Key Constraints

- Key constraints
  - Primary Key
  - Foreign Key
  - Domain constraints

Key Constraints ....

- Primary Key constraints force that –

  In a relation with a key attribute, no two tuples can have identical values for key attributes and a key attribute can not have NULL values.

- Domain constraints
  - Every attribute is bound to have a specific range of values.
  - Example : Age can not be negative

Key Constraints ....

- Referential integrity constraints

  Every relation has some conditions that must hold for it to be a valid relation. These conditions are called **Referential Integrity Constraints**.

  If a relation refers to a key attribute of a different or same relation, then that key element must exist. Example:-An employee can work in particular department if that department is exist in Department table.

ER DIAGRAM OF A COMPANY

ER diagram of Company has the following description

- Company has several departments.
- Each department may have several Location.
- Departments are identified by a name, D_no, Location.
- A Manager control a particular department.
- Each department is associated with number of projects.
- Employees are identified by name, id, address, dob, dat e_of_joining.
- An employee works in only one department but can work on several project.
- We also keep track of number of hours worked by an employee on a single project.
- Each employee has dependent
- Dependent has De_no., D_Name, Gender and Relationship.

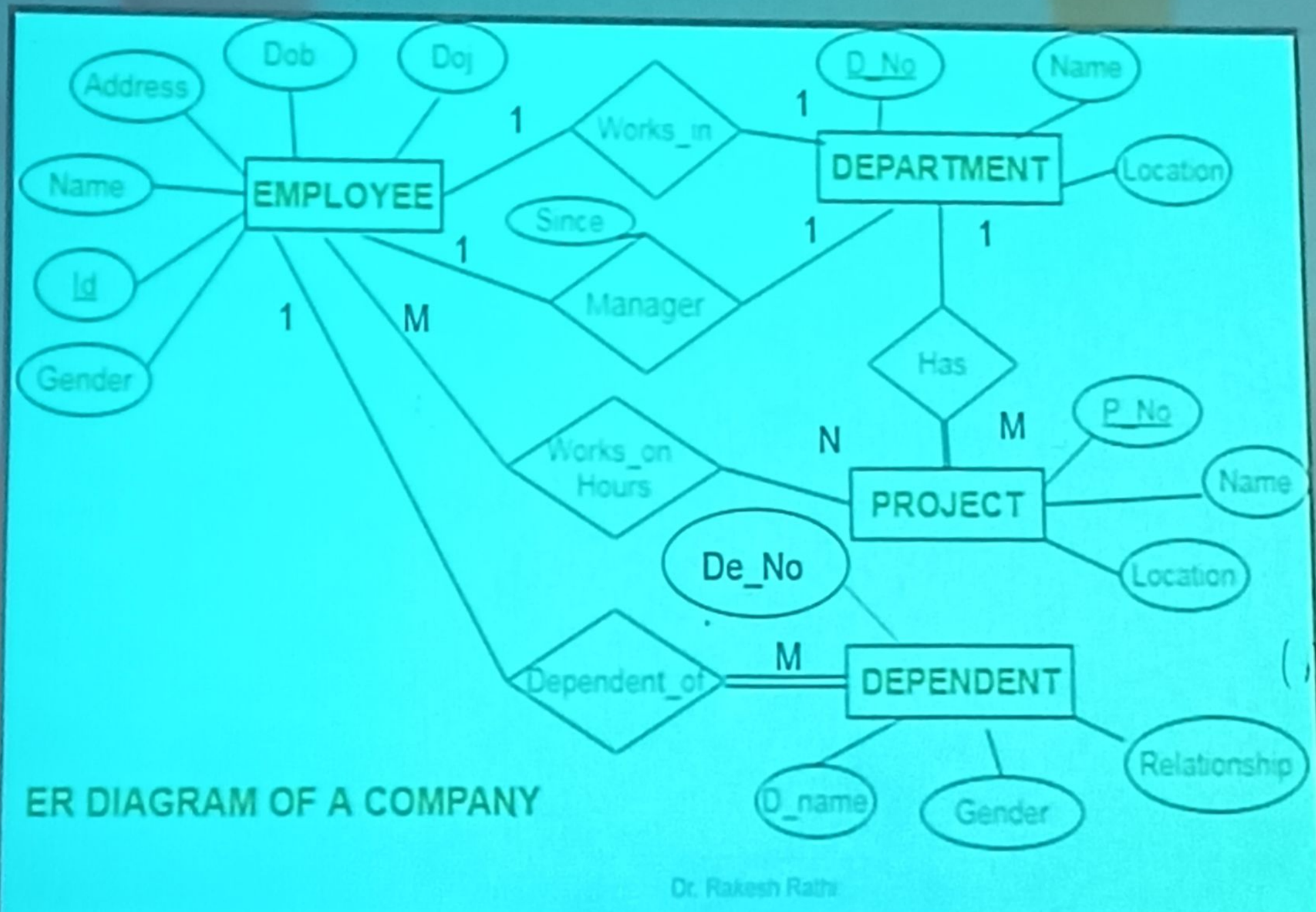
Entities and their **Attributes** are

- **Employee Entity :** Attributes of Employee Entity are Name, Id, Address, Gender, Dob and Doj.
  Id is Primary Key for Employee Entity.
- **Department Entity :** Attributes of Department Entity are D_no, Name and Location.
  D_no is Primary Key for Department Entity.
- **Project Entity :** Attributes of Project Entity are P_No, Name and Location.
  P_No is Primary Key for Project Entity.
- **Dependent Entity :** Attributes of Dependent Entity are De_No, Gender and relationship , D_Name.

Relationships are :

- **Employees works in Departments –**
  Many employee works in one Department but one employee can not work in many departments.
- **Manager controls a Department –**
  employee works under the manager of the Department and the manager records the date of joining of employee in the department.
- **Department has many Projects –**
  One department has many projects but one project can not come under many departments.
- **Employee works on project –**
  One employee works on several projects and the number of hours worked by the employee on a single project is recorded.
- **Employee has dependents –**
  Each Employee has dependents. Each dependent is dependent of only one employee.

ER DIAGRAM OF A COMPANY



ER DIAGRAM OF A COMPANY

Entities and their attributes are:-

Bank(#Name, Code, Address)

Branch(#Branch_id, Name, Address)

Loan(#Loan_id, Loan_type, Amount)

Account(#Account_No, Acc_Type, Balance)

Customer(#Custid, Name, Phone, Address)

Relationships are :

- **Bank has Branches => 1 : N**

  One Bank can have many Branches but one Branch can not belong to many Banks, so the relationship between Bank and Branch is one to many relationship.

- **Branch maintain Accounts => 1 : N**

  One Branch can have many Accounts but one Account can not belong to many Branches, so the relationship between Branch and Account is one to many relationship.

- **Branch offer Loans => 1 : N**

  One Branch can have many Loans but one Loan can not belong to many Branches, so the relationship between Branch and Loan is one to many relationship.

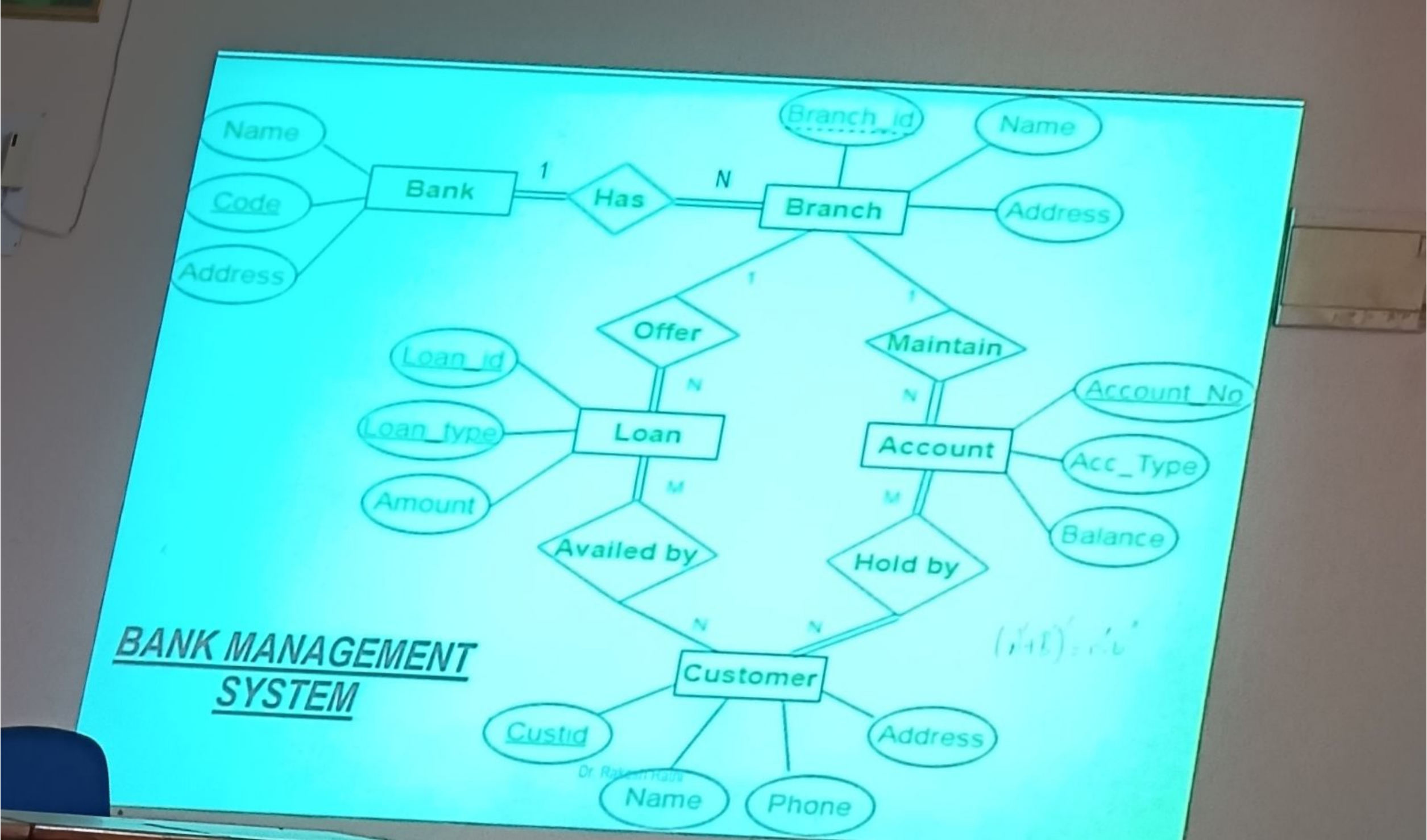
- **Account held by Customers => M : N**

  One Customer can have more than one Accounts and also One Account can be held by one or more Customers, so the relationship between Account and Customers is many to many relationship.

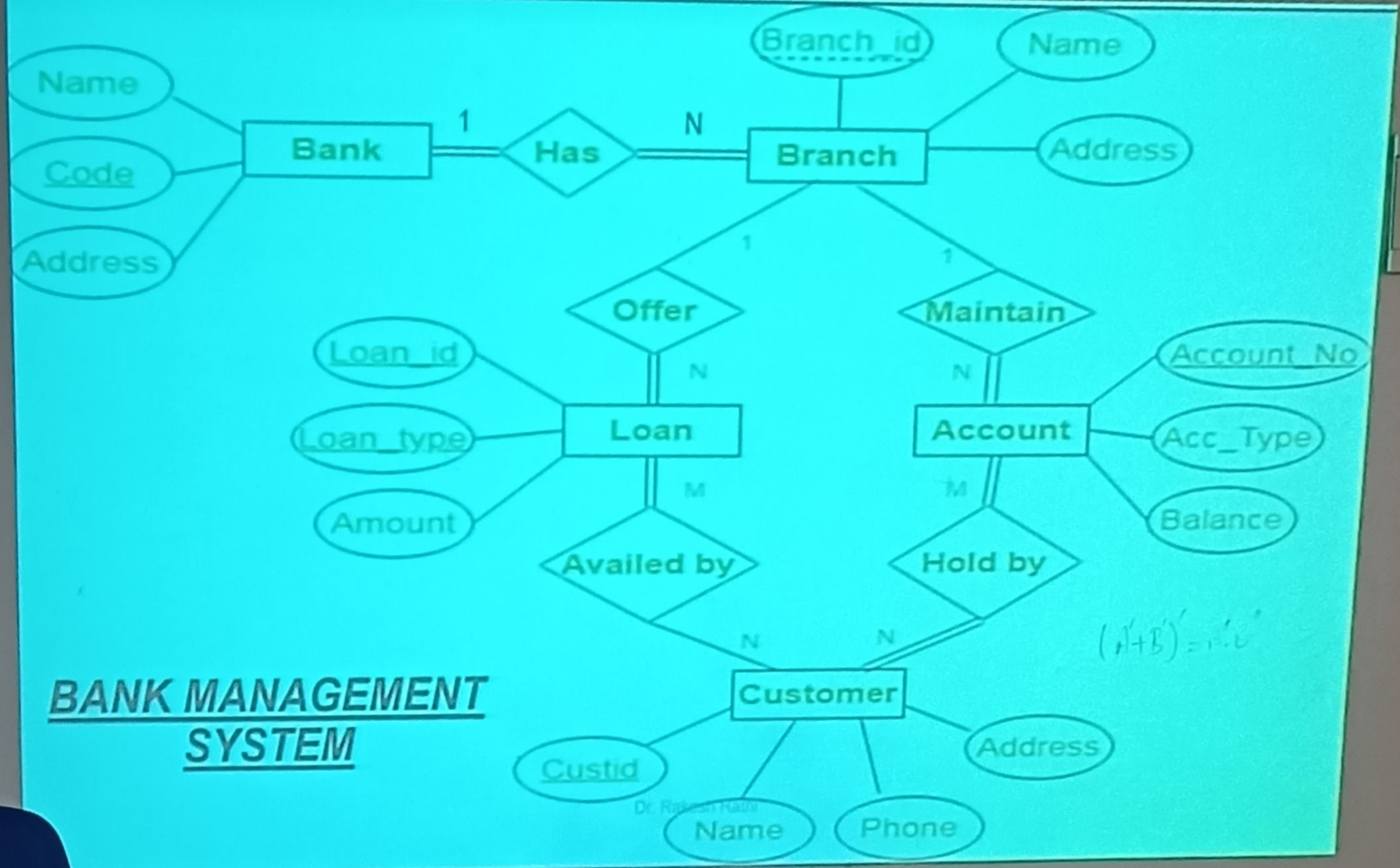
- **Loan availed by Customer => M : N**

  (Assume loan can be jointly held by many Customers).

  One Customer can have more than one Loans and also One Loan can be availed by one or more Customers, so the relationship between Loan and Customers is many to many relationship.


BANK MANAGEMENT SYSTEM
Bank
Name
Code
Address
1
Has
N
Branch
Branch_id
Name
Address
1
1
Offer
Maintain
N
N
Loan
Loan_id
Loan_type
Amount
Account
Account_No
Acc_Type
Balance
M
M
Availed by
Hold by
N
N
Customer
Custid
Name
Phone
Address

BANK MANAGEMENT SYSTEM



ER DIAGRAM OF A LIBRARY MANAGEMENT SYSTEM

The Library Management System database keeps track of readers with the following considerations –

- The system keeps track of the staff with a single point authentication system comprising login Id and password.
- Staff maintains the book catalog with its ISBN, Book title, price(in INR), category(novel, general, story), edition, author Number and details.
- A publisher has publisher Id, Year when the book was published, and name of the book.
- Readers are registered with their user_id, email, name (first name, last name), Phone no (multiple entries allowed), communication address. The staff keeps track of readers.
- Readers can return/reserve books that stamps with issue date and return date. If not returned within the prescribed time period, it may have a due date too.
- Staff also generate reports that has readers id, registration no of report, book no and return/issue info.