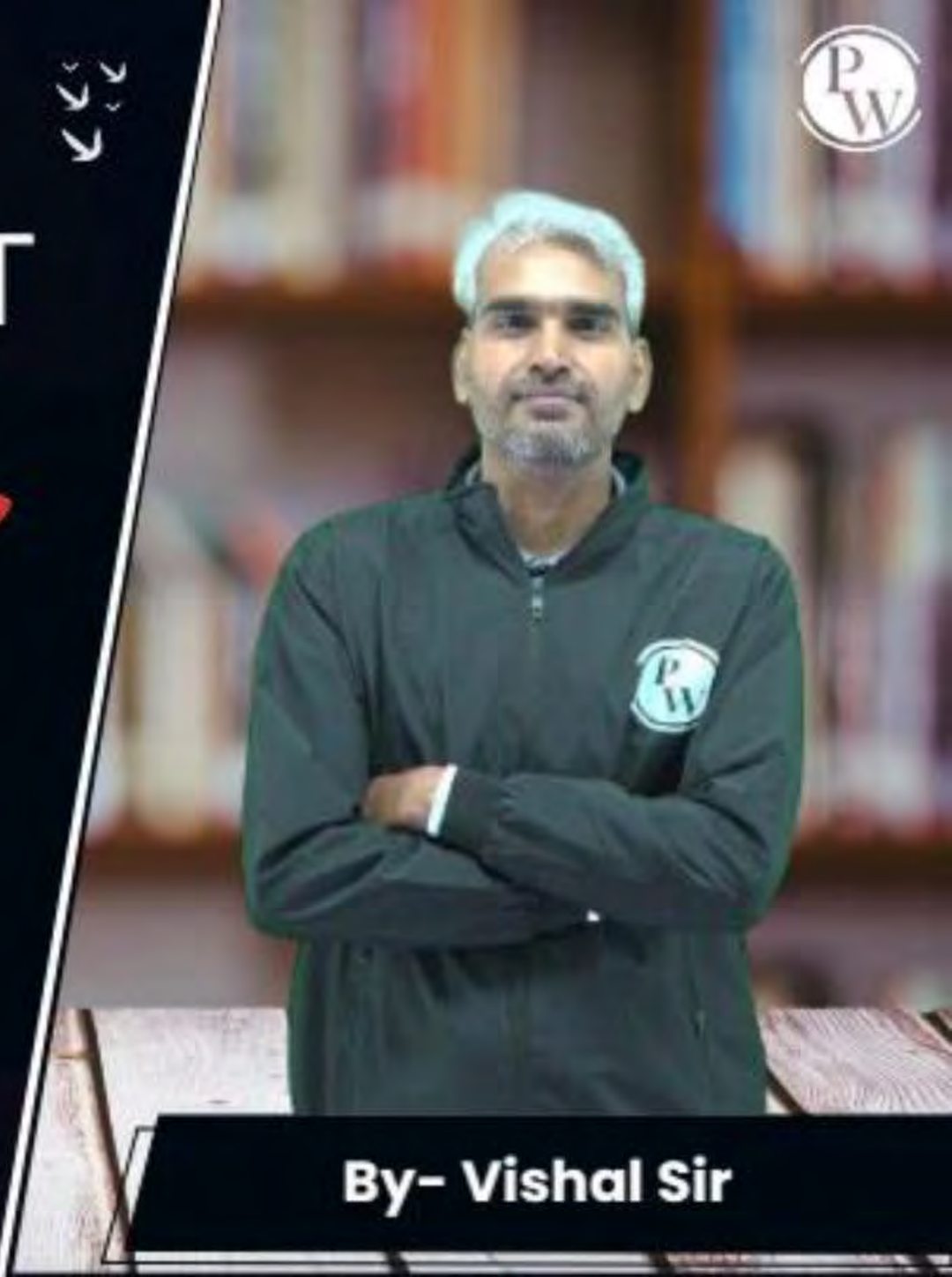
Computer Science & IT

Database Management System

Entity Relationship Model & Integrity constraints

Lecture No. 03



By- Vishal Sir

Recap of Previous Lecture

Topic — ER model & ER diagram

Topic — Terminologies related to ER model

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Topics to be Covered

- Topic: Mapping cardinalities (Cardinality ratio)
- Topic: Mix-max representation
- Topic: Relational table w.r.t. Entity type

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Topic : Mapping cardinality

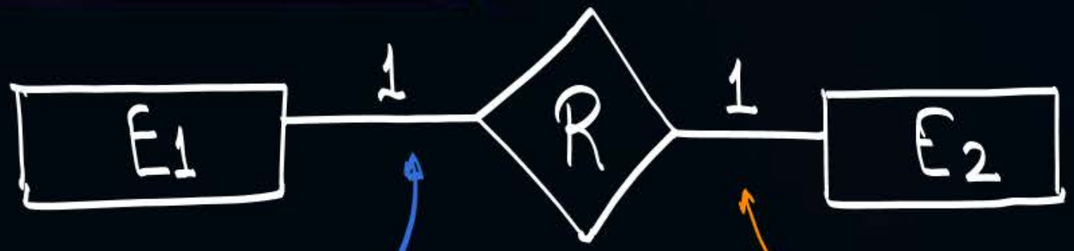
Mapping cardinality or cardinality ratio is used to denote the number of entities to which another entity can be associated through a certain relation set.

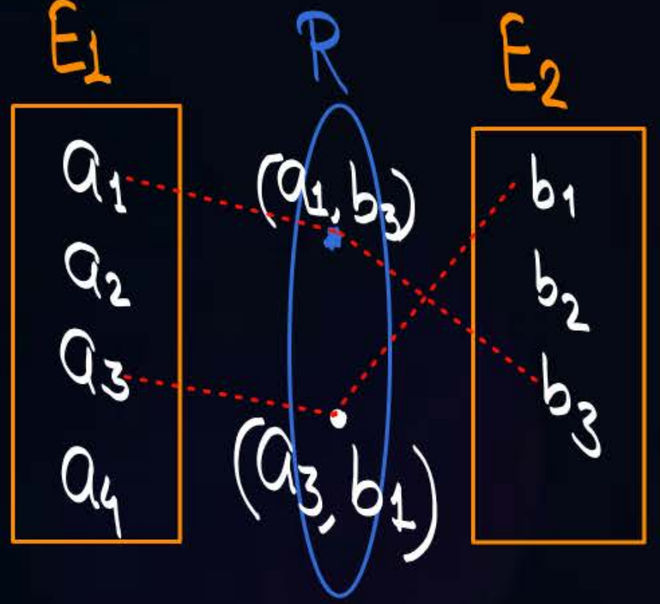
- For a binary relationship set mapping cardinalities must be one of the following types:

1. One-to-one
2. One-to-many
3. Many-to-one
4. Many-to many

Topic : One-to-one

$E_1 : E_2 = 1 : 1$





An Entity of Entity set E_2 Can associate with at most '1' Entity of set E_1

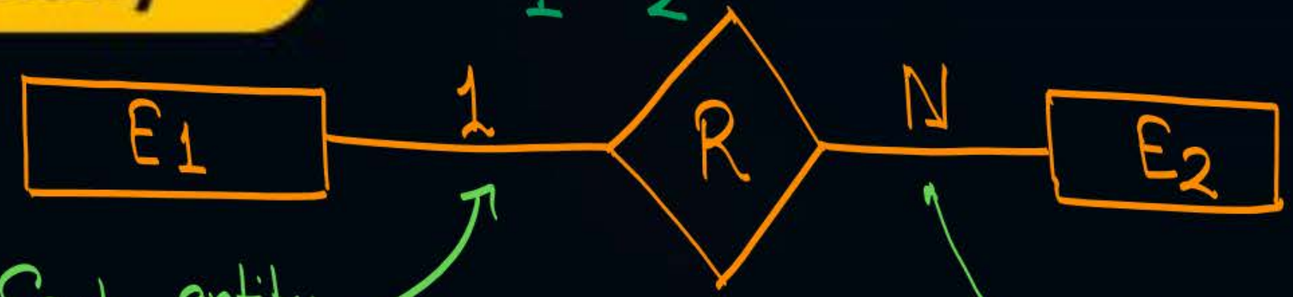
Each Entity of set E_2 Can appear at most once in the relationship set

An Entity of Entity set E_1 Can associate with at most one Entity of set E_2

Each entity of set E_1 Can appear at most once in the relationship set

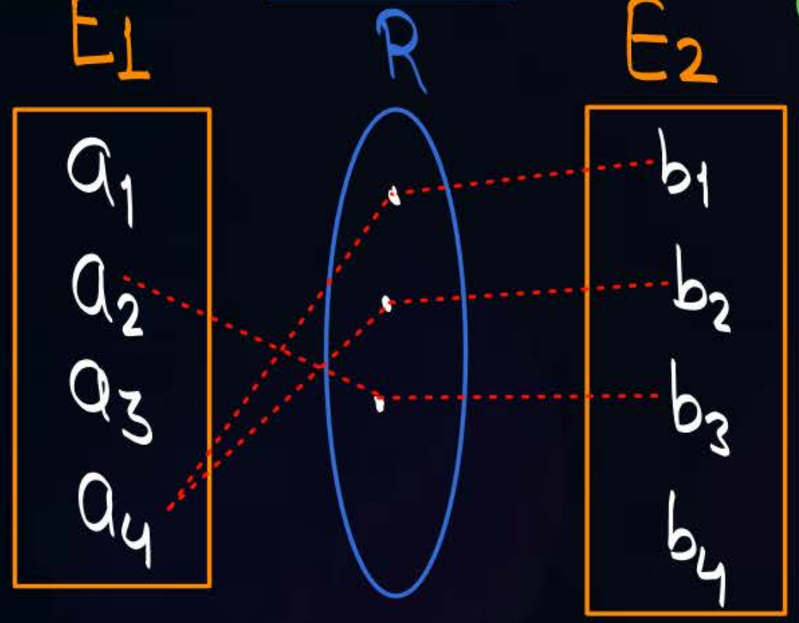
Topic : One-to-many

$E_1 : E_2 \equiv 1 : N$



"Relationship set R"

a_4	b_1
a_4	b_2
a_2	b_3



Each entity of set E_2 can associate with atmost one entity of set E_1

↓

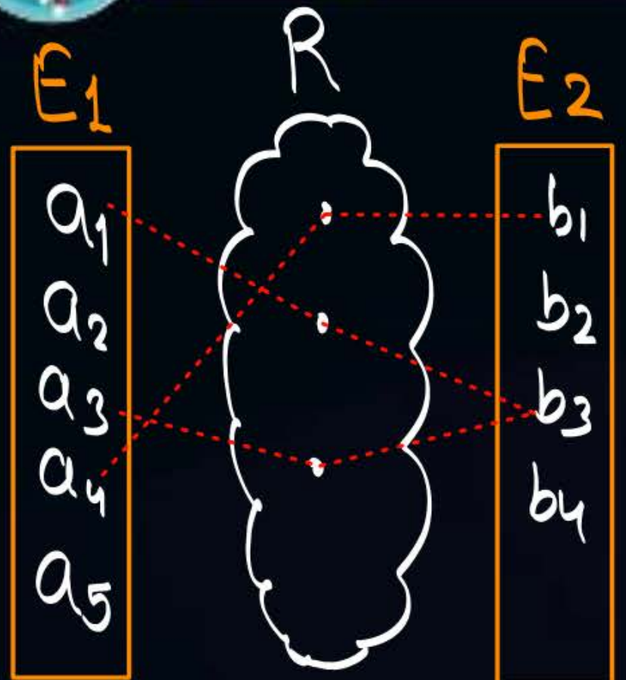
Each entity of set E_2 can appear atmost once in the relationship set

Each entity of set E_1 can associate with at most N (Many) {i.e. 0 to N} {0 or More} entities of set E_2

↓

Each entity of set E_1 can appear any no. of times in relationship set

Topic : Many-to-one



a_1	b_3
a_3	b_3
a_4	b_1

$E_1 : E_2 \equiv N : 1$

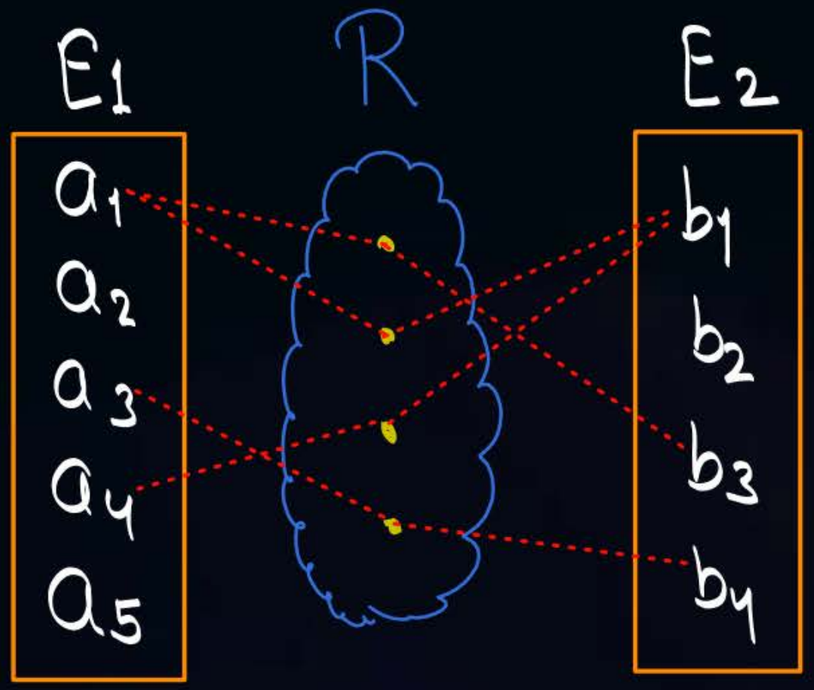
Each entity of set E_2 can associate with 0 or More (N) entities of set E_1

Entity of set E_2 can appear any no. of times in relationship set

Each entity of set E_1 can associate with at most one entity of set E_2

Each entity of set E_1 can appear at most once in relationship set

Topic : Many-to-many

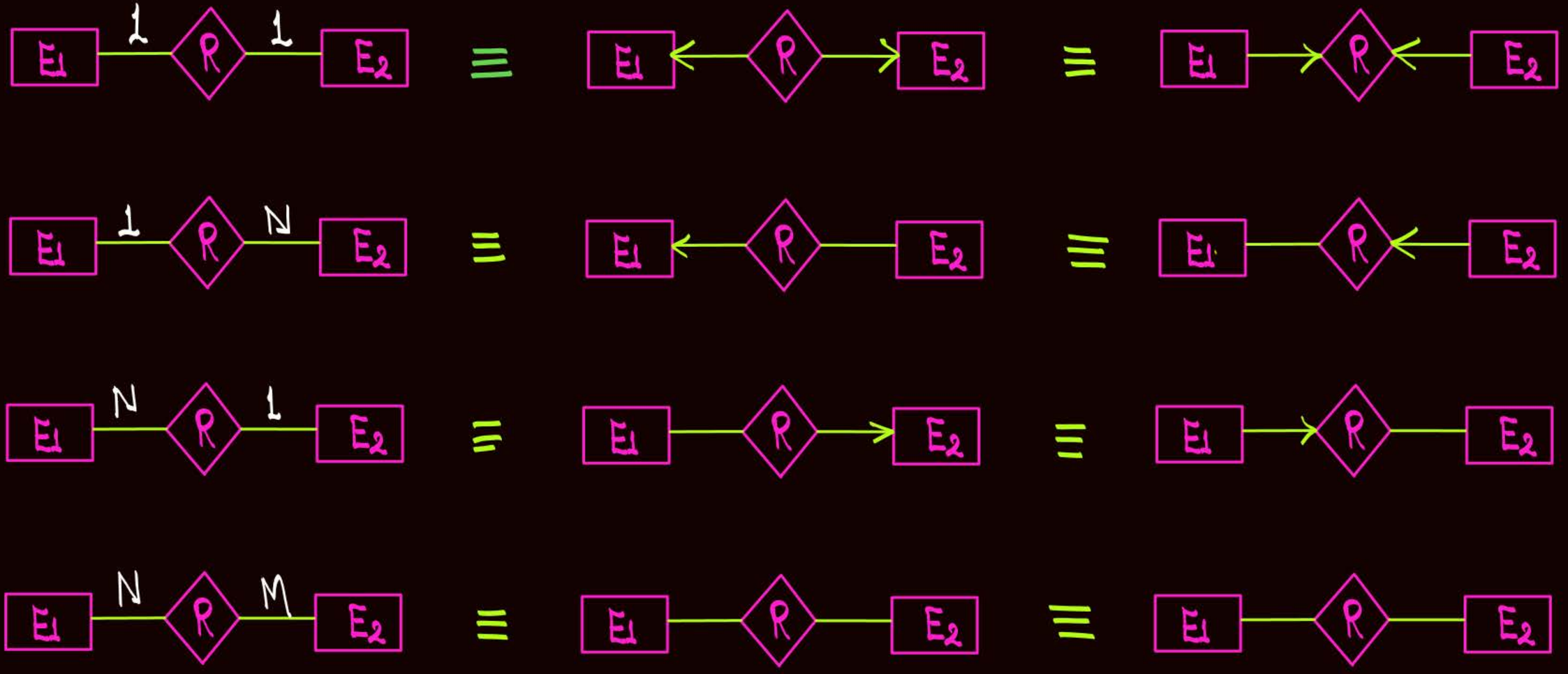


Each entity of set E_2 can associate with 0 or more entities of set E_1

Each entity of set E_2 can appear any no. of times in relationship set

Each entity of set E_1 can associate with 0 or more entities of set E_2

Each entity of set E_1 can appear any no. of times in relationship set


E1
1
R
1
E2
≡
E1
R
E2
≡
E1
R
E2
E1
1
R
N
E2
≡
E1
R
E2
≡
E1
R
E2
E1
N
R
1
E2
≡
E1
R
E2
≡
E1
R
E2
E1
N
R
M
E2
≡
E1
R
E2
≡
E1
R
E2

* Min-Max Representation

Participation is represented using order pair of type (min, max)

1st value will be minimum value

2nd value will be maximum value

* Minimum number of times that entity can appear in the relationship set is represented by "min"

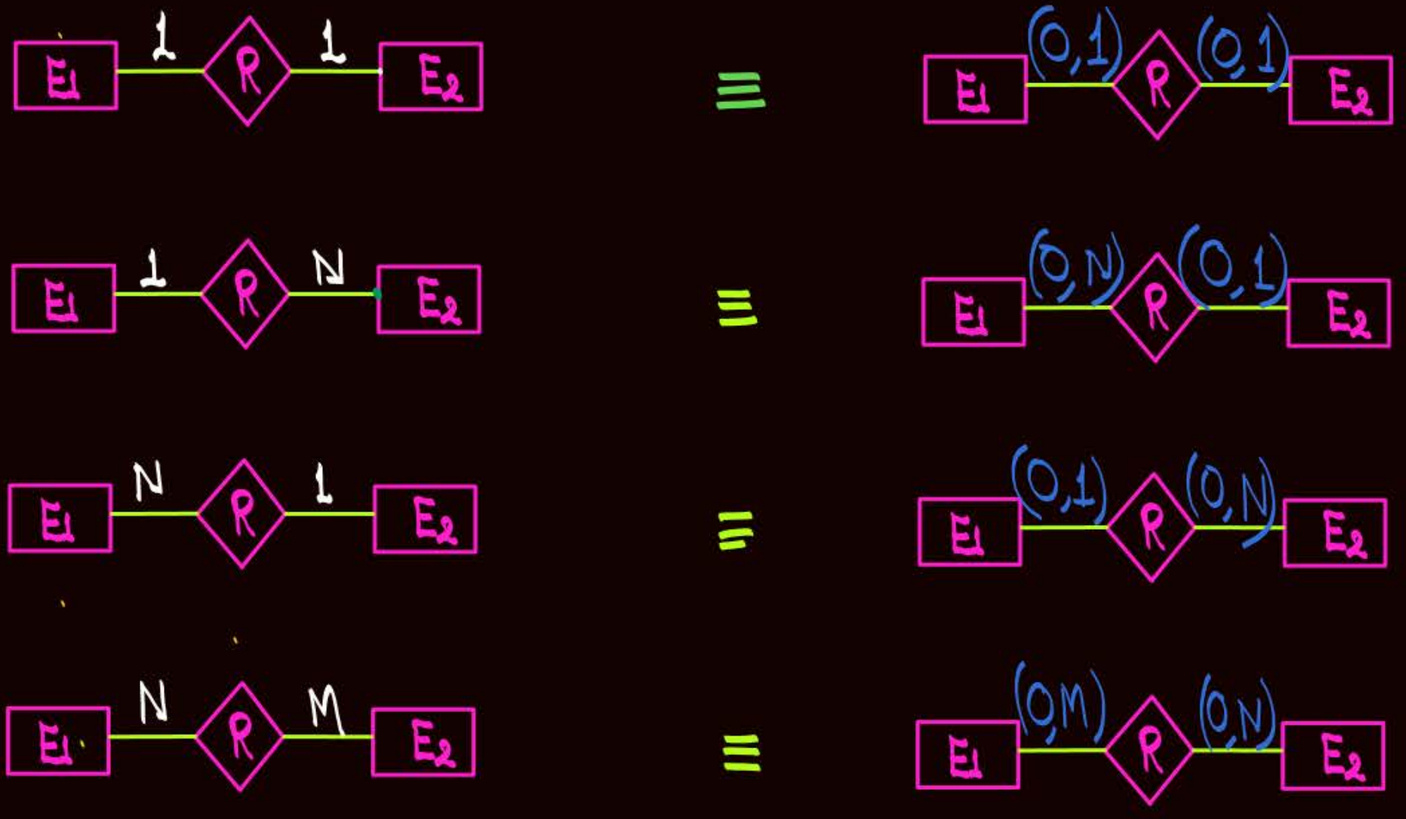
and " Maximum number of times that entity can appear in the relationship set is represented by "max"

Min-Max Representation

Participation is represented using order pair of type (min, max)

1st value will be minimum value

2nd value will be maximum value



Min-Max Representation

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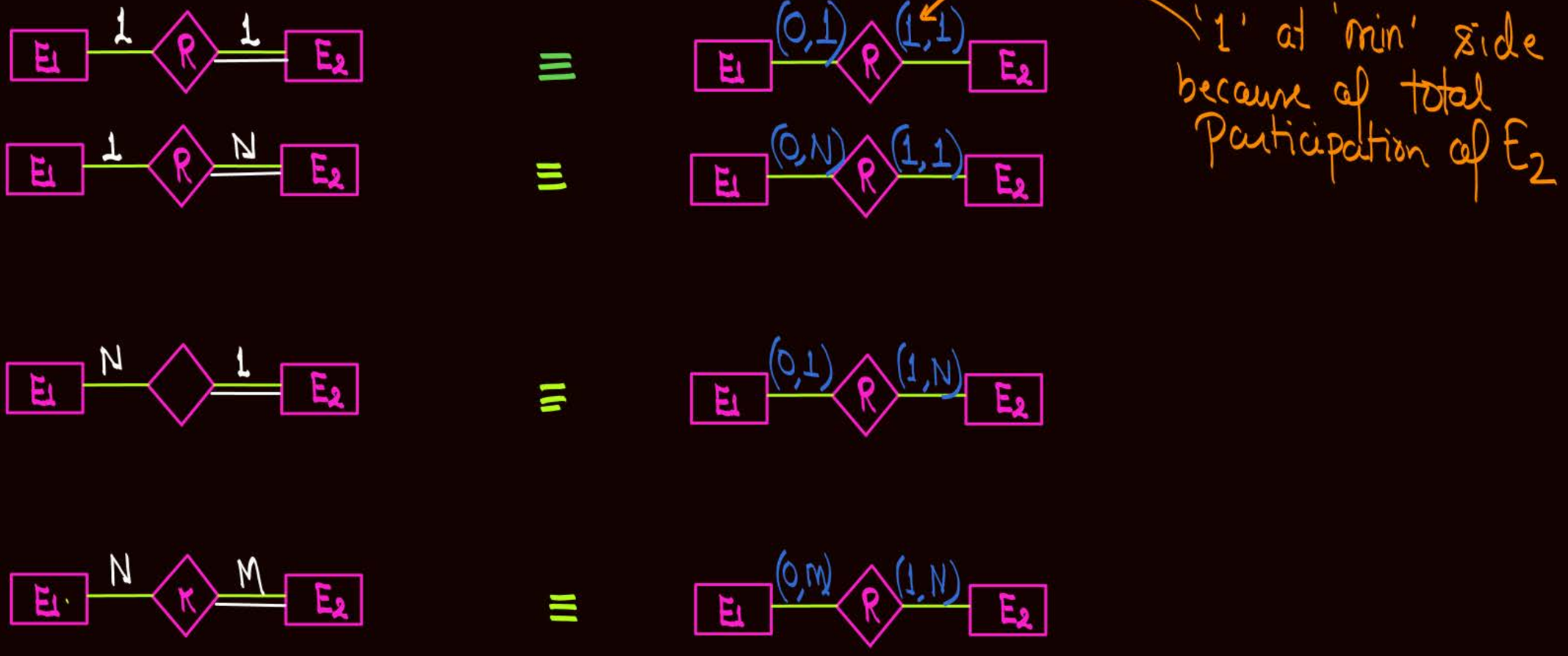
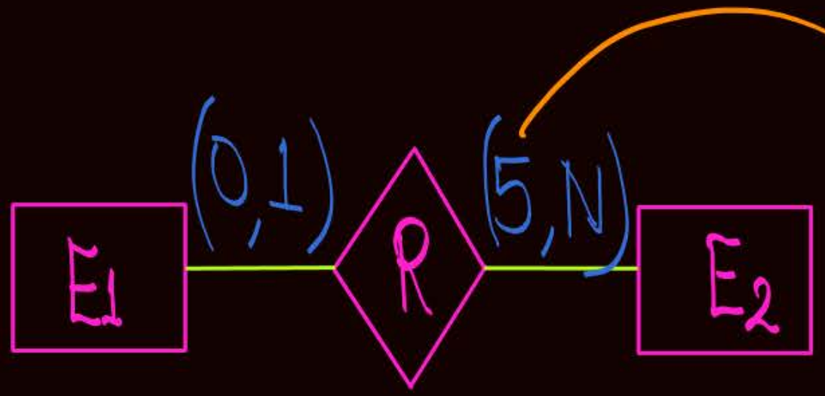
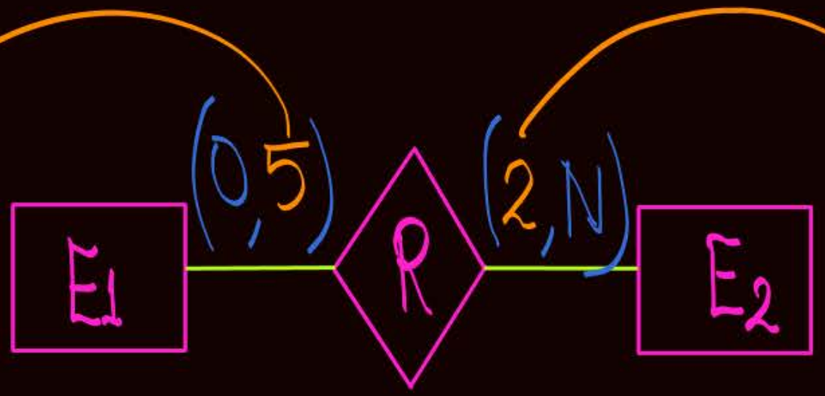




Each Entity of set E_2 will associate with at least '5' Entities of set E_1.



Each Entity of set E_1 Can associate with at most '5' Entities of set E_2

Each Entity of set E_2 will associate with at least '2' Entities of set E_1.

Strong & Weak Entity Type

Topic : Strong entity Set

- A strong entity set is an entity set that contains sufficient attributes to uniquely identify all its entities. In other words, a primary key exists for a strong entity set.
- Primary key of a strong entity set is represented by underlining it.

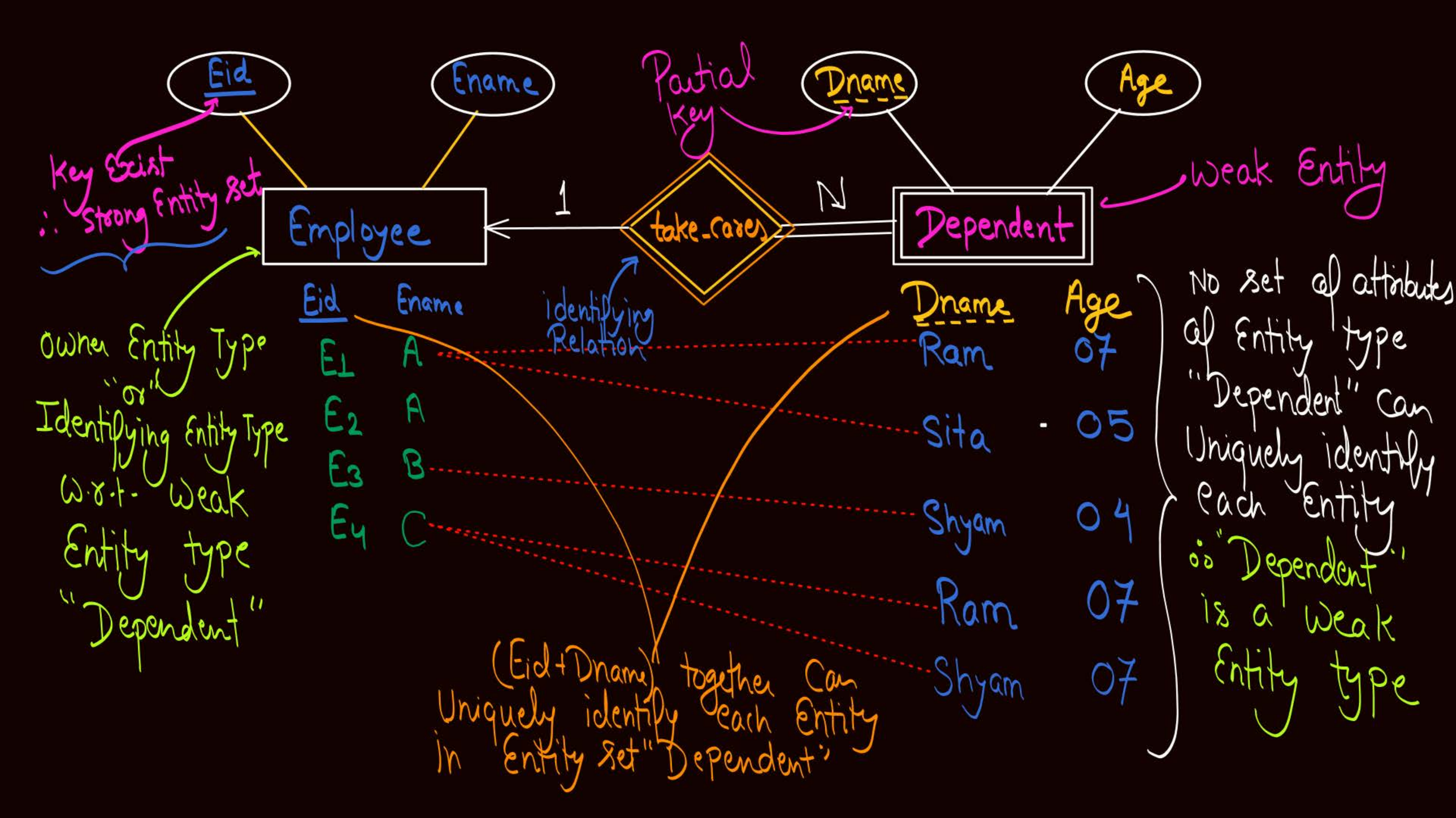
* Stoong Entity Type is represented using single lined rectangle

Weak Entity Set :-

An Entity set that does not contain sufficient attributes to uniquely identify all its entities. is called Weak Entity set.

i.e: we don't have sufficient attributes to define the key.

* Weak Entity type are represented using double lined rectangle.

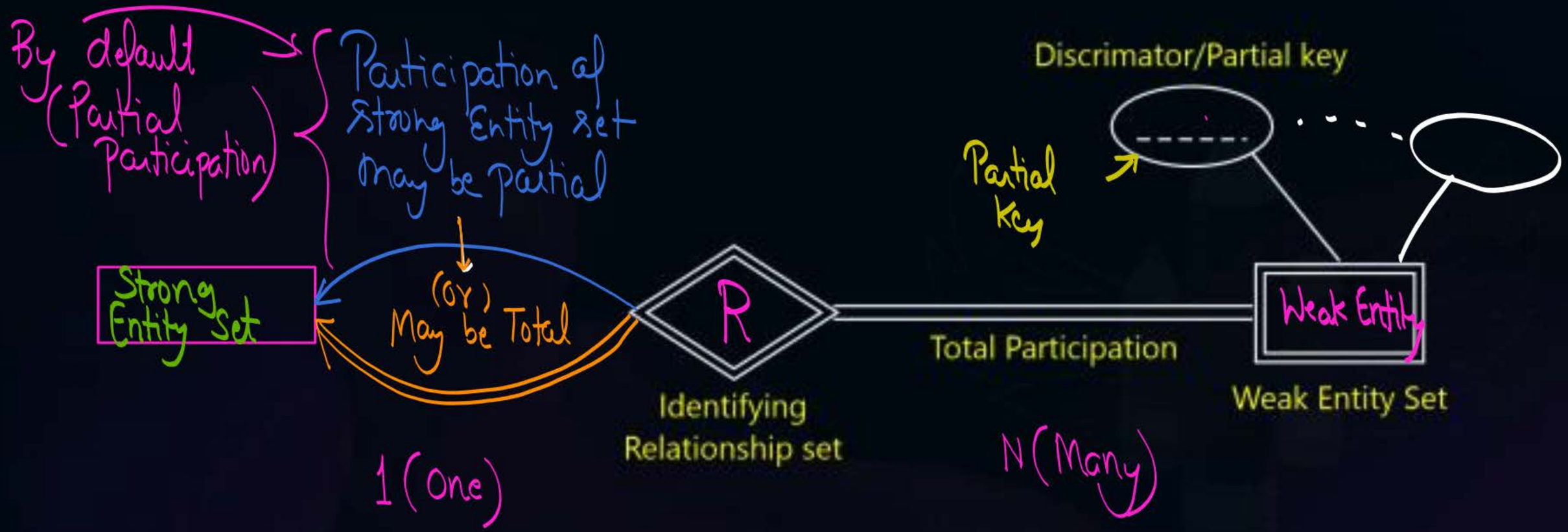

Eid
Ename
Partial Key
Dname
Age
Key Exist
∴ Strong Entity Set
Employee
1
take_care
N
Dependent
Weak Entity
Owner Entity Type
"or"
Identifying Entity Type
w.r.t. Weak
Entity type
"Dependent"
Identifying Relation
Eid Ename
E1 A
E2 A
E3 B
E4 C
Dname Age
Ram 07
Sita 05
Shyam 04
Ram 07
Shyam 07
(Eid+Dname) together Can Uniquely identify each Entity in Entity set "Dependent"
No set of attributes of Entity type "Dependent" can Uniquely identify each Entity
∴ "Dependent" is a Weak Entity type

Topic : Differences between Strong entity set and Weak entity set

Strong entity set	Weak entity set
A single line rectangle is used for the representation of a strong entity set.	A double line rectangle is used for the representation of a weak entity set.
It contains sufficient attributes to form its primary key.	It does not contain sufficient attributes to form its primary key.
A single line diamond symbol is used for the representation of the relationship that exists between the two strong entity sets.	A double line diamond symbol is used for the representation of the identifying relationship that exists between the strong and weak entity set.
Total participation may or may not exist in the relationship.	Total participation always exists in the identifying relationship.

Topic : Weak entity set in ER diagram

- In general, mapping cardinalities b/w Strong and Weak Entity set will be "one to many"



Topic for Next Class:

ER Model to Relational Table

2 mins Summary

Topic Mapping cardinalities (Cardinality ratio)

Topic Mix-max representation

Topic Relational tables w.r.t. Entity type

THANK - YOU

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