EE4202 Database Systems

REPRESENTATIONAL DATABASE MODEL – (RELATIONAL MODEL)

ER TO RELATIONAL MAPPING

Entity Relationship Model	Relational Model
Entity type	Relation/Table
Attribute name	Column header
Attributes	Domain constraint, Null constraint
Entity/Relationship instance	Tuple/Row
Relationship type	Referential integrity constraint or normalized into a separate table
Candidate Keys	Key constraint, Entity Integrity
----------	Data constraints

- Domain is the set of all distinct values that can be assigned for an attribute.
- Domain has a role name (attribute name), data type and format. Data types of attributes can be any one of integer (Ex: 2,3), decimal (total, decimal places) (Ex: 5.89), varchar(size)/char(size) (Ex: “Kamal Fonseka”), Boolean (Ex: 0, 1), date (20/11/2020), time (13:54:34) etc.
- Null value can be assigned to an attribute if the attribute is not applicable (Ex: Apartment num) or value exists and missing (Ex: height) or unknown about existence (Ex: degrees).

- A relational schema (intention/definition) is defined in SQL as,

```
CREATE TABLE Relation_name(
        Attibute_1  data type default ‘def_val’,
        Attribute_2  data type NOT NULL,…….,
        Attribute_n  data type,
        PRIMARY KEY  (Attribute_1, Attrbute2),
        constraint fk1 foreign key (attribute1) references othertable(attr2) on delete set NULL on update set
DEFAULT);
```

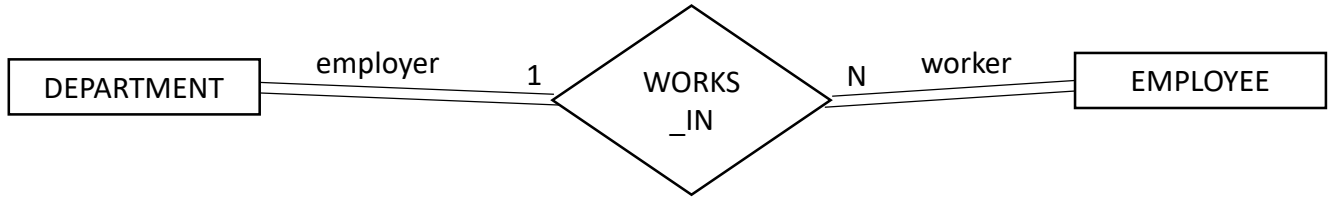
CONSTRAINTS IN RELATIONAL MODEL

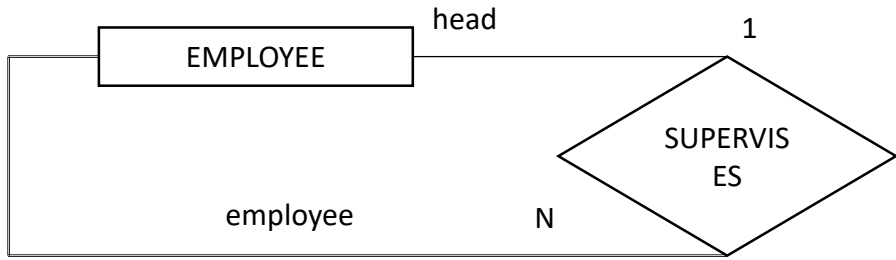
- Composite and multivalued attributes in ER-model cannot be implemented in Relational model. *All attribute values must be atomic, single valued (Domain constraint) and all tuples must be distinc*t (Entity Integrity) which is relational model must be in **first normal form**.
- Normalization is the goodness of design of a relational database.
- Multivalued attribute must be shown as a separate relation.
- Composite attribute can be broken into atomic attributes.
- Schema based constraints are
  - ❑ Domain constraints
  - ❑ Key constraints
  - ❑ Constraints on nulls
  - ❑ Entity integrity constraints
  - ❑ Referential integrity constraints
- Data constraints are
  - Functional dependencies
  - Multivalued dependencies

CONSTRAINTS

- **Domain constraints** – Each value of the attribute of the tuple must be atomic and single valued within its domain.
- **Key constraint** - When there are candidate keys only one of them is declared as primary key and underlined and other key attributes are declared with unique property.
- **Constraints on null** specifies whether null values are permitted or not.
- **Entity integrity** constraint specifies that primary key must be defined and the value cannot be null.

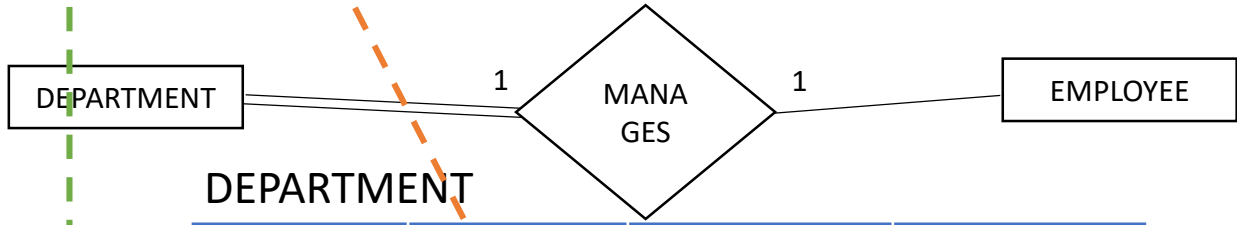
REFERENTIAL INTEGRITY





EMPLOYEE

Employee_ID	Department	Area	Designation	Field_Supervisor
EE001	EIE	Software	Lecturer	NULL
EE002	EIE	Communication	Senior Lecturer	EE001
MM007	MME	Automobile	Lecturer	NULL
MM001	MME	Manufacturing	Senior Lecturer	MM007
CE001	CEE	Hydraulic	Senior Lecturer	NULL
CE003	CEE	Structural	Lecturer	CE001
CE007	CEE	Environment	Lecturer	CE001
EE005	EIE	Electronics	Lecturer	EE001



DEPARTMENT

Dept_ID	Head	Location	Accreditation
EIE	EE001	Sector B	Yes
MME	MM007	Sector A	Yes
CEE	CE001	Sector C	Yes

- **Referential integrity** states that tuple from the referencing relation must refer to an existing tuple in the referenced relation or be null.
- The referencing attribute is called **foreign key** and it refers to a primary key in other relation.
- This facilitates to maintain the concept of relationships in ER model.
- Indicated using a dashed arrow from foreign key to the primary key.