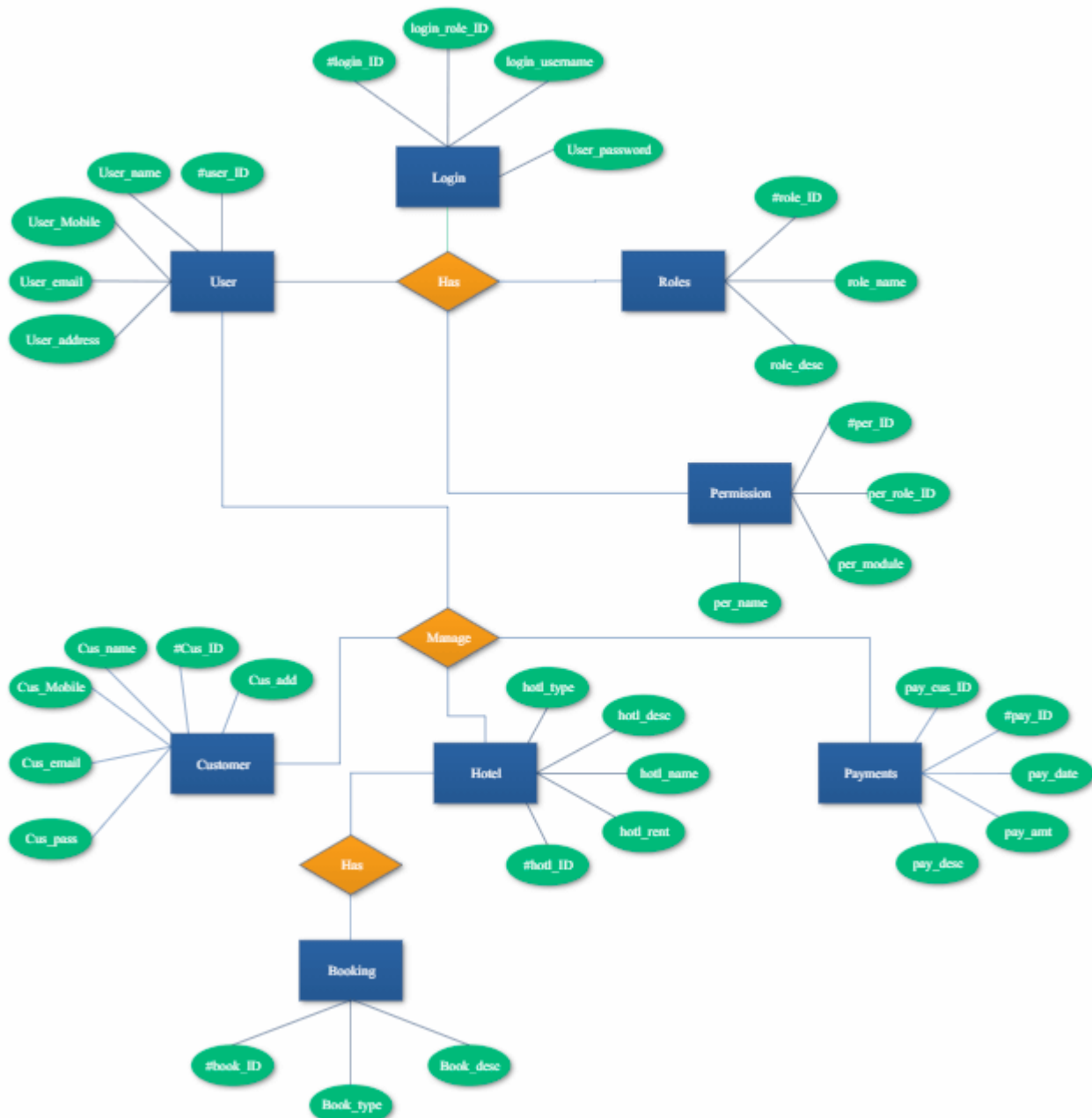# ER Diagrams Examples of Common Scenarios

We mentioned a few scenarios where ER diagrams are used. Now, let's look at a few real-life examples of ER diagrams.

#2.1 ER Diagram of Hotel Management System

The ER diagram given below is for a hotel management system. The diagram shows all the entities and the relationships between them. The data is structured and shows all the instruments of database tables.

ER diagram for Hotel Management System

Entities and their Attributes

The main entities of the Hotel Management System are a hotel, rooms, services, payments, bookings, and customers.

- **Hotel Entity:** Attributes are hotel_type, hotel_name, hotel_rent, hotel_ID and hotel_description.
- **Payments Entity:** Attributes are payment customer ID, payment_ID, payment_description, payment_date, payment_amount.
- **Customer Entity:** Attributes are customer_pass, customer_email, customer_mobile, customer_ID, customer_name, customer_address.
- **Booking Entity:** Attributes are booking_description, booking_type, booking_ID.

All the entities are normalized, and the duplicity of records is reduced. Furthermore, there are one-to-one and one-to-many relationships.

#2.2 ER Diagram of Database - University Database

A university database consists of all the information regarding a student. Although such a database is not suitable for a large institution, it illustrates relationships that help resolve queries.
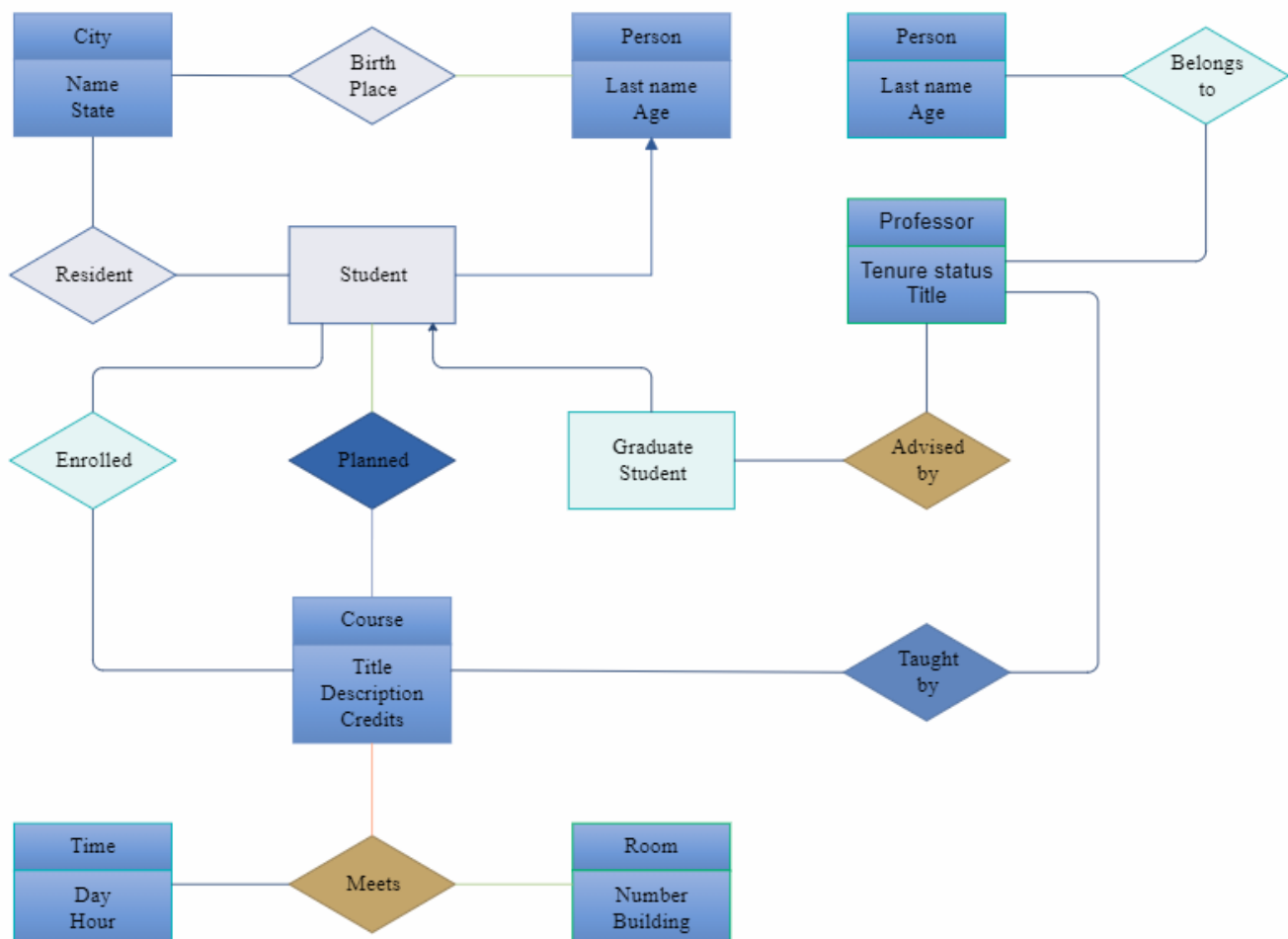

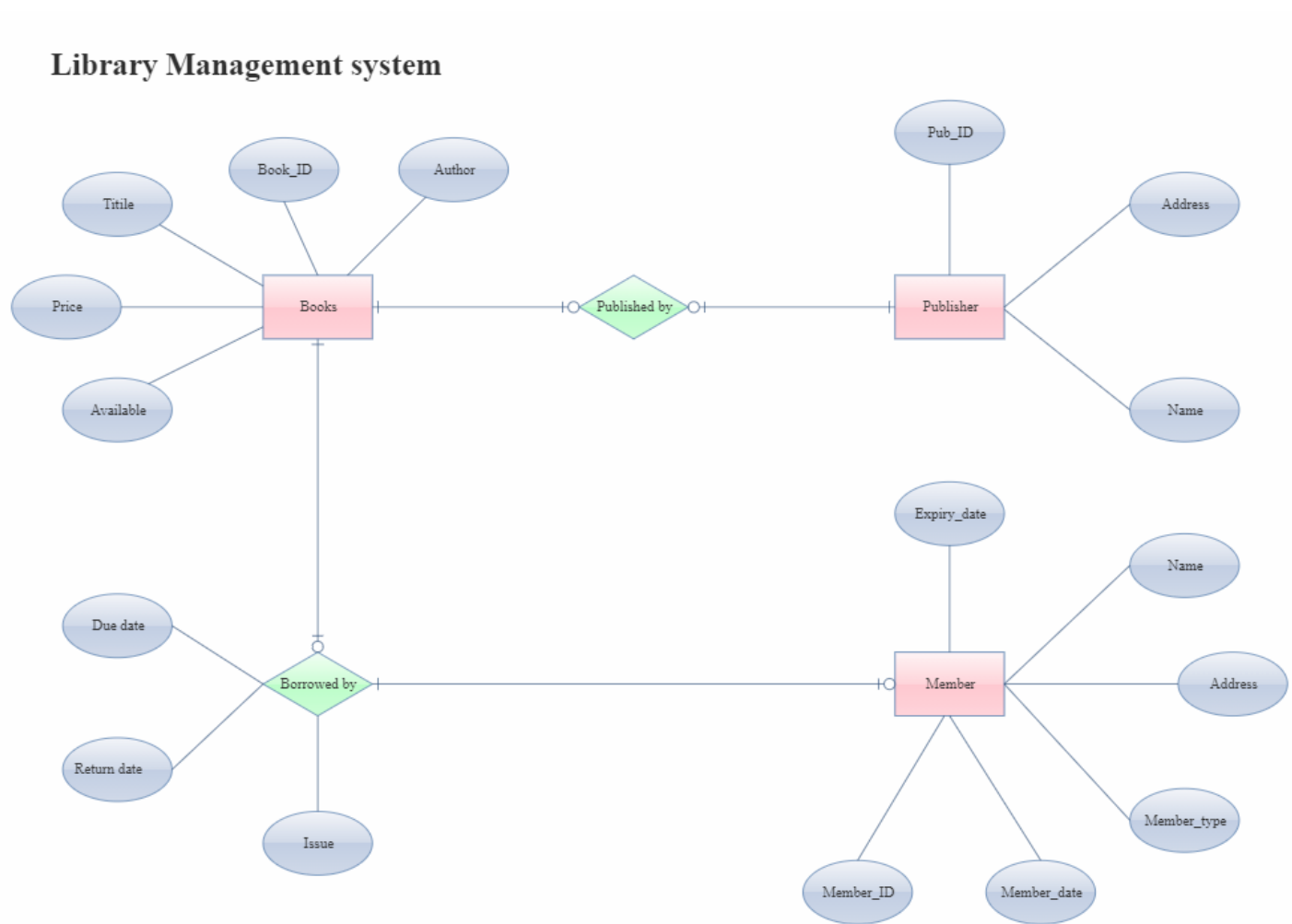ER Diagram of Database - University Database

Entities and their Attributes

- **Student Entity:** Attributes are a name, age, birthplace, birthday, etc.
- **Course Entity:** Attributes are course title, course description, credit hours, course teacher.
- **Professor Entity:** Attributes are tenure status, job title, name, age.

A student enrolls in many courses, so it's a one-to-many relationship.

#2.3 ER Diagram of Library Management System

The library management system has a database that shows the relationships between the entities such as a book, publisher, and member. Since this is a simple system, it has only three entities. Other systems can be more complex with a more significant number of entities such as staff etc.

ER Diagram of Library Management System

Entities and their Attributes

- **Book Entity:** It has author, book_ID, title, price, and availability.
- **Publisher Entity:** It has publisher_ID, publisher_address, and publisher_name.

- **Member Entity:** It has member_ID, member_date, member_type, member_address, member_name, and expiry_date.

In this example, we can again see one-to-one and one-to-many relationships. A member can borrow many books, but only one reader can borrow one book. So, the relationship is 1: Many.

#2.4 ER Diagram of Online Shopping System

The ER diagram given below is for an Online Shopping Management System. The purpose of this ER diagram is to use a database and Java to create a good project.

ER Diagram of Online Shopping System
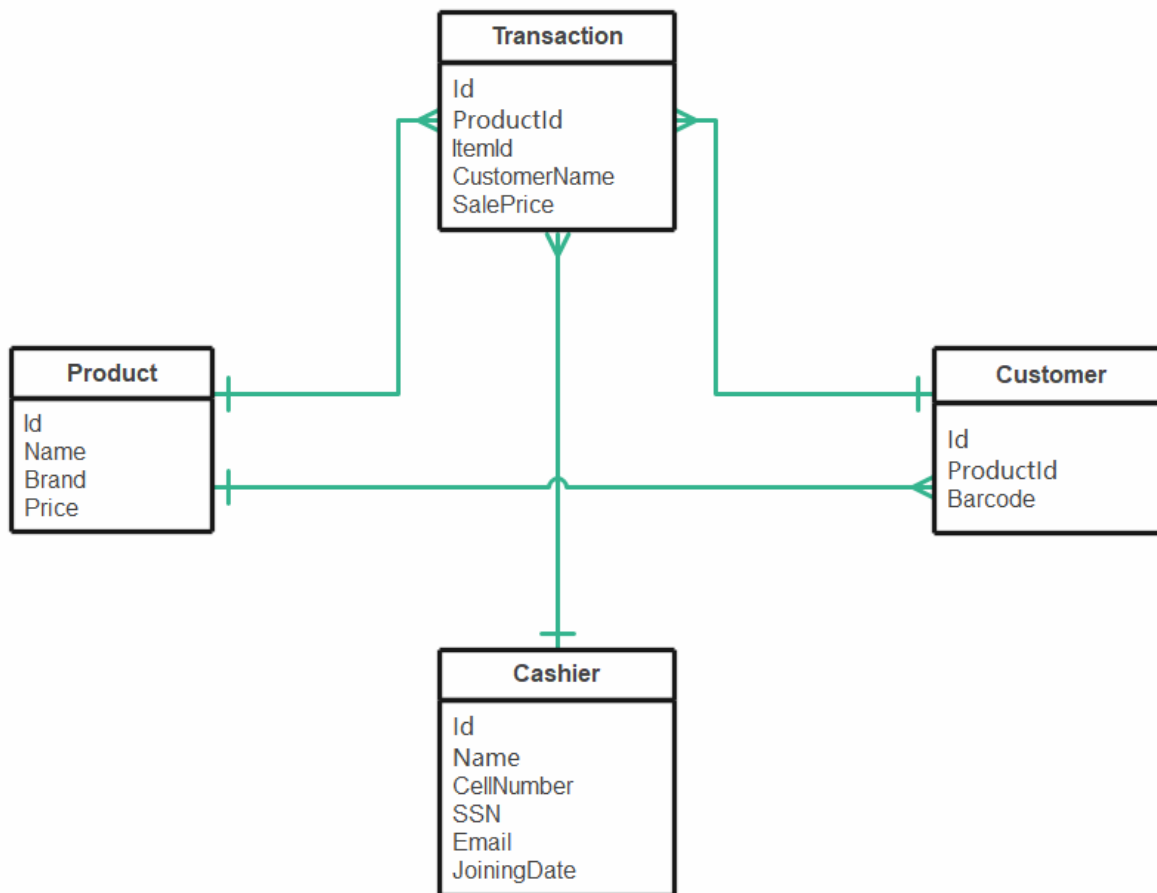
Entities and their Attributes

- **Website/Application Entity:** Attributes are domain name and app name.
- **Customer Entity:** Attributes are username, password, email address, mobile number, country name, district, address, C_id.
- **Products Entity:** Attributes are product ID, P_name, P_category, P_price, P_availability.
- **Admin Entity:** Attributes are username, password, A_id.
- **Shopping Cart Entity:** Attributes are product id, product name, total price, billing products.

- **Registration Entity:** Attributes are user id, username, password, forgot password, signup.

We can observe some relationships between the entity and its attributes, such as the entity mobile app and its domain name attribute. This shows that the project head will create the project based on software. Besides, we can also find other relationships between customers and admin, products and admin, etc.

#2.5 ER Diagram of NoSQL Database

Given below is a template for a NoSQL database ER diagram.
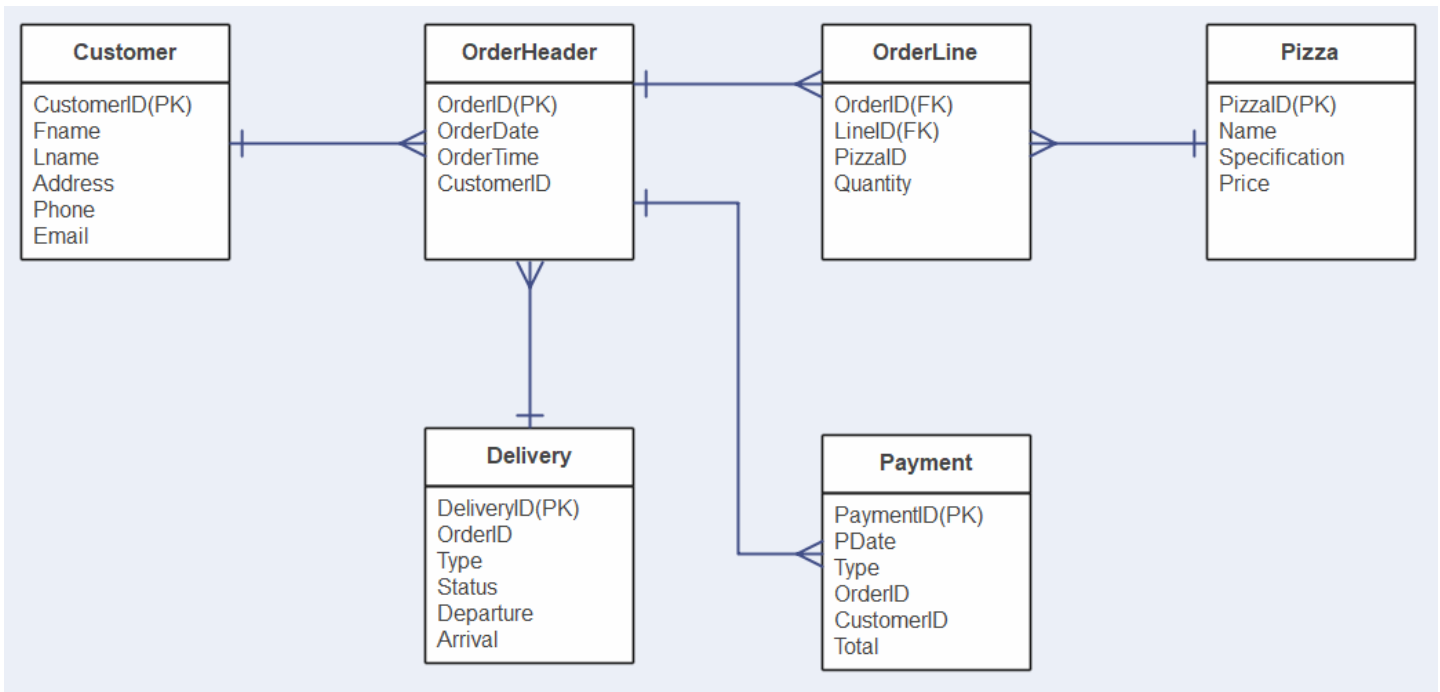

ER Diagram of NoSQL Database

Entities and their Attributes

- **Transaction Entity:** Attributes are transaction Id, productId, Item Id, customer name, and sale price.
- **Customer Entity:** Attributes are customer id, product id, and barcode.
- **Products Entity:** Attributes are product id, product name, product brand, product price.
- **Cashier Entity:** Attributes are cashier id, cashier name, cashier cell number, cashier social security number, cashier email, and cashier's joining date.

You can observe the relationships between the product and customer and product and transaction. This is a one-to-many relationship. Other relationships include cashier to transaction and transaction to the customer.

#2.6 ER Diagram of One-to-Many Relationship

Following is an example of an ER diagram that is showing a one-to-many relationship.

Customer	OrderHeader	OrderLine	Pizza
CustomerID(PK) Fname Lname Address Phone Email	OrderID(PK) OrderDate OrderTime CustomerID	OrderID(FK) LineID(FK) PizzaID Quantity	PizzaID(PK) Name Specification Price

Delivery	Payment
DeliveryID(PK) OrderID Type Status Departure Arrival	PaymentID(PK) PDate Type OrderID CustomerID Total

ER Diagram of One-to-Many Relationship
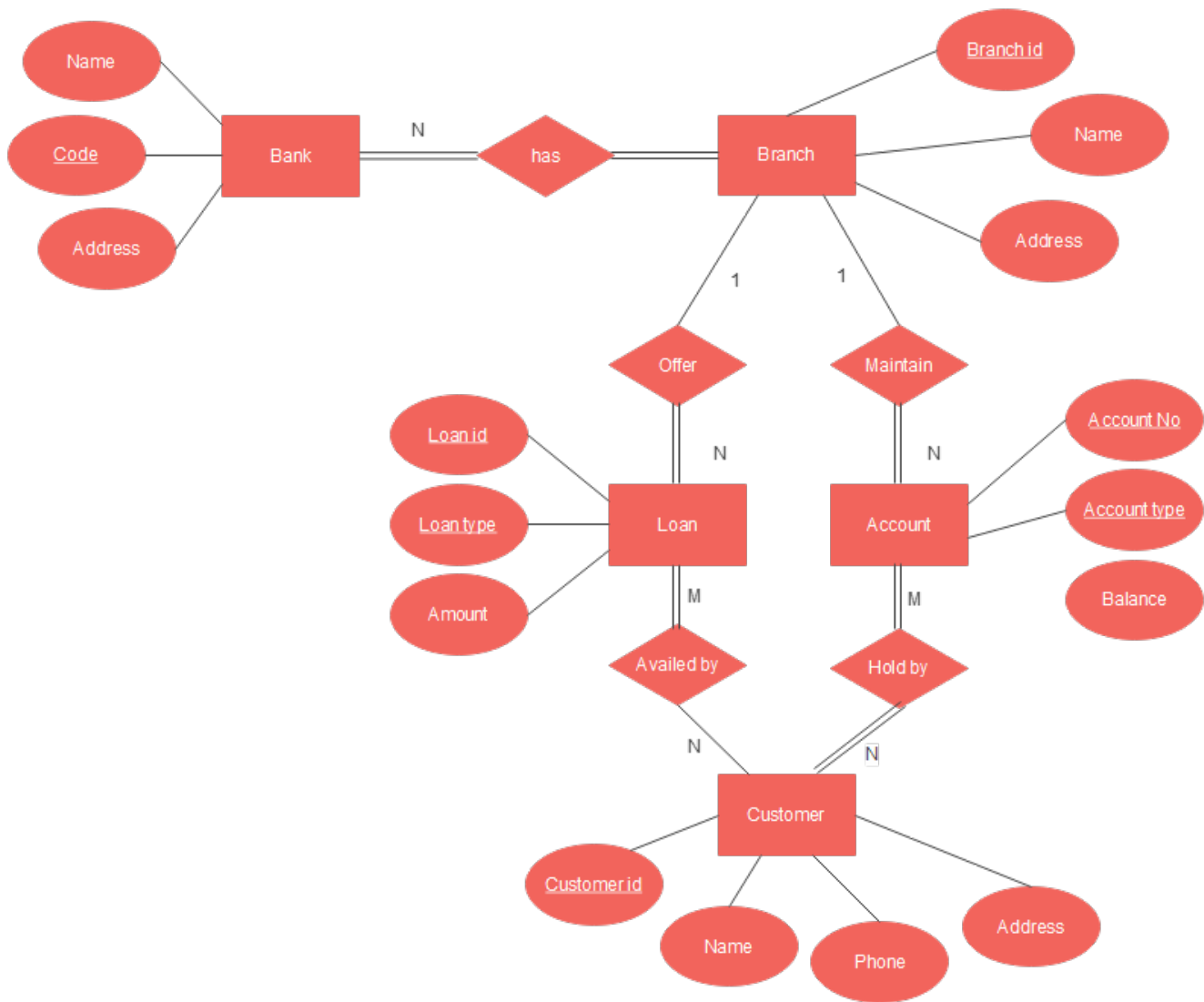
Entities and their Attributes

- **Delivery Entity:** Attributes are delivery ID, order ID, type, status, departure, arrival.
- **Customer Entity:** Attributes are customer ID, phone, email, customer's address.
- **Payment Entity:** Attributes are payment id, payment date, type, order ID, customer ID, total payment.
- **Order Header Entity:** Attributes are order ID, order date, order time, and customer ID.
- **Order Line Entity:** Attributes are order id, line id, pizza id, and quantity.
- **Pizza Entity:** Attributes are pizza id, name, specification, and price.

You can observe the one-to-many relationships such as order time of order header entity is linked to the payment type, payment date, and order id of the payment entity.

#2.7 ER Diagram of Banking System

The ER diagram given below is for the Bank Management System. It illustrates critical information about the bank.

ER Diagram of Banking System

ER Diagram of Banking System
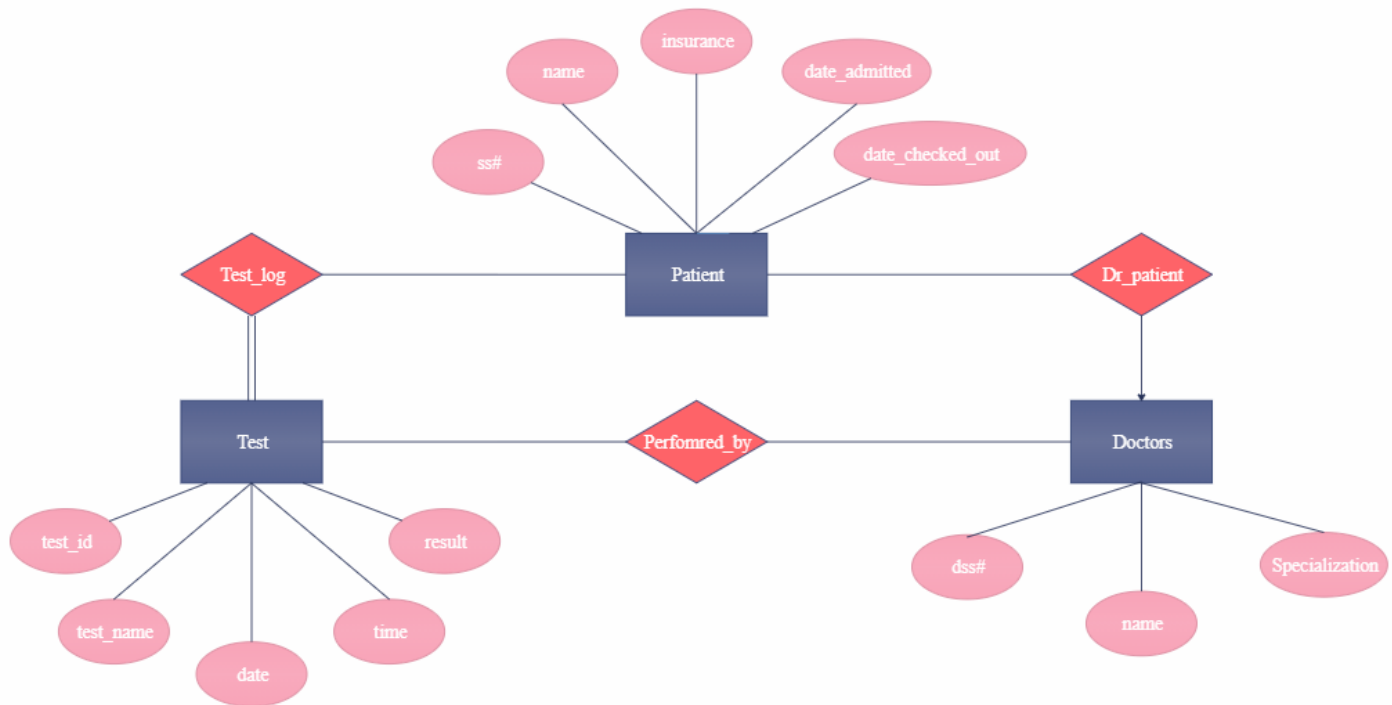
Entities and their Attributes

- **Bank Entity:** Attributes are bank name, code, and address.
- **Customer Entity:** Attributes are customer_id, name, phone number, and customer's address.
- **Branch Entity:** Attributes are branch_id, branch name, and branch address.
- **Account Entity:** Attributes are account_number, account_type, and account balance.
- **Loan Entity:** Attributes are loan_id, loan_type, and loan amount.

You can observe different relationships, such as a branch offering many loans, so 1: N relationship. Other relationships such as M: N can also be observed.

#2.8 ER Diagram of Hospital Management System

The below ER diagram is for a hospital management system. You can see the different entities and how they relate to each other.

ER diagram of Hospital

ER Diagram of Hospital Management System

Entities and their Attributes

- **Patient Entity:** Attributes are social security number, name, insurance, date of admission, date of checking out.
- **Doctors Entity:** Attributes are dss#, name, specialization.
- **Test Entity:** Attributes are test_id, test_name, test date, test time, test result.