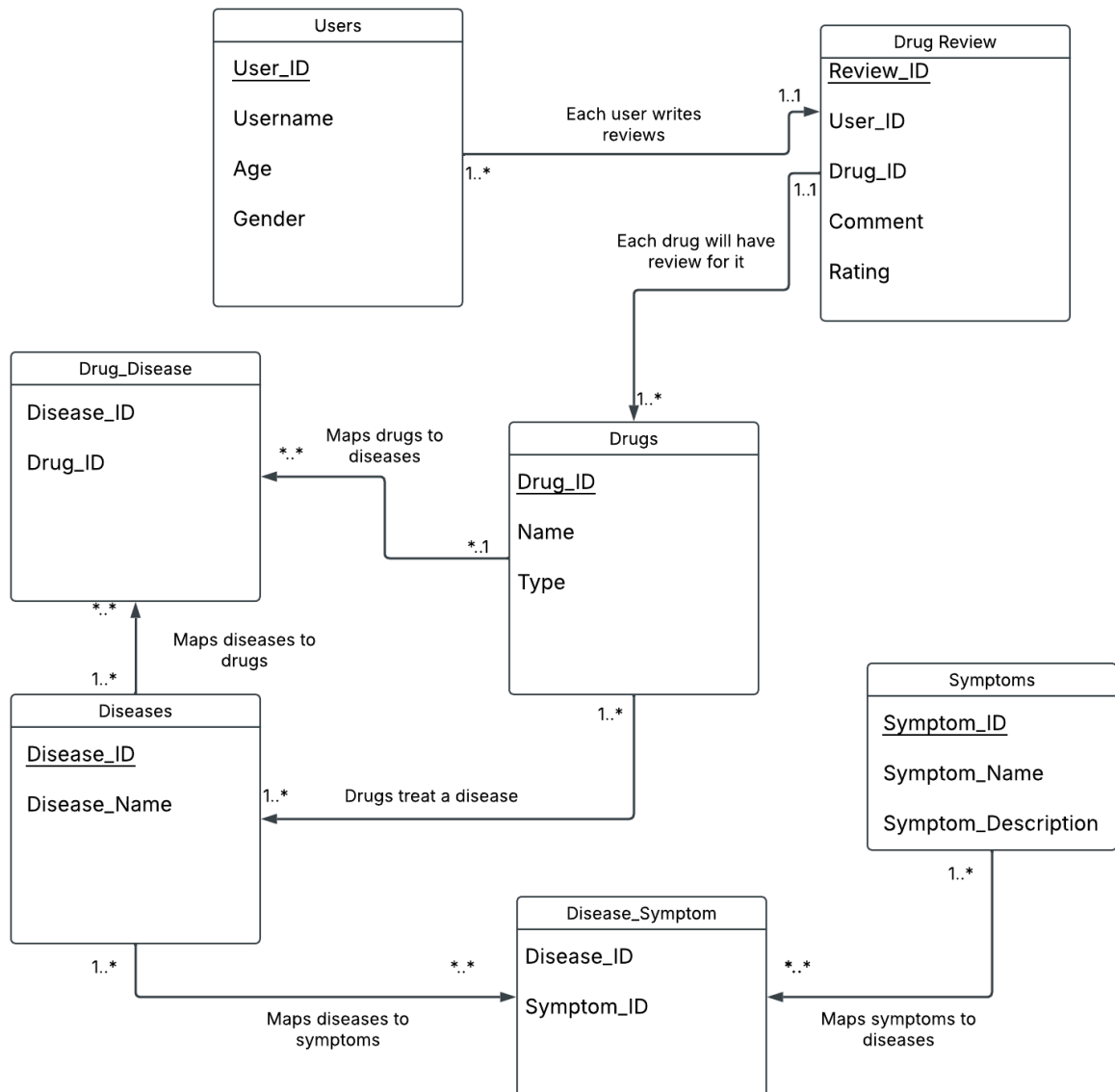Maps diseases to symptoms — 1..* / *..*

Maps symptoms to diseases — *..* / 1..*

Assumptions and Justifications

1. User

- Each user will have its own User_ID to connect its table with reviews they have written.
- The age, gender, and username for each user will display under their reviews for others to see as well.

2. Drug Review

- Users can make multiple Review_IDs to review drugs that they have tried.
- The User_ID and Drug_ID will be an identifier to each review and each review will have a rating and a comment.

3. Drugs

- Each drug will be identified by a Drug_ID to match it with symptoms and reviews.
- Its name and prescription type will be used to inform the user on how they can receive the medication.

4. Diseases

- Each disease is identified by a Disease_ID which will link it to either drugs or symptoms.
- The disease name is the only other necessary attribute of the table.

5. Drug_Diseases

- Each Drug can be matched to multiple Diseases, so each Drug_Disease table will store this matching of drugs to disease.

6. Symptoms

- Each symptom is identified by a Symptom_ID which will link it to the symptom names and diseases.
- The symptom name and the symptom descriptions will be used to find a matching drug that can clear those symptoms

7. Disease_Symptom

- Each Disease_ID will be matched with each Symptom_ID
- Each symptom can have multiple diseases and vice versa, so this table will show all matched Symptoms and Diseases.

Relationships and Cardinality

Relationship	Cardinality	Justification
User - Symptom Log	1:M	A user can have multiple symptom logs, but each log belongs to one user.
Symptom Log - Symptom	M:M	Each symptom log can contain multiple symptoms, and each symptom can be part of multiple logs.
Symptom - Condition	M:M	Symptoms can be linked to multiple conditions, and each condition can have multiple symptoms.
Condition - Medication	M:M	Conditions can be treated with multiple medications, and each medication can treat multiple conditions.
User - Review	1:M	A user can write multiple reviews, but each review belongs to one user.
Drug - Disease	M:M	A drug can treat multiple diseases, and a disease can be treated by many drugs
Disease - Symptom	M:M	A disease can have multiple symptoms, and a symptom can be linked to multiple diseases
Review - Medication	M:1	Multiple reviews exist for one medication, but a review only refers to one medication.

Normalization: 3NF

Functional Dependencies:

User_ID -> Username, Age, Gender
Drug_ID -> Name, Type
Disease_ID -> Disease_Name
Symptom_ID -> Symptom_Name, Symptom_Description
Review_ID -> User_ID, Drug_ID, Comment, Rating
Drug_ID, Disease_ID -> Maps Drugs to Diseases
Disease_ID, Symptom_ID -> Maps Diseases to Symptoms

Relations in 3NF:

Users (User_ID, Username, Age, Gender)
Drugs (Drug_ID, Name, Type)
Diseases (Disease_ID, Disease_Name)
Symptoms (Symptom_ID, Symptom_Name, Symptom_Description)
Drug_Review (Review_ID, User_ID, Drug_ID, Comment, Rating)
Drug_Disease (Drug_ID, Disease_ID)
Disease_Symptom (Disease_ID, Symptom_ID)

Relational Schema

```
USERS (
    User_ID      : INT [PK],
    Username     : VARCHAR(100),
    Age          : INT,
    Gender       : VARCHAR(6)
)

DRUGS (
    Drug_ID       : INT [PK],
    Name          : VARCHAR(100),
    Type          : VARCHAR(50)
)

DISEASES (
    Disease_ID      : INT [PK],
    Disease_Name    : VARCHAR(100)
)

SYMPTOMS (
    Symptom_ID            : INT [PK],
    Symptom_Name          : VARCHAR(100),
    Symptom_Description    : TEXT
)

DRUG_REVIEW (
    Review_ID       : INT [PK],
    User_ID         : INT [FK to USERS.User_ID],
    Drug_ID         : INT [FK to DRUGS.Drug_ID],
    Comment         : TEXT,
    Rating          : INT
)

DRUG_DISEASE (
    Disease_ID        : INT [FK to DISEASES.Disease_ID],
    Drug_ID           : INT [FK to DRUGS.Drug_ID],
    PRIMARY KEY (Disease_ID, Drug_ID)
)

DISEASE_SYMPTOM (
    Disease_ID   : INT [FK to DISEASES.Disease_ID],
    Symptom_ID   : INT [FK to SYMPTOMS.Symptom_ID],
    PRIMARY KEY (Disease_ID, Symptom_ID)
)
```