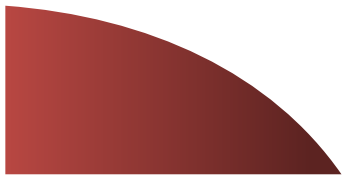
Participation Constraints

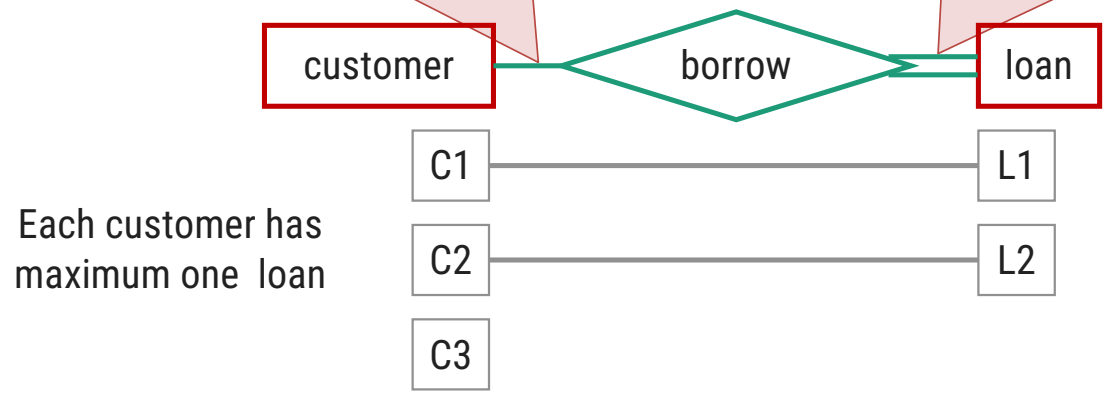


Participation Constraints

- It specifies the **participation of an entity set** in a relationship set.
- Participation/Existence: Minimum number of time the entity participate in a relationship.
- There are two types participation constraints:
  - Total participation
  - Partial participation

Partial participation
- some entities in the entity set may not participate in any relationship in the relationship set.
- indicated by single line

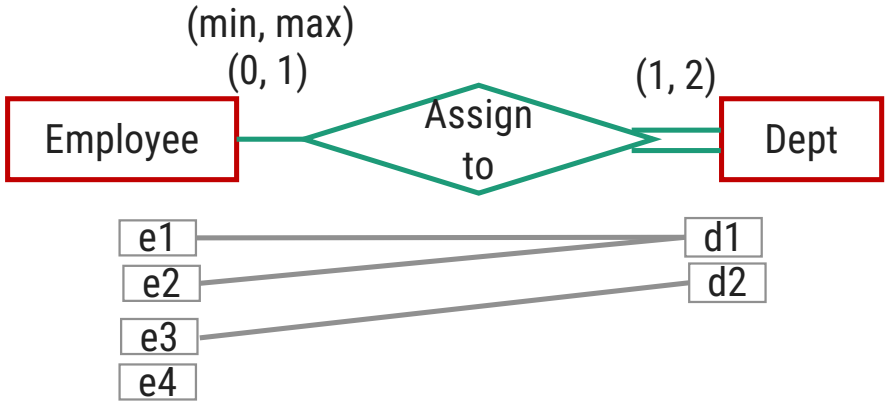
Total participation
- every entity in the entity set participates in at least one relationship in the relationship set.
- indicated by double line



Each customer has maximum one loan

Cardinality Ratio or (min, max) Notation for Relationship

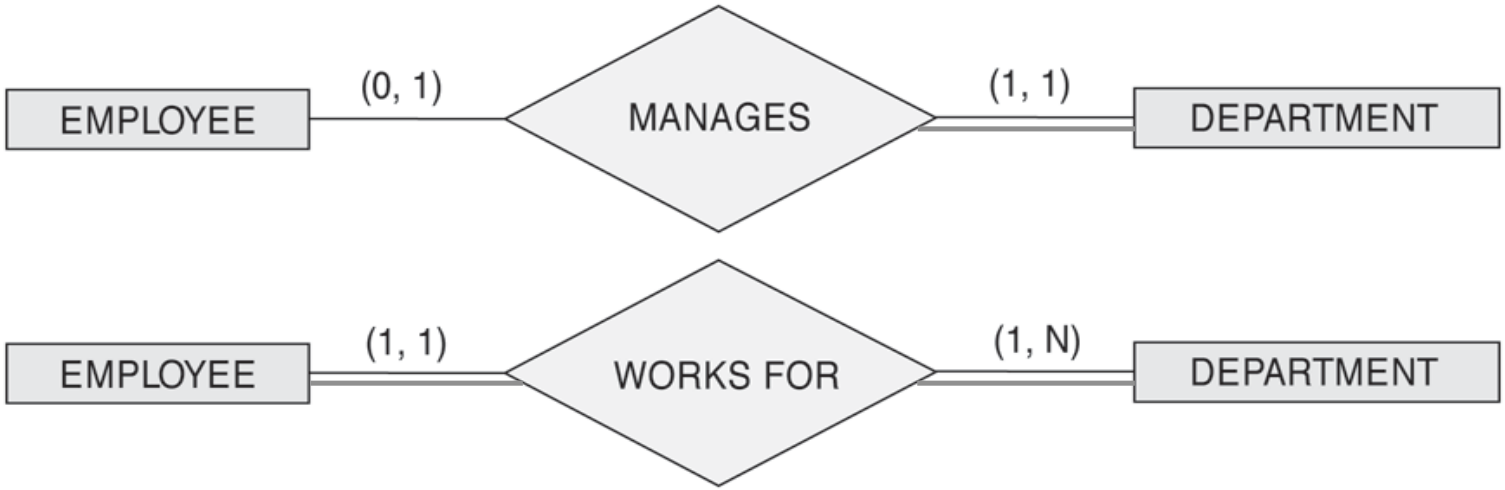
- **Cardinality Ratio:** It defines minimum and maximum entity occurrences that participating in a relationship.
- Each entity e in E participates in at least *min* and at most *max* relationship instances in R.
- Must have min≤max, 0≤ min ≤1≤max, Default(no constraint): min=0, max=n.



- Examples:
  - A department has exactly one manager and an employee can manage at most one department.
    - Specify (1,1) for participation of DEPARTMENT in MANAGES
    - Specify (0,1) for participation of EMPLOYEE in MANAGES
  - An employee can work for exactly one department but a department can have any number of employees.
    - Specify (1,1) for participation of EMPLOYEE in WORKS_FOR
    - Specify (1,n) for participation of DEPARTMENT in WORKS_FOR

Example: (min, max) notation for relationship

- Read the min, max numbers next to the entity type and looking **away from** the entity type



Note: If minimum cardinality is 0 then it is partial participation. If minimum cardinality is 1 then total participation.

Ramez Elmasri and Shamkant B. Navathe. 1989. Fundamentals of database systems. Benjamin-Cummings Publishing Co., Inc., USA.

Exercises:

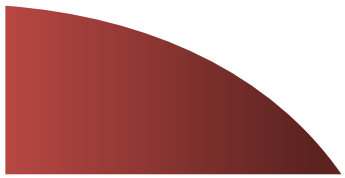
- Interpret the following sample of E-R diagram and explain the relationship in terms of participation.

- Draw the E-R diagram for the following:
  - All project need not have employee. Maximum 25 employee can work on a project. Each employee can participate at least two and maximum of 4 projects.

Note: If minimum cardinality is 0 then it is partial participation. If minimum cardinality is 1 then total participation.

Ramez Elmasri and Shamkant B. Navathe. 1989. Fundamentals of database systems. Benjamin-Cummings Publishing Co., Inc., USA.

Keys



Keys : Super Key and Candidate Key

- **Key or Super Key:** An attribute or collection of attributes whose value uniquely identify an entity in the entity set.
  - **Example:** rollno, empid.
  - **Note:** A super key may have more than one attribute and an entity set may have more than one super key.
  - {Student Name, Roll} is a super key.

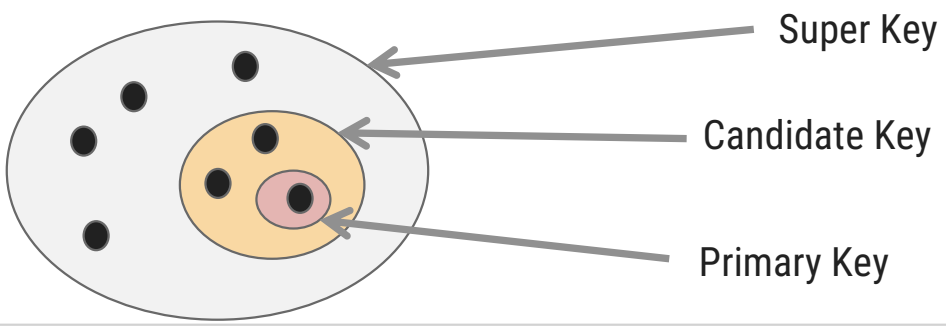
Name	Roll No.	Branch
Ajay	101	ENC
Tanya	102	ENC
Rohan	104	CSE
Ajay	106	CSE
Jatin	108	EC

- **Candidate Key:** Super key whose proper subset cannot be a super key.
  - **Example:** {Roll No.}, {Name, Branch}

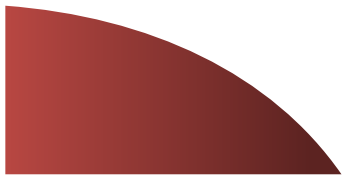
- **Primary Key:** Any one candidate key which is selected for manipulating the data base.

CAR

License_number	Engine_serial_number	Make	Model	Year
Texas ABC-739	A69352	Ford	Mustang	02
Florida TVP-347	B43696	Oldsmobile	Cutlass	05
New York MPO-22	X83554	Oldsmobile	Delta	01
California 432-TFY	C43742	Mercedes	190-D	99
California RSK-629	Y82935	Toyota	Camry	04
Texas RSK-629	U028365	Jaguar	XJS	04

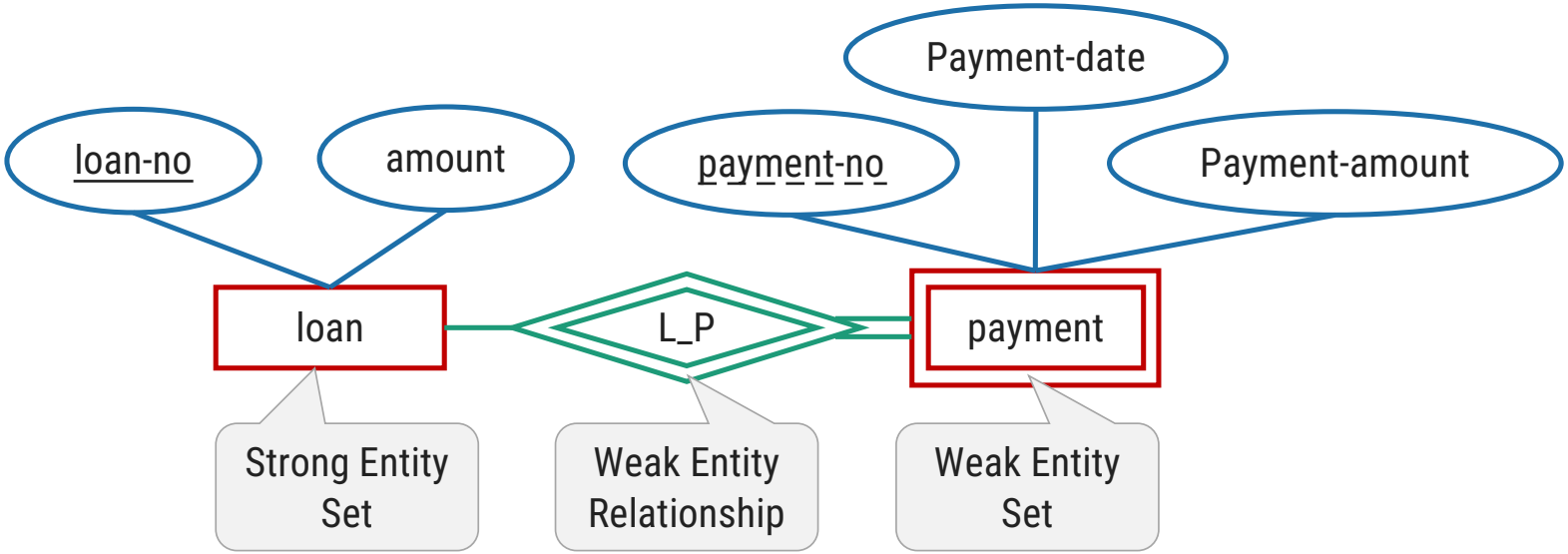


Weak Entity Set



Weak Entity Set

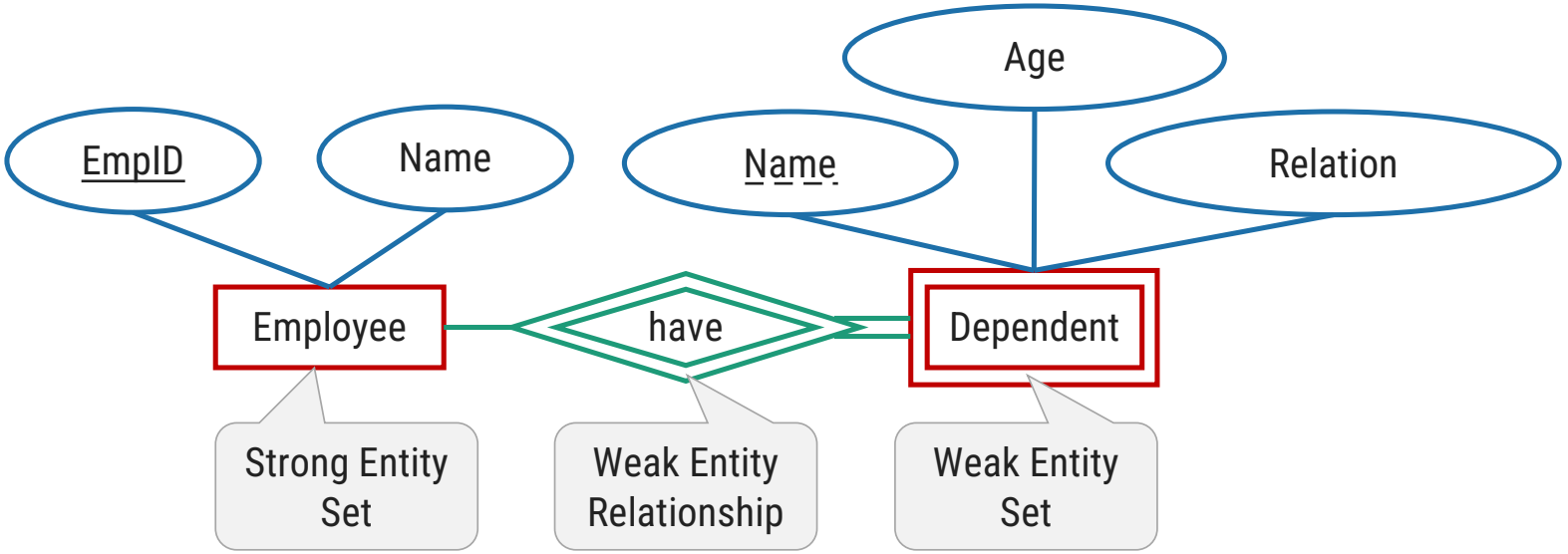
- An **entity set that does not have a primary key** is called weak entity set.



- Weak entity set is indicated by double rectangle.
- Weak entity relationship set is indicated by double diamond.

Weak Entity Set

- The **primary key** of a weak entity set is created by **combining the primary key of the strong entity set** and the **weak entity set's partial key**.



Weak Entity Set

- Entity types that **do not have any key** attribute and **can not be identified independently** are called weak entity.
- The **existence of a weak entity set** depends on the **existence of a strong entity set**
- Entities belonging to a weak entity set are identified by being related to specific entities from another entity set in combination with one of their attribute values.
- The **discriminator (partial key)** of a weak entity set is the set of **attributes that distinguishes all the entities** that are related to the same owner entity.
- We underline the discriminator attribute of a weak entity set with a **dashed line**.
- Payment entity has payment-no which is discriminator.
- Loan entity has loan-no as primary key.
- So primary key for payment is **(loan-no, payment-no).**