CIS4301 Notes

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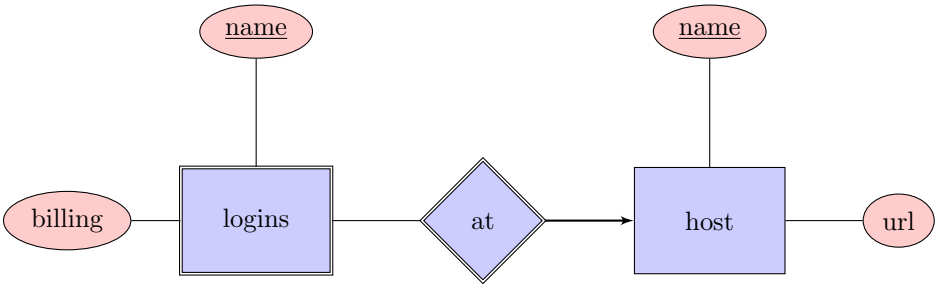
1 Entity Relationship (ER) Models

1.1 Example ER Model



Host is a **strong entity** (can exist on its own)
Login is a **weak entity** (cannot exist without Host)

Host uniquely identified by name

name underlined - key for Host (must be unique)

URL

At Circular arrow - maps to a single Host, cannot exist without it

Logins A login requires a Host

name underlined - key for name (must be unique)

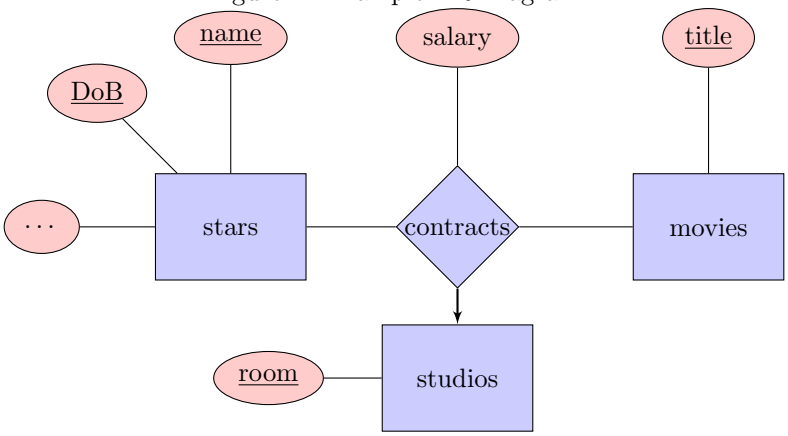
Host

1.2 Schema Format

- Host(<u>name</u>, URL)
- Logins(<u>name</u>, <u>host.name</u>), billing

2 ER Diagrams

Figure 1: Example ER Diagram



stars-movies many-many

stars-studios many-one

movies-studios many-one

An underlined attribute indicates a key for the entity.
A star can only be associated with one studio, but a studio can be associated with many stars.
A movie can only be associated with one studio, but a studio can be associated with many movies.

Schema:

- stars(name, DoB, ...)
- stars(title,)
- Contracts(StudioName, starname, DoB, movie-title, salary)

Example Contracts:

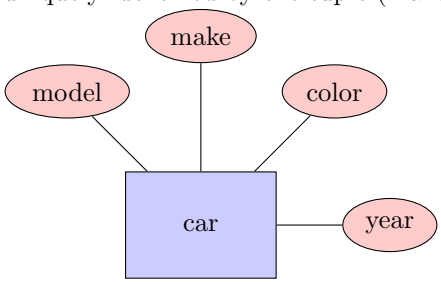
- (Ricky R, Jaws, MGM)
- (Ricky R, Batman, WB)
- (Michael Keaton, Batman, WB)

StudioName, StarName, and MovieTitle are all required to uniquely identify a contract.

2.1 Multiple Key Example

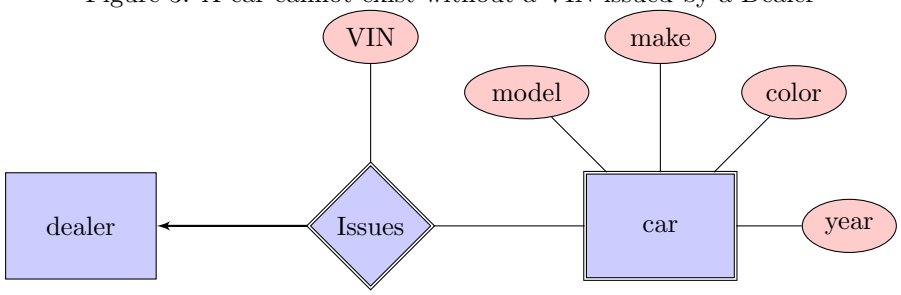
If there are no underlined attributes for an entity, the entire collection of attributes is the unique identifier for that entity. Anything short of that is not sufficient to uniquely identify the entity.

Figure 2: A car is uniquely identified by the tuple (make,model,color,year)



2.2 Weak Entity Example

Figure 3: A car cannot exist without a VIN issued by a Dealer

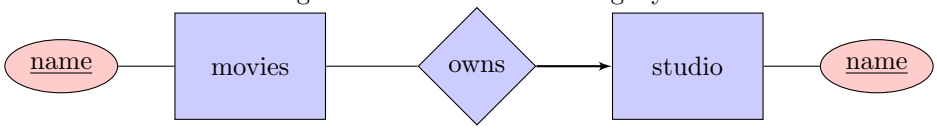


Issues(<u>VIN</u>,<u>Dealer</u>)

2.3 Weak Entities and Referential Integrity

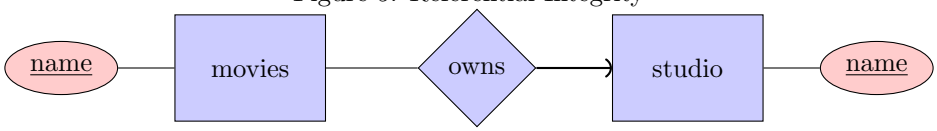
The difference between weak entities and referential integrity (the rounded arrowhead) can be subtle and confusing, so here's the deal:

Figure 4: No Referential Integrity



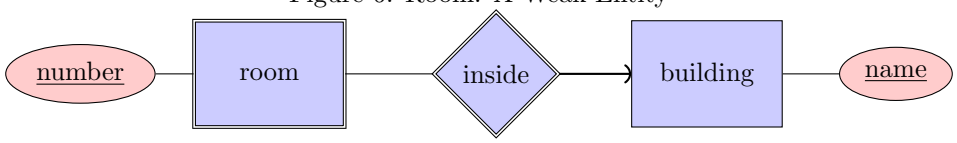
In Figure 4, the arrow indicates a **many-one** relation from movies to studio. This means that a movie may be owned by at most one studio. This allows for the possibility that a movie is *not owned by any studio*. If we want to enforce that a movie be owned by a studio, we must use a rounded arrowhead to represent **Referential Integrity**.

Figure 5: Referential Integrity



In Figure 5, the rounded arrow indicates a **many-one** relation with **Referential Integrity**. This means that for every movie entity, there must be a studio entity that it is associated with. Note that, even in this example, **movies is not a weak entity**. Why? Because even though a movie must be associated with a studio, locating a particular movie does not require any information about the producing studio. A movie can be uniquely identified with just its name.
What follows is a truly weak entity, based on an example a classmate posted on piazza:

Figure 6: Room: A Weak Entity



In Figure 6, room is a weak entity. This means that a room's number is not sufficient to uniquely identify it – a building name is also required. As an example, the number G186 does not uniquely identify a room, but McCarty G186 does. Note that the referential integrity arrow is also necessary, as a room must be associated with a building.

3 Postgres

See http://www.postgresql.org/docs/9.2/static/index.html for full documentation.

3.1 SQL Server Commands

ssh username@thunder.cise.ufl.edu ssh into CISE thunder server

psql -h postgres.cise.ufl.edu db enter database db

\? view commands

\l list databases

\d to list relations

\d to list relations

TRUNCATE TABLE mytable remove all data from table mytablej

DROP TABLE mytable completely remove table mytable

ALTER TABLE mytable DROP COLUMN date remove column date from mytable

3.2 SQL Data Types

CHAR, CHAR(1) fixed number of strings available (e.g. gender: M,F)

VARCHAR(n) variable length strings up to specified size n

BIT(n) bit string - fixed sized n

BIT VARYING (n) Variable length bit string up to n bits

BOOLEAN

INT, INTEGER

SHORT INT

FLOAT,REAL single precision FP

DOUBLE Double precision FP

DECIMAL(n,d) fixed n digits above decimal, d below decimal

DATE 'YYYY-MM-DD', can be added as string following preceding format

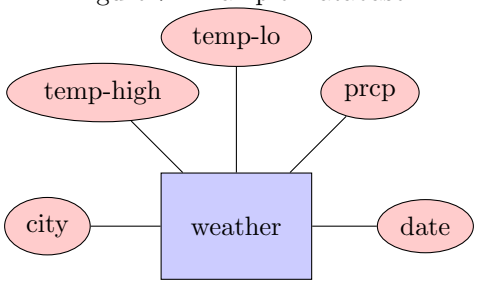
TIME 'HH:MM:SS', seconds are in decimal (e.g. '15:00:02.5')

DATETIME

TIMESTAMP

3.3 Example Database

Figure 7: Example Database




```
CREATE TABLE weather (
  city VARCHAR(80), --this is a comment
  temp_lo INT,
  temp_hi INT,
  prcp REAL,
  date DATE,
);
```