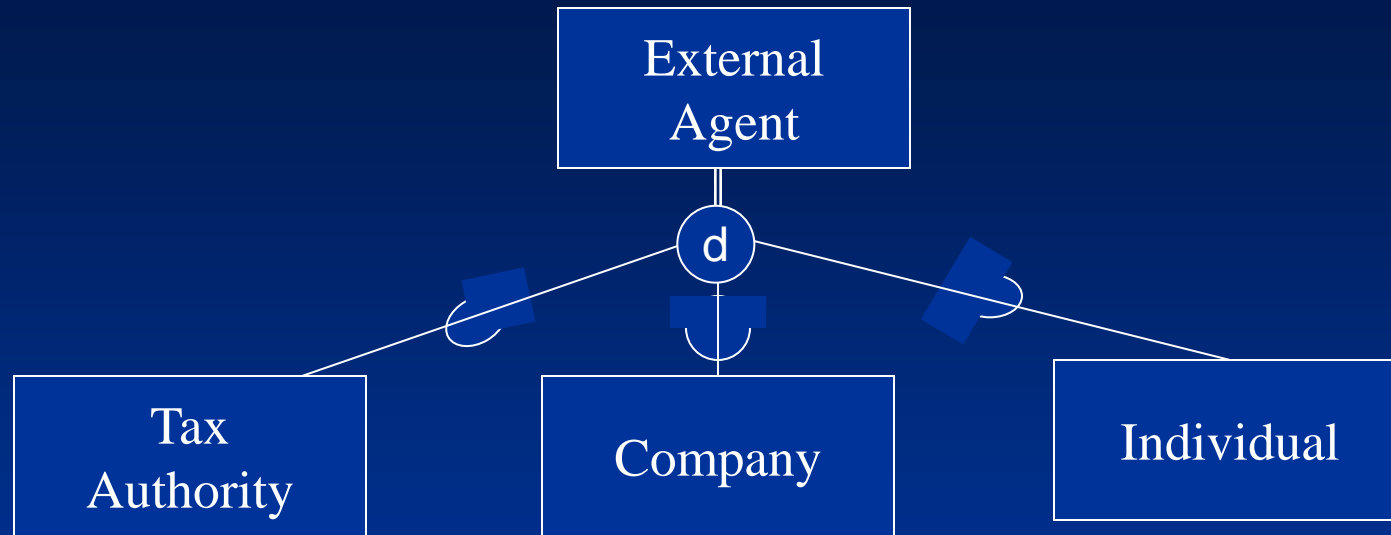


Examples



Business Rules

An external agent must be exactly one of: Tax Authority, Company, or Individual.

All external agents have: a name, an address for correspondence, ...

A tax authority has attributes of sales tax rate, ...

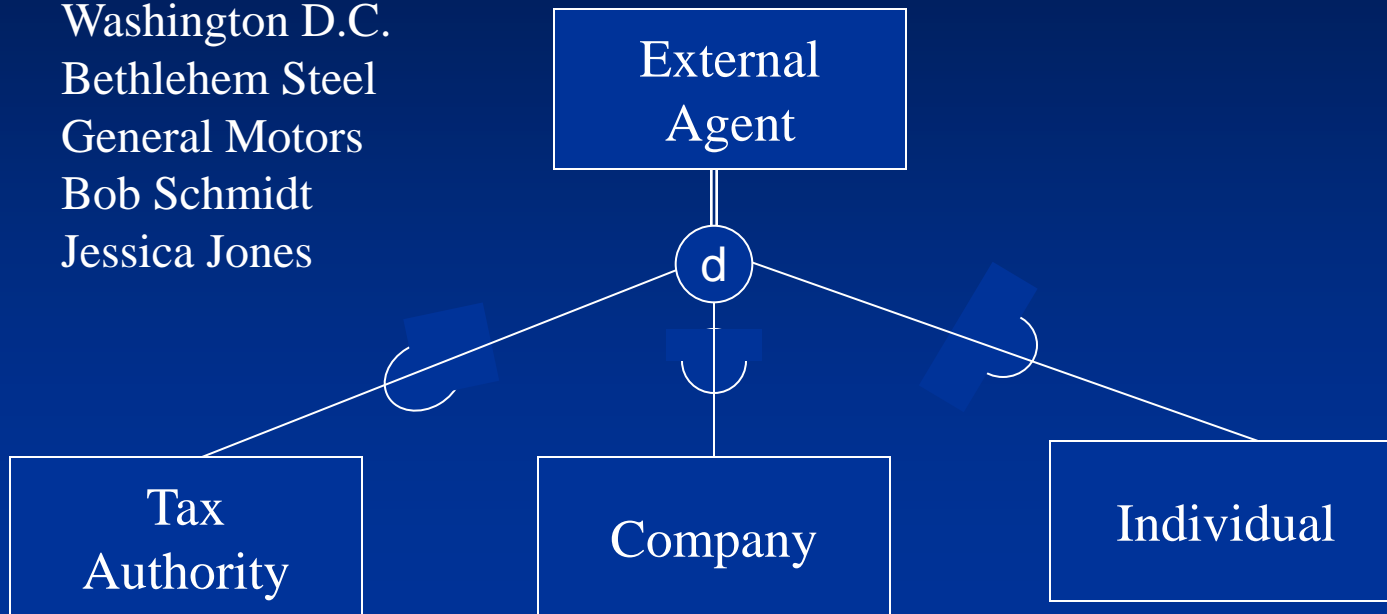
A company has attributes: federal tax id, an address for payments, ...

An individual has attributes: smoker, SIN, ...

Examples

Example data

State of Missouri
Washington D.C.
Bethlehem Steel
General Motors
Bob Schmidt
Jessica Jones



E.g.

State of Missouri
Washington D.C.

E.g.

Bethlehem Steel
General Motors

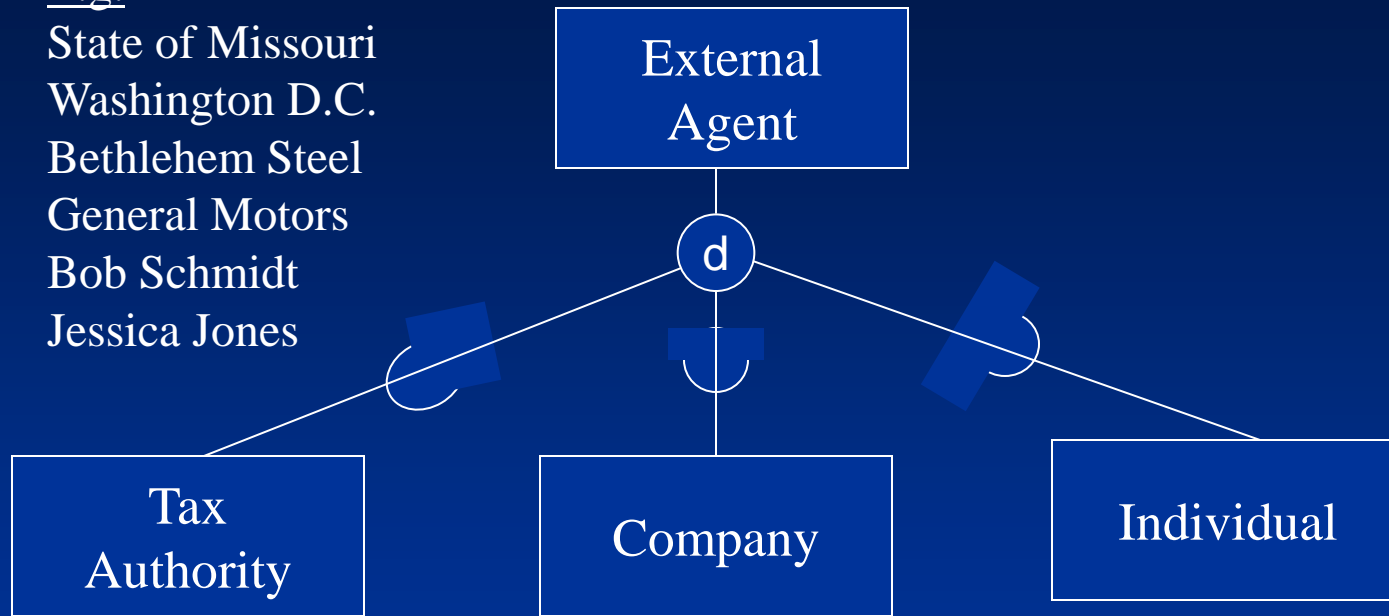
E.g.

Bob Schmidt
Jessica Jones

Examples

E.g.

State of Missouri
Washington D.C.
Bethlehem Steel
General Motors
Bob Schmidt
Jessica Jones



E.g.

State of Missouri
Washington D.C.

E.g.

Bethlehem Steel
General Motors

E.g.

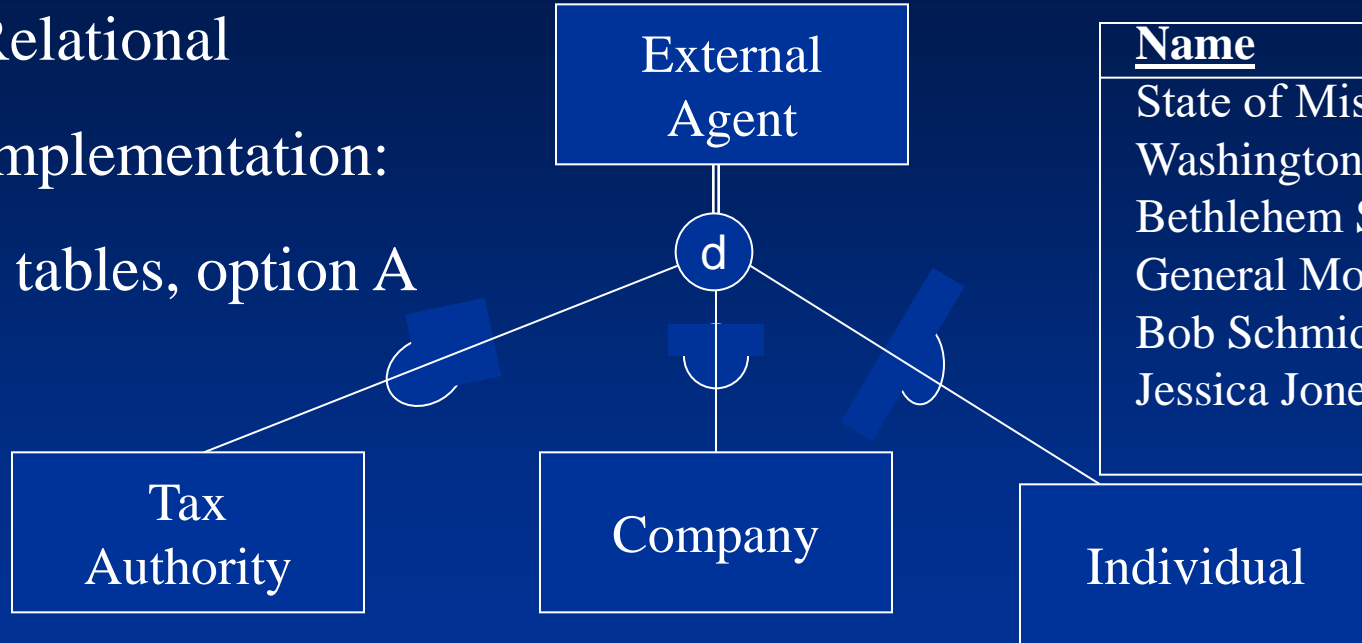
Bob Schmidt
Jessica Jones

Relational Implementations:

usually one of : 1 (C and D), 3 (B), or 4 (A) tables

Examples

Relational
Implementation:
4 tables, option A



External Agent

| <u>Name</u> | Address |
|-------------------|----------------|
| State of Missouri | 16 Main, |
| Washington D.C. | jfkajskjfaj |
| Bethlehem Steel | 224 West... |
| General Motors | 22 dfa sdfsa |
| Bob Schmidt | asdf asdfasd |
| Jessica Jones | asd fas fa |

Tax Authority

| <u>Name</u> | SalesTax |
|-------------------|----------|
| State of Missouri | 7 |
| Washington D.C. | 6 |

Company

| <u>Name</u> | Tax Id |
|-----------------|---------|
| Bethlehem Steel | 3434 |
| General Motors | 7684573 |

Individual

| <u>Name</u> | Smoker |
|---------------|--------|
| Bob Schmidt | yes |
| Jessica Jones | no |

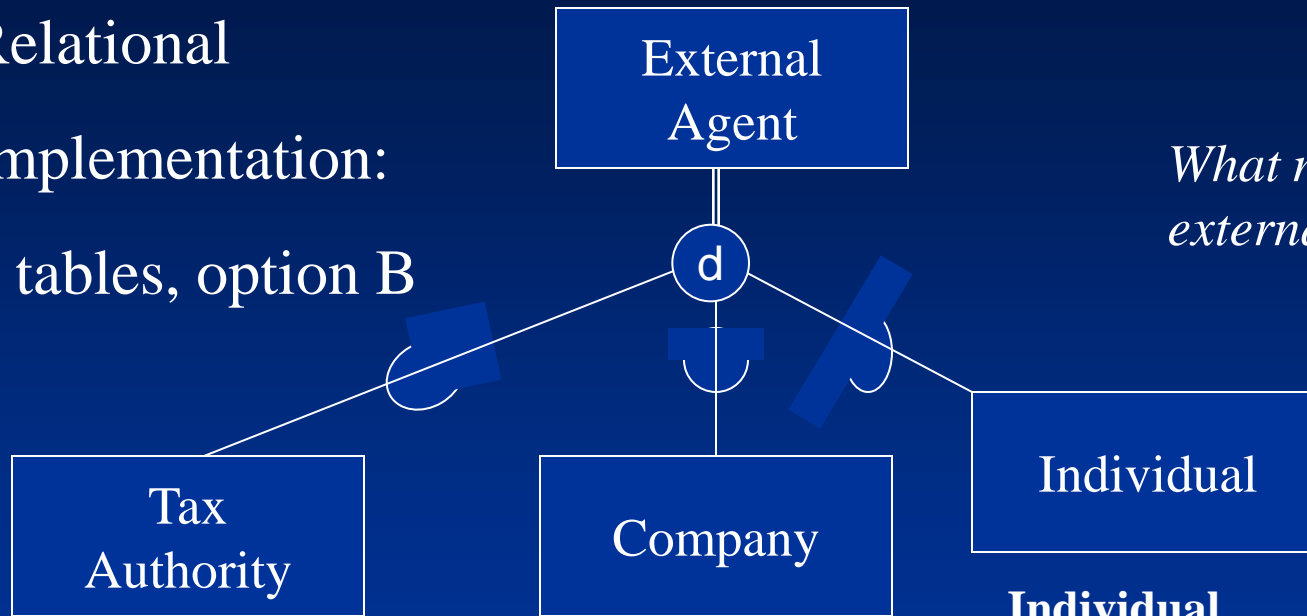
What are the implications for insert, delete, update?

Examples

Relational

Implementation:

3 tables, option B



What must we do to list all external agents?

Tax Authority

| <u>Name</u> | Address | SalesTax |
|-------------------|--------------|----------|
| State of Missouri | 16 Main, ... | 7 |
| Washington D.C. | jfkajskjfaj | 6 |

Individual

| <u>Name</u> | Address | Smoker |
|---------------|--------------|--------|
| Bob Schmidt | asdf asdfasd | yes |
| Jessica Jones | asd fas fa | no |

Company

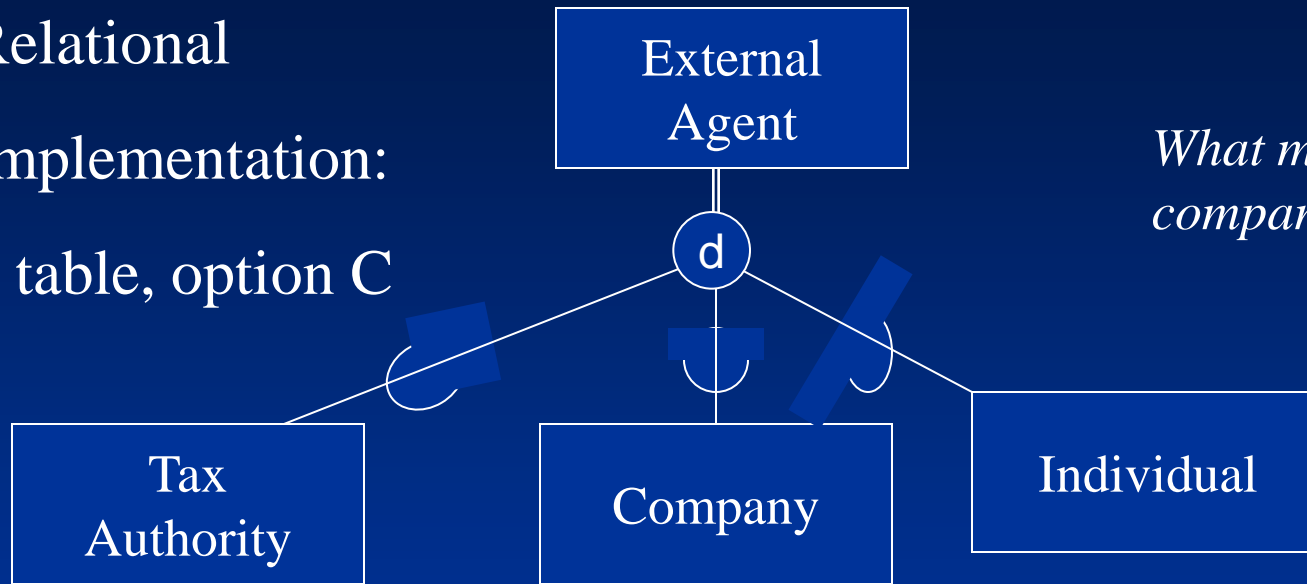
| <u>Name</u> | Address | Tax Id |
|-----------------|--------------|---------|
| Bethlehem Steel | 224 West.. | 3434 |
| General Motors | 22 dfa sdfsa | 7684573 |

Examples

Relational

Implementation:

1 table, option C

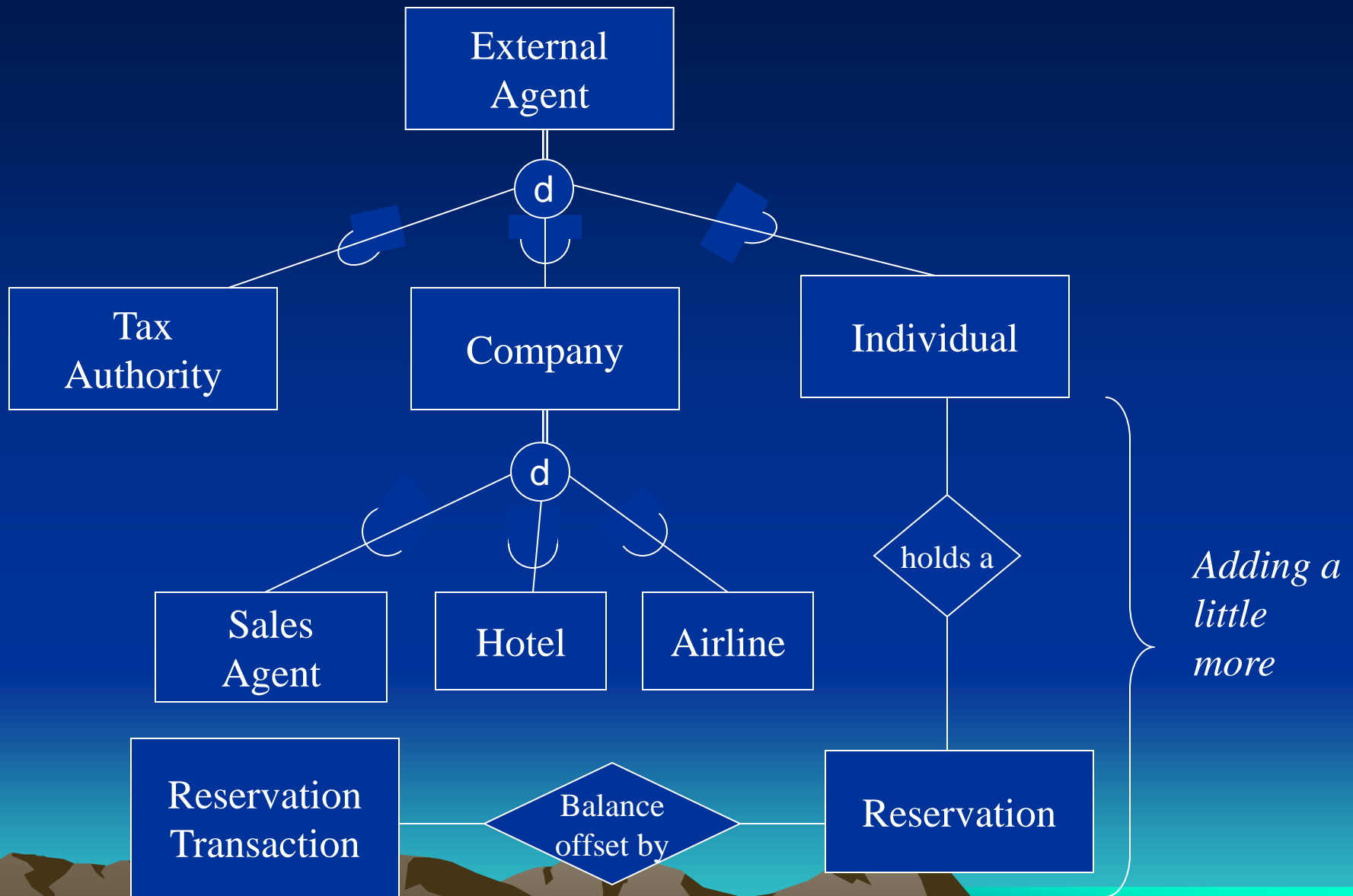


What must we do to list all companies?

External Agent

| <u>Name</u> | Type | Address | SalesTax | Smoker | Tax Id |
|-------------------|------|--------------|----------|--------|---------|
| State of Missouri | T | 16 Main, ... | 7 | | |
| Washington D.C. | T | jfkajskjfaj | 6 | | |
| Bob Schmidt | I | asdf asdfasd | | yes | |
| Jessica Jones | I | asd fas fa | | no | |
| Bethlehem Steel | C | 224 West.. | . | | 3434 |
| General Motors | C | 22 dfa sdfsa | | | 7684573 |

Examples



Examples

Business Rules

A company must be exactly one of: Sales Agent, Hotel, or Airline

A sales agent has attributes IATA number, commission percent, ...

A hotel has attributes: number of stars, first eval, avg eval, ...

An airline has attributes: reservations network, ...

A reservation has attributes: reservation date, smoking preference, ...

An individual can hold a reservation for travel

The cost of travel (a reservation) is offset by reservation transactions

A reservation transaction has attributes: amount, date

Reservation transactions reflect the balance due on a trip

Examples



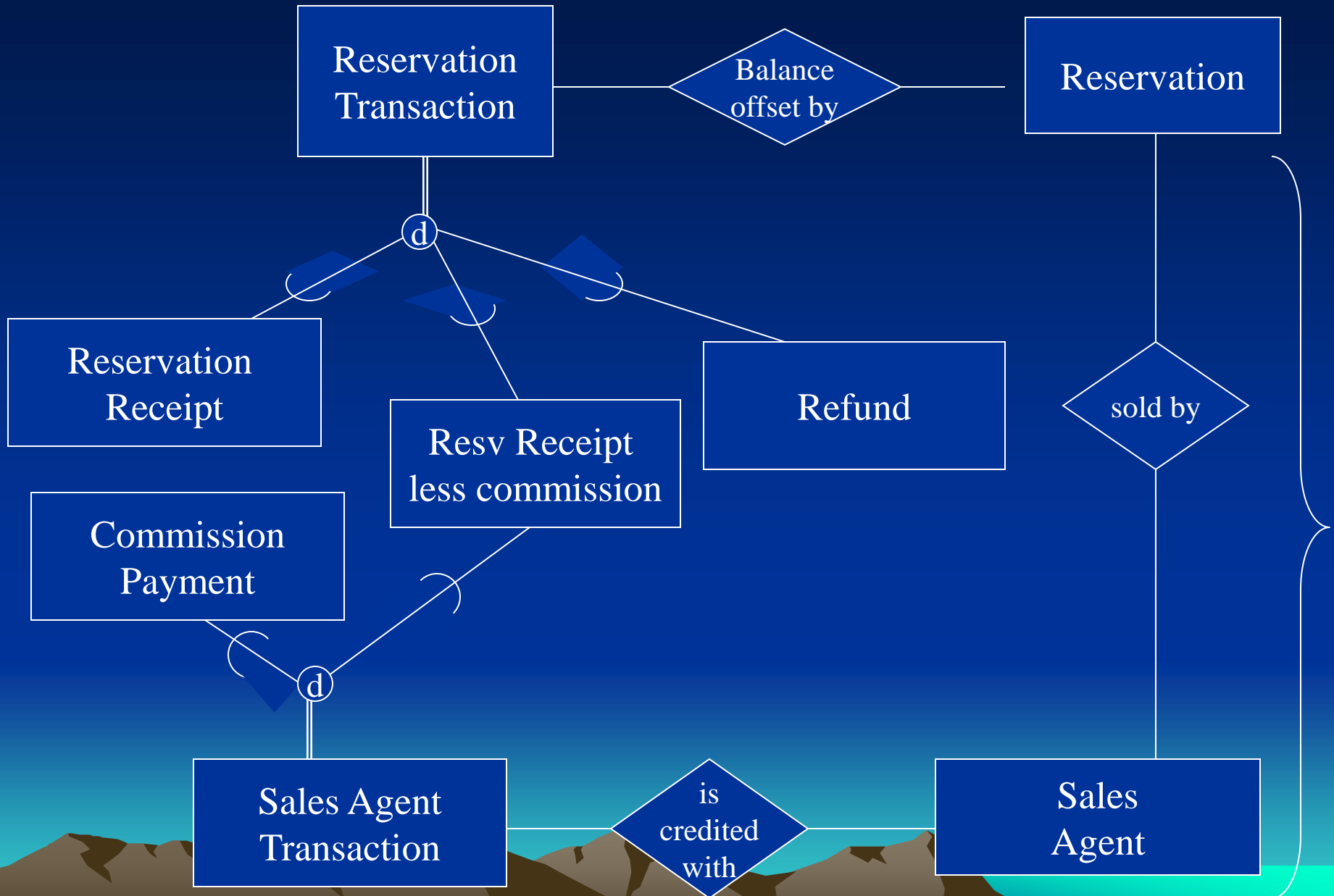
Individual

| <u>Name</u> | Address | Smoker |
|---------------|--------------|--------|
| Bob Schmidt | asdf asdfasd | yes |
| Jessica Jones | asd fas fa | no |

Reservation

| <u>reservation date</u> | <u>name</u> | smoke pref |
|-------------------------|---------------|------------|
| Jan 1, 2000 | Bob Schmidt | yes |
| Jan 3, 2000 | Jessica Jones | no |

Examples



Examples

Business Rules

A reservation transaction must be exactly one of refund, reservation receipt, or a reservation receipt less commission.

A reservation receipt has no additional attributes

A reservation receipt less commission has attributes: commission earned, ...

A refund has attributes: reason, ...

The superclass *reservation transaction* makes the balance due on a trip easy to understand - not complicated by the subclasses

A reservation is sold by a sales agent

A sales agent transaction has attributes: commission, date, ...

A sales agent is credited with sales agent transactions

Examples

Business Rules

Sales agent transactions reflect the balance due to an agent - this is uncomplicated due to the superclass

A sales agent transaction must be exactly one of: *commission payment* or a *reservation receipt less commission*

A commission payment has no additional attributes

A reservation receipt less commission has an amount (of payment) attribute

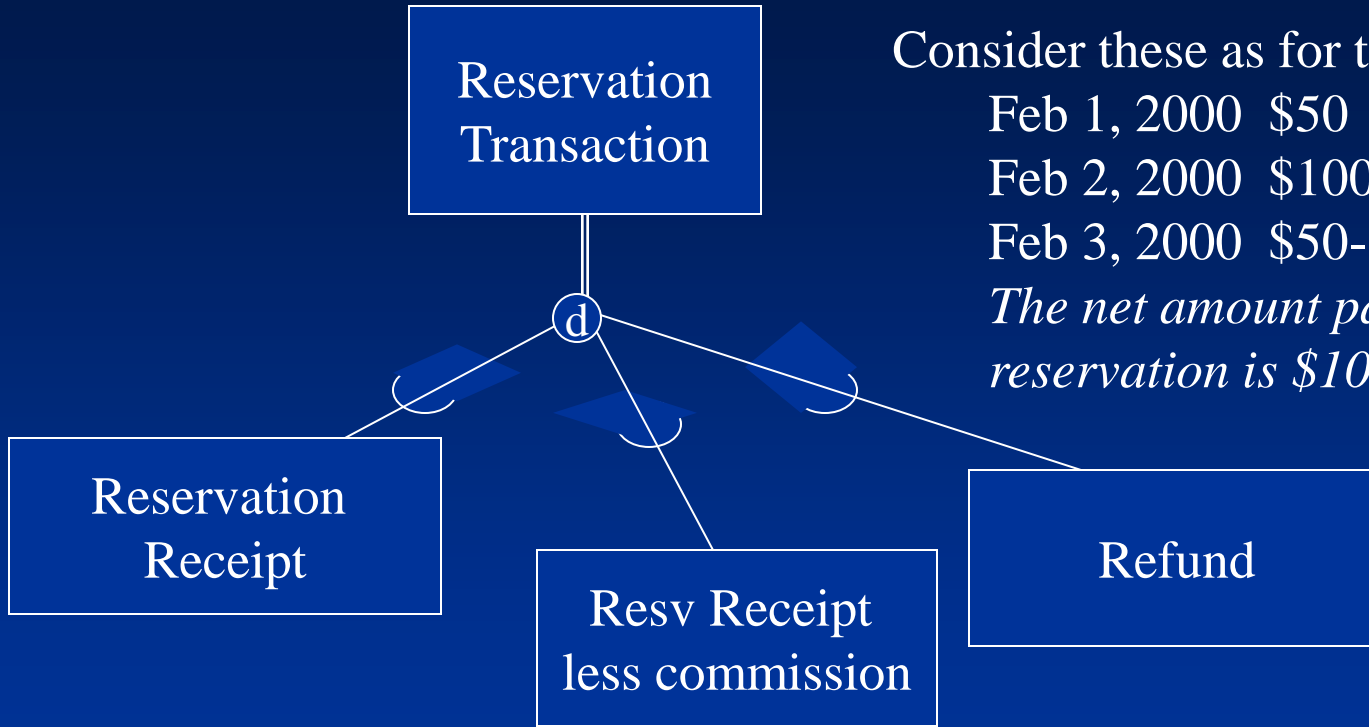
A reservation receipt for which the sales agent has withheld his or her commission is *a reservation transaction*, and it is a *sales agent transaction*.

A reservation receipt for which no commission is due is not a *sales agent transaction*

A reservation receipt less commission is an example of a _____;

What kind of inheritance is involved?

Examples



Consider these as for the same reservation:

Feb 1, 2000 \$50

Feb 2, 2000 \$100

Feb 3, 2000 \$50-

The net amount paid towards the reservation is \$100

The last is obviously a *refund*: Feb 3, 2000 \$50-

Lets assume the first was a *Reservation Receipt* and the second a *Resv Receipt less commission*.

The *Resv Receipt less commission* could look like:

Feb 2, 2000 \$100 \$12

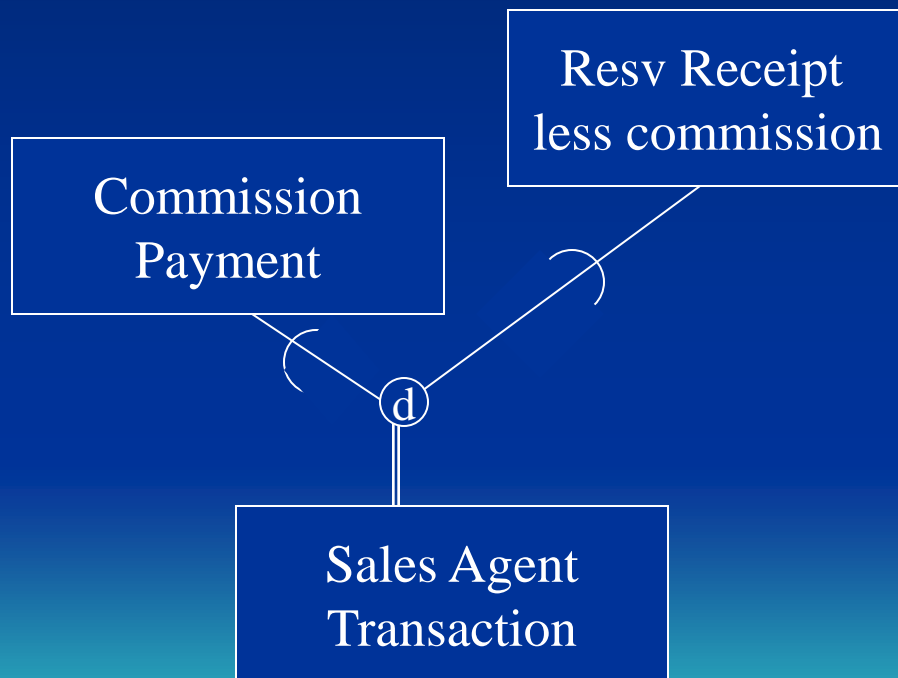
where the \$12 is the commission earned

Examples

The *Resv Receipt less commission* also reflects a *Sales Agent Transaction*.
As a *Sales Agent Transaction* it would appear as:

Feb 2, 2000 \$12

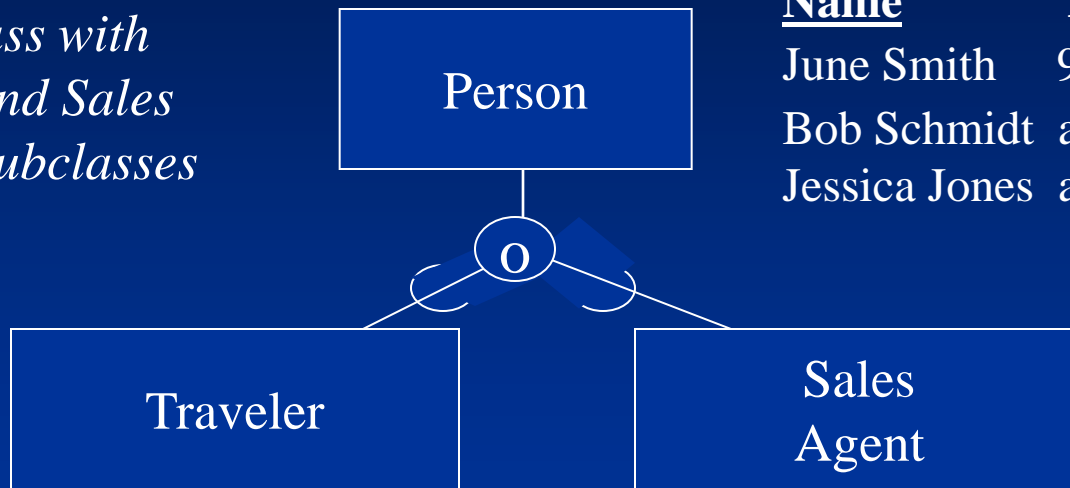
where the \$12 is the commission earned on Feb 2, 2000



Examples

What-if:

suppose we had a Person class with Traveler and Sales Agent as subclasses



| <u>Name</u> | <u>Address</u> |
|---------------|----------------|
| June Smith | 908 jlsaf9w |
| Bob Schmidt | asdf asdfasd |
| Jessica Jones | asd fas fa |

| <u>Name</u> | <u>Smoker</u> |
|---------------|---------------|
| Bob Schmidt | yes |
| Jessica Jones | no |

| <u>Name</u> | <u>IATA</u> | <u>Commission</u> |
|-------------|-------------|-------------------|
| Bob Schmidt | 334 | 12 |

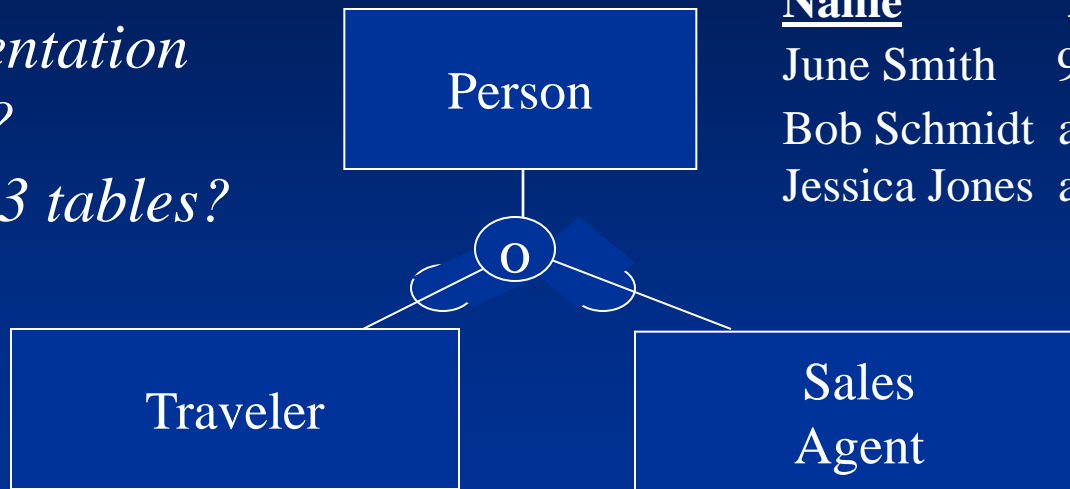
This allows a person to play different roles, but they remain the same person. Sales agents collect commission; travelers make reservations.

Examples

What-if:

implementation choices?

• *1, 2 or 3 tables?*



| <u>Name</u> | Address |
|---------------|--------------|
| June Smith | 908 jlsaf9w |
| Bob Schmidt | asdf asdfasd |
| Jessica Jones | asd fas fa |

| <u>Name</u> | Smoker |
|---------------|--------|
| Bob Schmidt | yes |
| Jessica Jones | no |

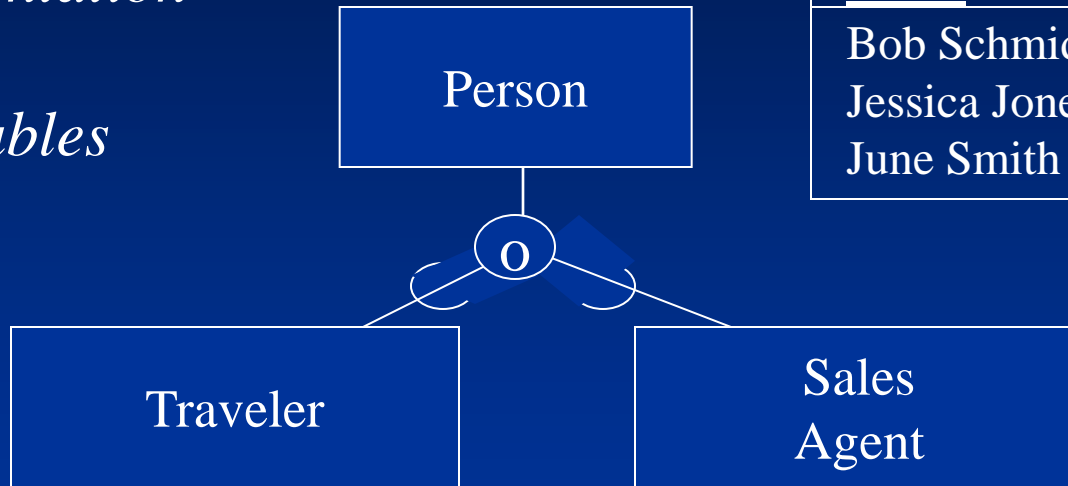
| <u>Name</u> | IATA | Commission |
|-------------|------|------------|
| Bob Schmidt | 334 | 12 |

Examples

What-if:

*implementation
choices*

- 3 tables



Person

| <u>Name</u> | Address | |
|---------------|--------------|--|
| Bob Schmidt | asdf asdfasd | |
| Jessica Jones | asd fas fa | |
| June Smith | 908 jlsaf9w | |

Traveler

| <u>Name</u> | Smoker |
|---------------|--------|
| Bob Schmidt | yes |
| Jessica Jones | no |

Sales Agent

| <u>Name</u> | IATA | Commission |
|-------------|------|------------|
| Bob Schmidt | 334 | 12 |

What are the implications for insert, delete, update?

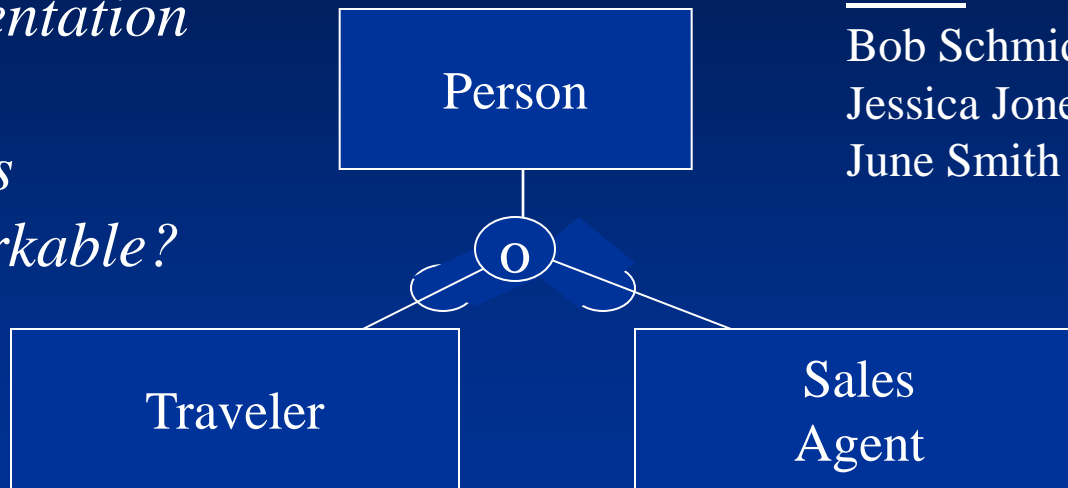
Examples

What-if:

*implementation
choices*

• 2 tables

• *workable?*



Person

Name

Address

Bob Schmidt asdf asdfasd

Jessica Jones asd fas fa

June Smith 908 jlsaf9w

Traveler

| <u>Name</u> | Smoker | Address |
|---------------|--------|---------|
| Bob Schmidt | yes | |
| Jessica Jones | no | |

Sales Agent

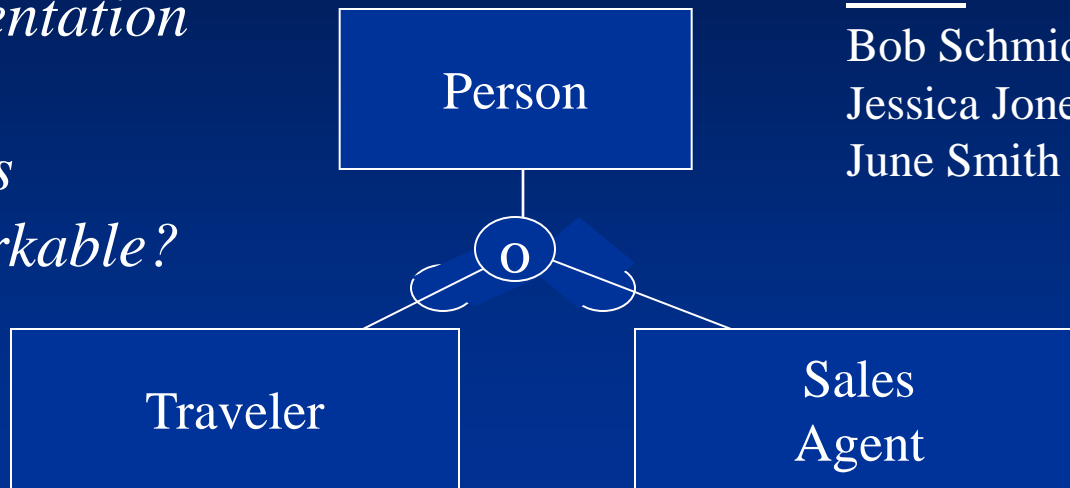
| <u>Name</u> | IATA | Commission | Address |
|-------------|------|------------|---------|
| Bob Schmidt | 334 | 12 | |

What-if:

*implementation
choices*

• 1 tables

• *workable?*



Person

Name

Address

Bob Schmidt asdf asdfasd

Jessica Jones asd fas fa

June Smith 908 jlsaf9w

P_T_S:

| <u>Name</u> | <u>Addr.</u> | <u>Tflag</u> | <u>Smoker</u> | <u>Sflag</u> | <u>IATA</u> | <u>Commission</u> |
|---------------|--------------|--------------|---------------|--------------|-------------|-------------------|
| Bob Schmidt | ... | T | yes | T | 334 | 12 |
| Jessica Jones | ... | T | no | F | ... | ... |