
# Sillah Phase 3

**CS340: Introduction to Databases Systems**

**Section: 1629**

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## 1. Relational Schema

The conceptual EER model developed in Phase 2 has been transformed into a relational schema suitable for implementation in a relational database management system.

Each entity was mapped to a corresponding relation. One-to-many (1:N) relationships were implemented by placing foreign keys on the N-side of the relationship.

***The resulting relational schema is defined as follows:***

```sql
USER(
  user_id PRIMARY KEY,
  first_name,
  last_name,
  email UNIQUE,
  password_hash,
  phone_number,
  created_at
)

FAMILY_MEMBER(
  member_id PRIMARY KEY,
  user_id FOREIGN KEY REFERENCES USER(user_id),
  first_name,
  last_name,
  date_of_birth,
  relationship,
  contact_phone,
  medical_history,
  blood_type,
  gender,
  status
)

HEALTH_CONDITION(
  condition_id PRIMARY KEY,
  condition_name,
  category,
  description
)
```

```
MEDICAL_HISTORY(
  event_id PRIMARY KEY,
  member_id FOREIGN KEY REFERENCES FAMILY_MEMBER(member_id),
            condition_id      FOREIGN      KEY      REFERENCES
HEALTH_CONDITION(condition_id),
  event_date,
  event_type,
  diagnosis,
  severity,
  symptoms,
  treatment,
  outcome
)

RISK_ALERT(
  alert_id PRIMARY KEY,
  member_id FOREIGN KEY REFERENCES FAMILY_MEMBER(member_id),
  alert_type,
  risk_level,
  priority,
  status,
  notes,
  description,
  created_date,
  resolved_date
)

CLINIC(
  clinic_id PRIMARY KEY,
  clinic_name,
  city,
  address,
  phone
)

APPOINTMENT(
  appointment_id PRIMARY KEY,
  user_id FOREIGN KEY REFERENCES USER(user_id),
  clinic_id FOREIGN KEY REFERENCES CLINIC(clinic_id),
  appointment_date,
```

```
  appointment_time,
  reason,
  status
)

AWARENESS_CONTENT(
  content_id PRIMARY KEY,
  title,
  topic,
  content_type,
  content_body,
  created_at
)

HEALTH_EVENT(
  event_id PRIMARY KEY,
  event_date,
  severity,
  symptoms,
  condition_name,
  treatment,
  outcome,
  event_type,
  diagnosis,
  diagnosis_date,
  notes,
  onset_age,
  status
)
```

**2. Data Dictionary**

The data dictionary defines attribute types and constraints for each relation.

| **USER** | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| user_id | INT | Unique user identifier | Primary Key |
| first_name | VARCHAR(50) | User first name | NOT NULL |

| USER | | | |
|---|---|---|---|
| last_name | VARCHAR(50) | User last name | NOT NULL |
| email | VARCHAR(100) | User email address | UNIQUE, NOT NULL |
| password_hash | VARCHAR(255) | Encrypted password | NOT NULL |
| phone_number | VARCHAR(20) | Contact number | — |
| created_at | DATETIME | Account creation timestamp | NOT NULL |

| FAMILY_MEMBER | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| member_id | INT | Unique family member identifier | Primary Key |
| user_id | INT | Owner of family member | Foreign Key |
| first_name | VARCHAR(50) | First name | NOT NULL |
| last_name | VARCHAR(50) | Last name | NOT NULL |
| date_of_birth | DATE | Date of birth | NOT NULL |
| relationship | VARCHAR(50) | Relationship to user | — |
| contact_phone | VARCHAR(20) | Contact number | — |
| medical_history | TEXT | General notes | — |
| blood_type | VARCHAR(5) | Blood type | — |
| gender | VARCHAR(10) | Gender | — |
| status | VARCHAR(30) | Overall condition | — |

| HEALTH_CONDITION | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| condition_id | INT | Unique condition identifier | Primary Key |

| HEALTH_CONDITION | | | |
|---|---|---|---|
| condition_name | VARCHAR(100) | Disease/condition name | NOT NULL |
| category | VARCHAR(50) | Condition category | — |
| description | TEXT | Condition description | — |

| MEDICAL_HISTORY | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| event_id | INT | Unique medical history record | Primary Key |
| member_id | INT | Related family member | Foreign Key |
| condition_id | INT | Related condition | Foreign Key |
| event_date | DATE | Date of diagnosis | NOT NULL |
| event_type | VARCHAR(50) | Type of medical event | — |
| diagnosis | TEXT | Diagnosis details | — |
| severity | VARCHAR(20) | Severity level | — |
| symptoms | TEXT | Reported symptoms | — |
| treatment | TEXT | Treatment information | — |
| outcome | TEXT | Treatment outcome | — |

| RISK_ALERT | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| alert_id | INT | Unique alert identifier | Primary Key |
| member_id | INT | Related family member | Foreign Key |
| alert_type | VARCHAR(50) | Type of alert | — |
| risk_level | VARCHAR(20) | Risk level | — |

| RISK_ALERT | | | |
|---|---|---|---|
| priority | VARCHAR(20) | Alert priority | — |
| status | VARCHAR(20) | Alert status | — |
| notes | TEXT | Medical notes | — |
| description | TEXT | Alert explanation | — |
| created_date | DATETIME | Date generated | NOT NULL |
| resolved_date | DATETIME | Date resolved | — |

| CLINIC | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| clinic_id | INT | Unique clinic identifier | Primary Key |
| clinic_name | VARCHAR(100) | Clinic name | NOT NULL |
| city | VARCHAR(50) | Clinic city | — |
| address | VARCHAR(150) | Clinic address | — |
| phone | VARCHAR(20) | Contact phone | — |

| APPOINTMENT | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| appointment_id | INT | Unique appointment ID | Primary Key |
| user_id | INT | Scheduling user | Foreign Key |
| clinic_id | INT | Associated clinic | Foreign Key |
| appointment_date | DATE | Appointment date | NOT NULL |
| appointment_time | TIME | Appointment time | NOT NULL |
| reason | TEXT | Appointment reason | — |

| APPOINTMENT | | | |
|---|---|---|---|
| status | VARCHAR(20) | Appointment status | — |

| AWARENESS_CONTENT | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| content_id | INT | Unique content ID | Primary Key |
| title | VARCHAR(150) | Content title | NOT NULL |
| topic | VARCHAR(100) | Health topic | — |
| content_type | VARCHAR(30) | Article / Video / Infographic | — |
| content_body | TEXT | Main content | — |
| created_at | DATETIME | Date created | NOT NULL |

| HEALTH_EVENT | | | |
|---|---|---|---|
| **Attribute** | **Data Type** | **Description** | **Constraints** |
| event_id | INT | Unique event ID | Primary Key |
| event_date | DATETIME | Event time | NOT NULL |
| severity | VARCHAR(20) | Severity level | — |
| symptoms | TEXT | Event symptoms | — |
| condition_name | VARCHAR(100) | Condition name | — |
| treatment | TEXT | Treatment | — |
| outcome | TEXT | Event result | — |
| event_type | VARCHAR(50) | Event category | — |
| diagnosis | TEXT | Overall findings | — |
| diagnosis_date | DATE | Date of diagnosis | — |

| HEALTH_EVENT | | | |
|---|---|---|---|
| notes | TEXT | Medical notes | — |
| onset_age | INT | Age during event | — |
| status | VARCHAR(30) | Event status | — |

**3. Mapping from EER Model to Relational Model**

The logical schema was derived directly from the conceptual EER model developed in Phase 2.

***Mapping decisions:***

- Each strong entity was mapped to a separate relation.
- One-to-many (1:N) relationships were implemented using foreign keys on the N-side.
    - Example: FAMILY_MEMBER includes user_id referencing USER.
    - Example: MEDICAL_HISTORY includes member_id and condition_id as foreign keys.
- Independent entities (e.g., AWARENESS_CONTENT) were mapped to standalone tables.
- Primary keys uniquely identify each tuple within its respective relation.
- Referential integrity is preserved using foreign key constraints.

This relational structure preserves the integrity and relationships defined in the conceptual model while preparing the database for implementation in Phase 4.

**4. Relational Diagram**

***The relational diagram includes:***

- All relations listed above

- Primary keys clearly marked
- Foreign key relationships represented with directional arrows
- One-to-many relationships implemented via foreign key references

The diagram visually demonstrates the structural integrity and relationships of the relational schema.

**5. Individual Contribution Description**

| Team Member | Contribution |
|---|---|
| Yara Albugami | Assisted in mapping User and Appointment entities into relational schema and defining key constraints. |
| Raghad Abdulaziz | Transformed FamilyMember and MedicalHistory into relational form and ensured foreign key consistency. |
| Shoug Alomran | Designed RiskAlert relational structure and verified mapping logic across modules. |
| Rose Alrakan | Developed HealthCondition, Clinic, and AwarenessContent relational definitions and reviewed overall schema consistency. |