# Assignment 1

Analyse a given business scenario and create an ER diagram that includes entities, relationships, attributes, and cardinality. Ensure that the diagram reflects proper normalization up to the third normal form.

An ER diagram for an online doctor appointment system involves identifying the main entities involved, their attributes, relationships between them, and ensuring normalization up to the third normal form (3NF). Here's a detailed breakdown:

**Entities and Attributes:**

1. **Patient**:
    - Attributes: PatientID (PK), Name, Address, Phone, Email
2. **Doctor**:
    - Attributes: DoctorID (PK), Name, Specialization, Phone, Email
3. **Appointment**:
    - Attributes: AppointmentID (PK), AppointmentDate, StartTime, EndTime

**Relationships:**

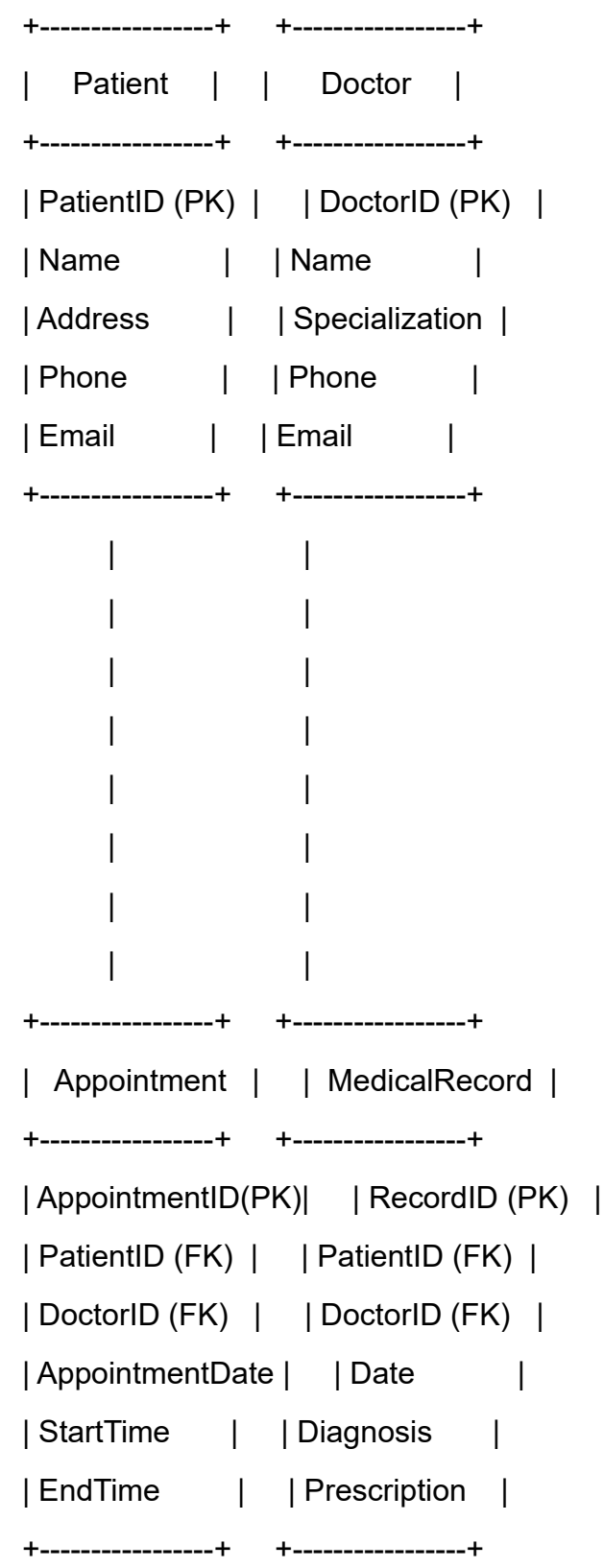
- **Patient schedules Appointment with Doctor**:
    - **Relationship**: Appointment
    - **Participation**: Total (every appointment must involve a patient and a doctor)
    - **Cardinality**: Many-to-One (Each appointment is scheduled by one patient and with one doctor)
- **Doctor schedules Appointment with Patient**:
    - **Relationship**: Appointment
    - **Participation**: Total (every appointment must involve a doctor and a patient)
    - **Cardinality**: Many-to-One (Each appointment is scheduled with one patient and by one doctor)

**Additional Entities (if required for further normalization):**

4. **Medical Record**:
    - Attributes: RecordID (PK), PatientID (FK), DoctorID (FK), Date, Diagnosis, Prescription
    - **Relationships**:
        - Patient (One-to-Many)

- Doctor (One-to-Many)

**ER Diagram:**



**Normalization:**

- **1st Normal Form (1NF)**: Each attribute contains only atomic values. The ER diagram adheres to this principle by separating entities into specific attributes.
- **2nd Normal Form (2NF)**: No partial dependencies; attributes depend on the entire primary key. In our ER diagram, each non-key attribute is fully dependent on the primary key of its respective entity.
- **3rd Normal Form (3NF)**: No transitive dependencies; attributes depend only on the primary key, not on other non-key attributes. The ER diagram is structured such that all attributes are directly related to the primary key of their entity.

This ER diagram captures the relationships between patients, doctors, appointments, and optionally medical records, ensuring data integrity and efficiency in querying and updating the system.