

ERD relationships

course: Information Modelling

Defining relationships

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WHAT IS A...

RELATIONSHIP

Relationship is an association among two or more entities.

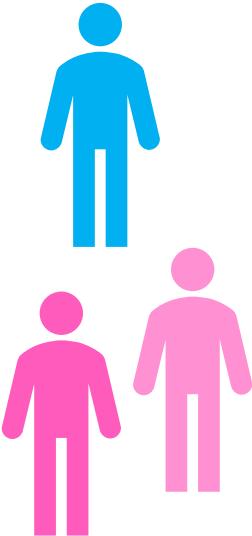
WHAT IS A...

RELATIONSHIP

Relationship is an association among two or more entities.

Relationships are used to **document the interaction** between entities.

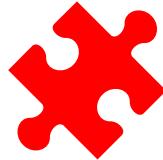
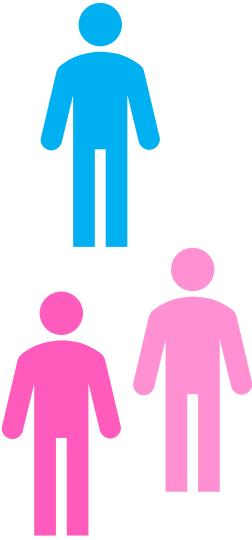
Relationships are usually verbs. They provide useful information that could not be discerned with just the entity types.



FINDING...

RELATIONSHIPS

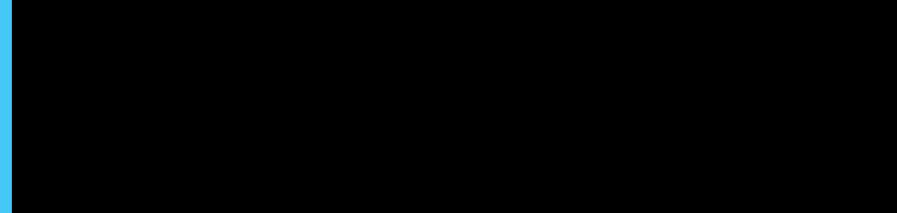
Rob, Ann and Astrid are members of VGC. Rob wants to borrow Mastermind and Stratego. Astrid is interested in Mastermind and Monopoly. Ann wants the Cute Cats Puzzle.

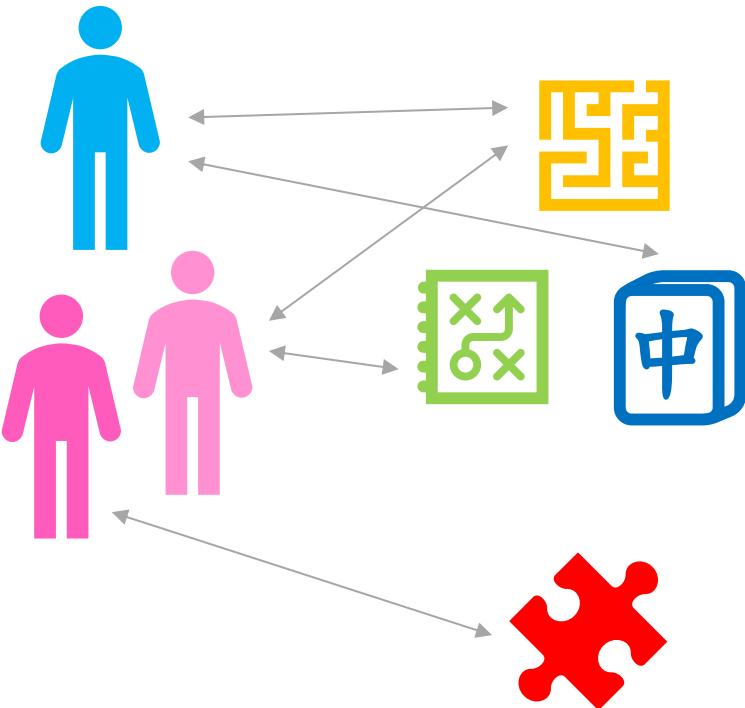


FINDING...

RELATIONSHIPS

How do members relate to games?



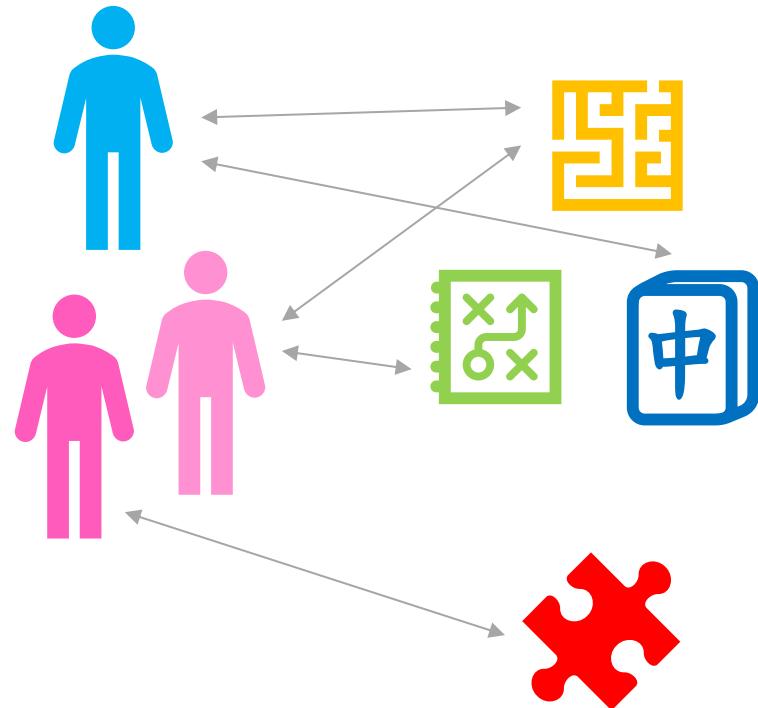


FINDING...

RELATIONSHIPS

Rob, Ann and Astrid are members of VGC. Rob wants to borrow Mastermind and Stratego. Astrid is interested in Mastermind and Monopoly. Ann wants the Cute Cats Puzzle.

Verbs in a language can be **ambiguous**:
borrow, to be interested, want, ... meaning
the same. Choose a descriptive one.



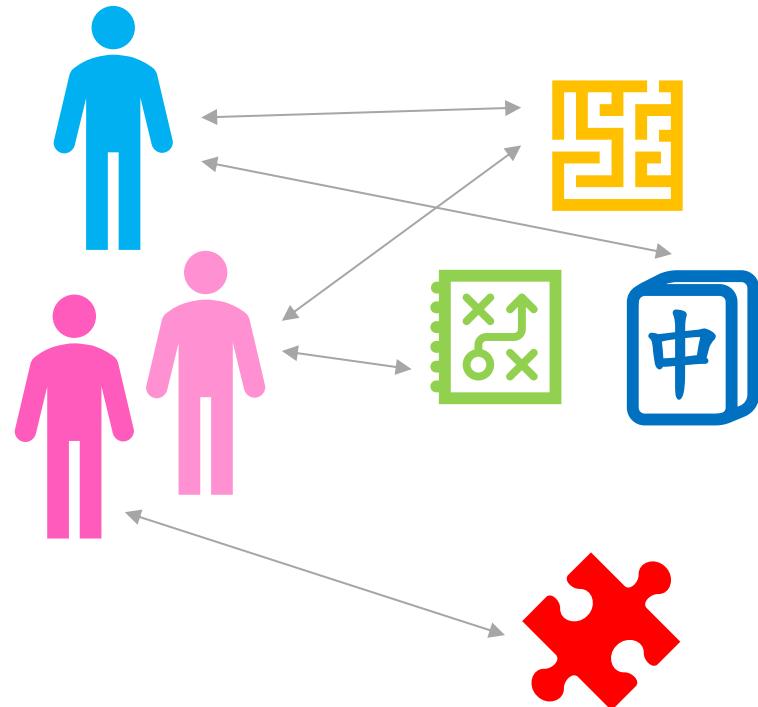
FINDING...

RELATIONSHIPS

Rob, Ann and Astrid are members of VGC. Rob wants to borrow Mastermind and Stratego. Astrid is interested in Mastermind and Monopoly. Ann wants the Cute Cats Puzzle.

to borrow, to be interested, wants... leading towards to **check out**.

Verbs in a language can be **ambiguous**: borrow, to be interested, want, ... meaning the same. Choose a descriptive one.

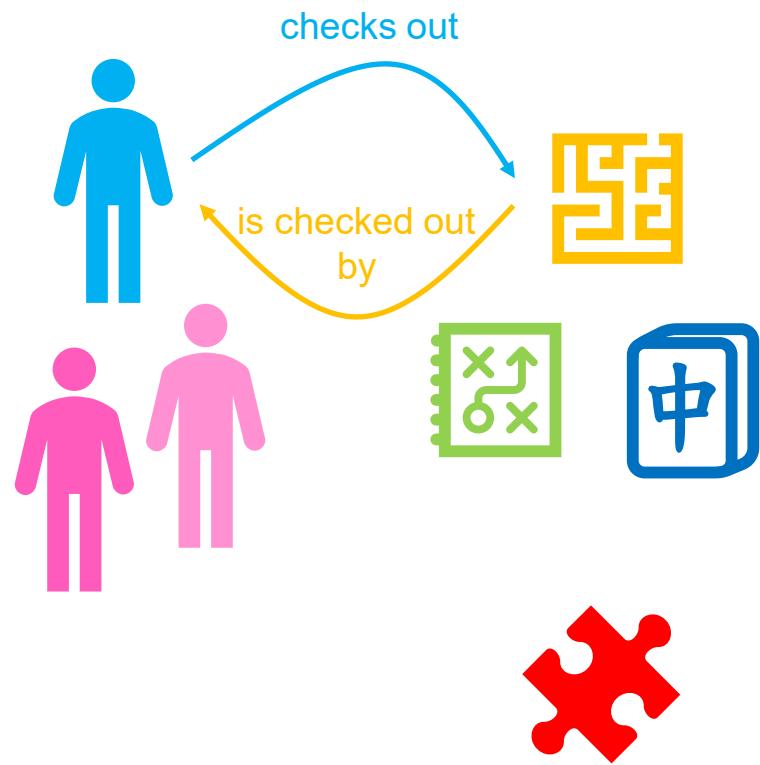


FINDING...

RELATIONSHIPS

Rob, Ann and Astrid are members of VGC. Rob **checks out** Mastermind and Stratego. Astrid **checks out** Mastermind and Monopoly. Ann **checks out** the Cute Cats Puzzle.

Verbs in a language can be **ambiguous**: borrow, to be interested, want, ... meaning the same. Choose a descriptive one.



FINDING...

RELATIONSHIPS

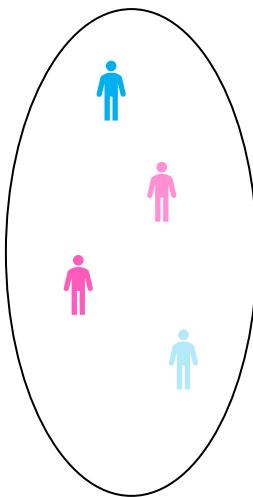
How do members relate to games?
A member checks out a game, a game
can be checked out by a member.

An **relationship** is usually represented as a
verb in a spoken language

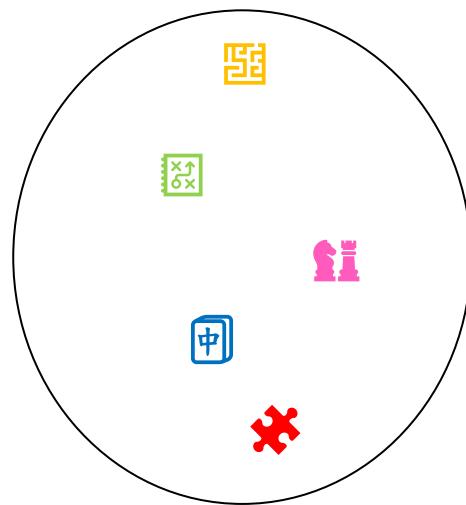
SET THEORY

RELATIONSHIPS

Members



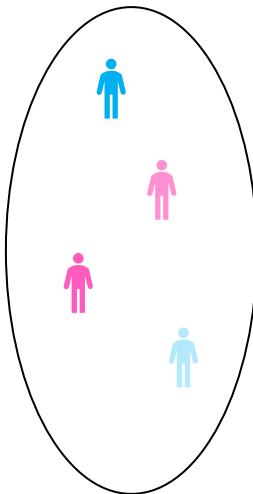
Games



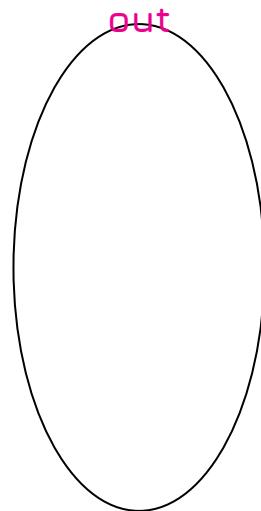
SET THEORY

RELATIONSHIPS

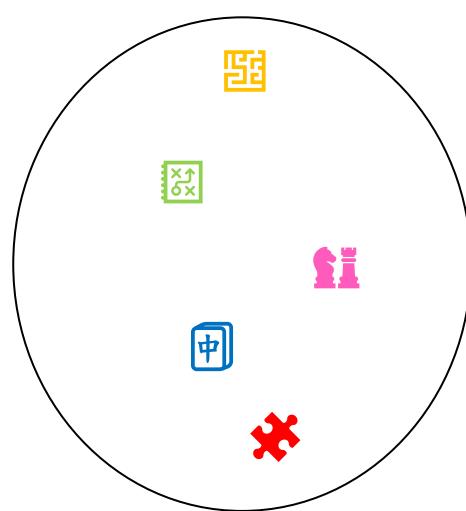
Members



checks
out



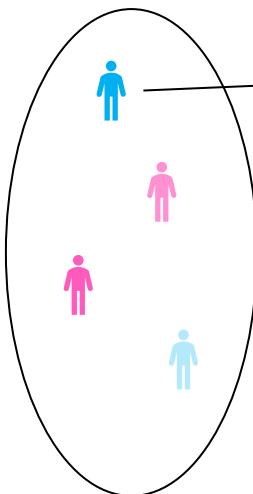
Games



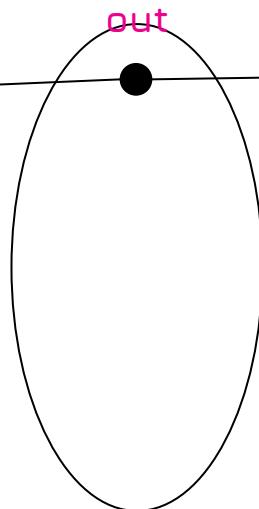
SET THEORY

RELATIONSHIPS

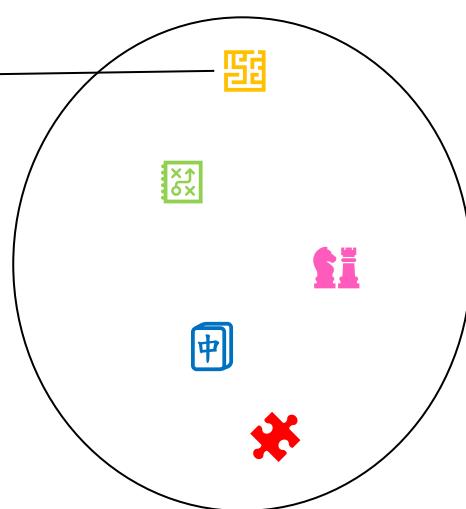
Members



checks
out

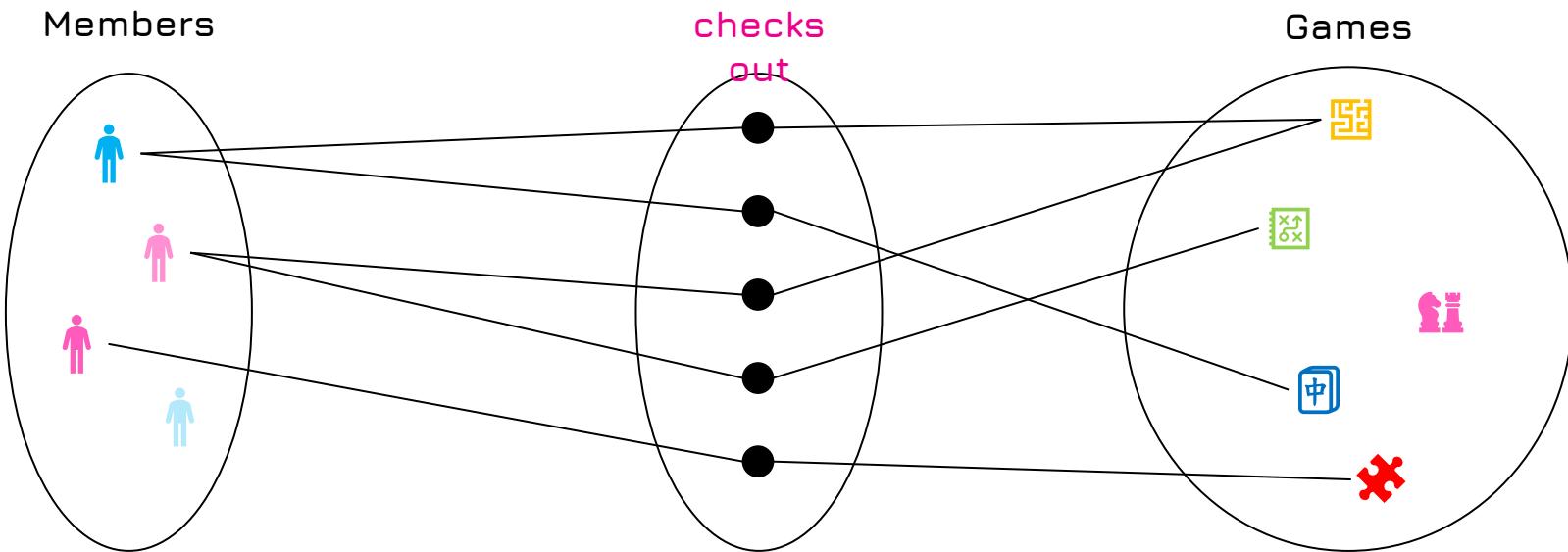


Games



SET THEORY

RELATIONSHIPS



Relationship Role

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WHAT IS A...

ROLE

The **role of a relationship type** may additionally name the purpose of the entity in the relationship.

student



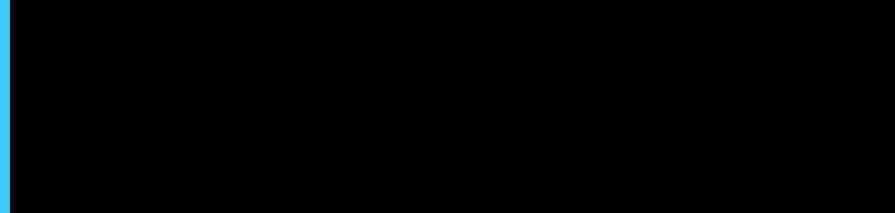
course

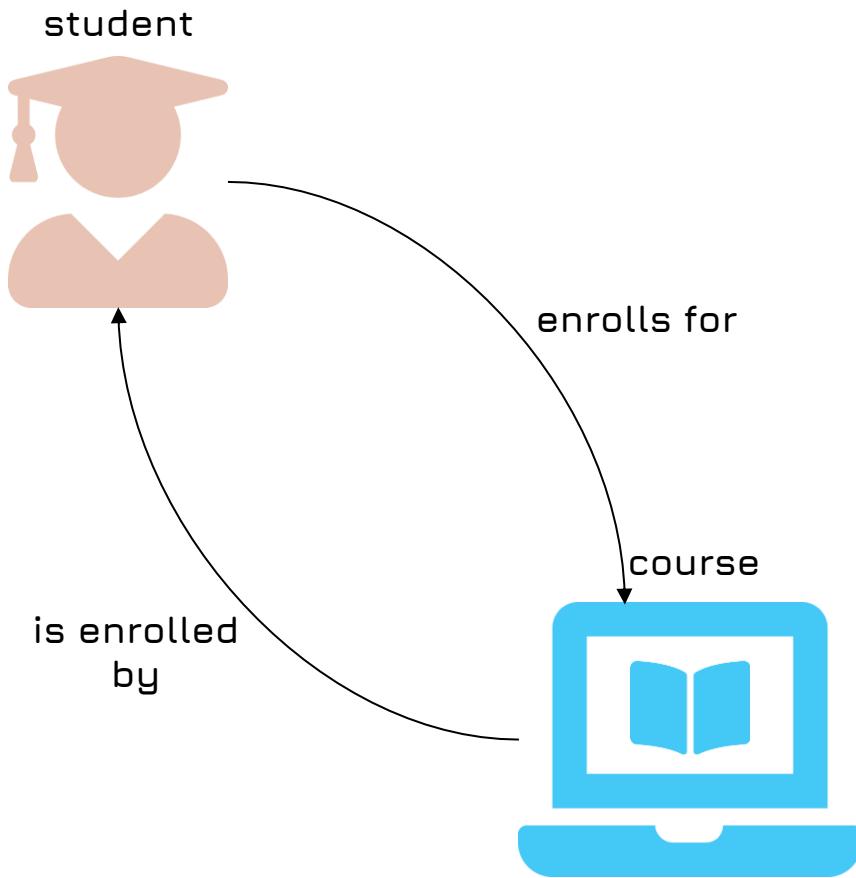


FINDING...

RELATIONSHIPS

What is the relationship between a **student** and **course**, and what are the roles?



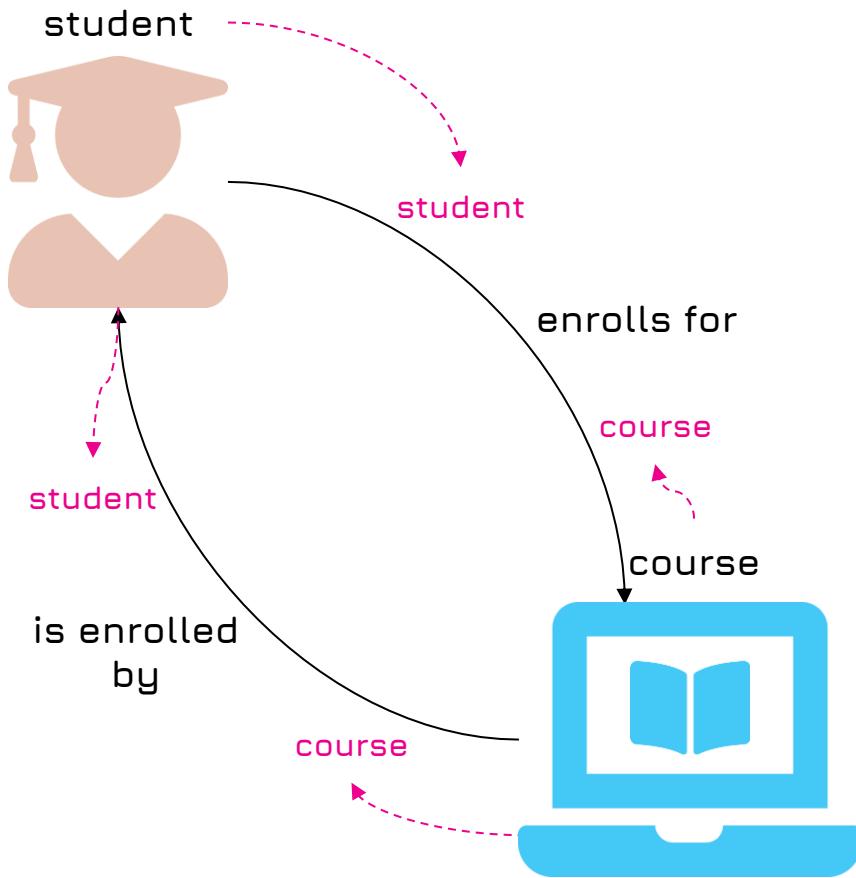


FINDING...

RELATIONSHIPS

What is the relationship between a **student** and **course**, and what are the roles?

Usually, role names are the same as the related entity type names. This is implicit.

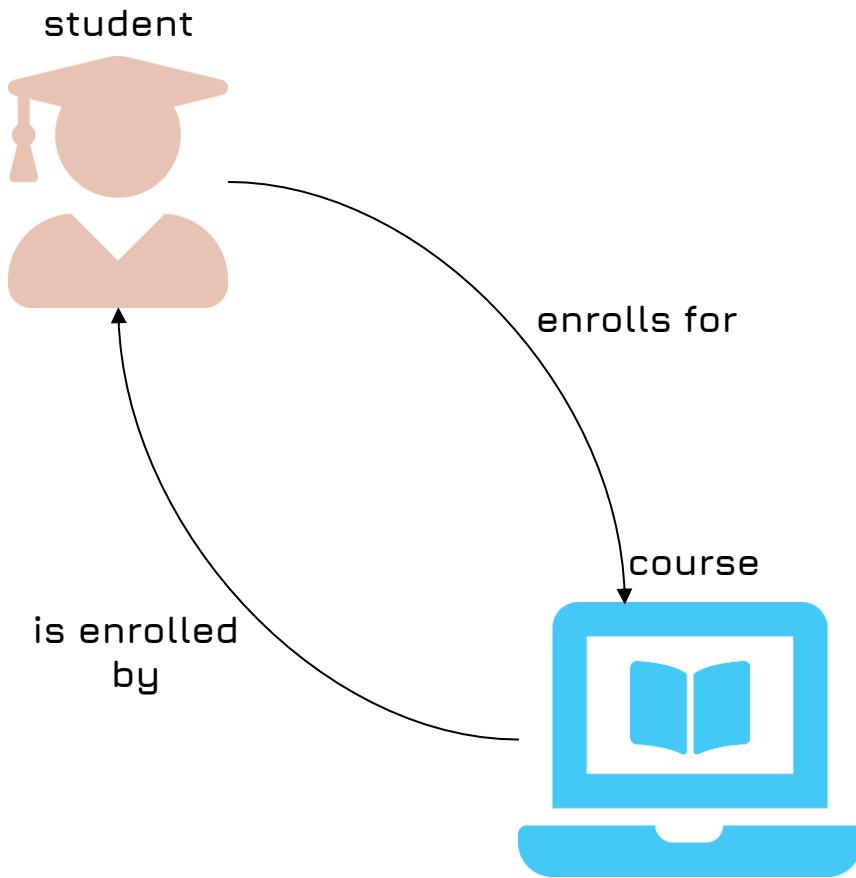


FINDING...

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What is the relationship between a **student** and **course**, and what are **the roles**?

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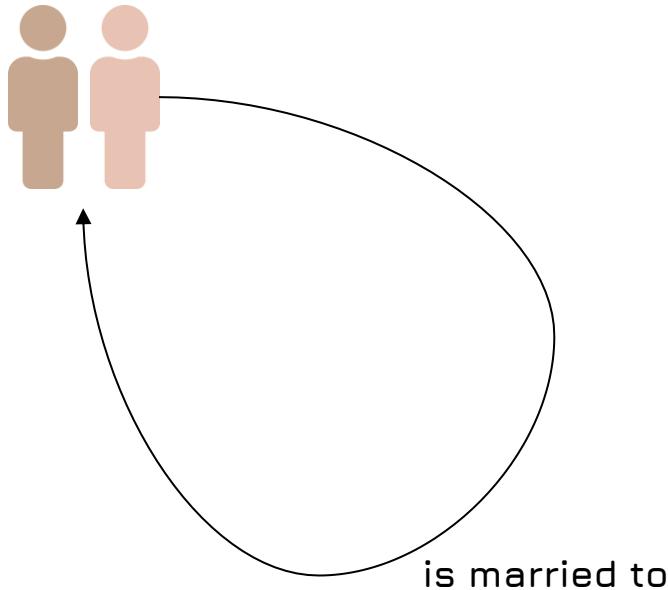


FINDING...

RELATIONSHIPS

What is the relationship between a **student** and **course**, and what are the roles?

In this case, the roles can be omitted without loss of information.



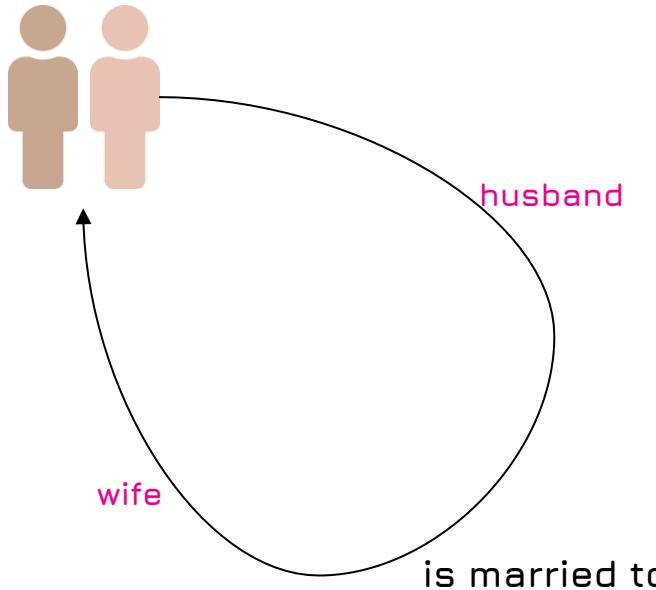
FINDING...

RELATIONSHIPS

What about marriage?

In a conservative marital monogamy,
we have a husband and wife.

To avoid confusion, it is allowed to add an explicit role.



FINDING...

RELATIONSHIPS

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we have a husband and wife.

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student



location

FINDING...

RELATIONSHIPS

Sometime more relationships exist, for example between a **student** and a **location**



student



is born in

lives in



location

FINDING...

RELATIONSHIPS

Sometimes more relationships exist, for example between a **student** and a **location**

Try to label the relationships to clarify the meaning.

Relationship degree

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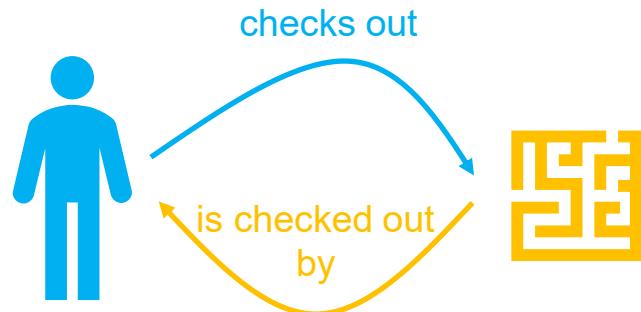
WHAT IS THE...

RELATIONSHIP DEGREE

The **relationship degree** is the number of entity types involved or participating in the relationship.

Unary, Binary, Ternary, n-ary

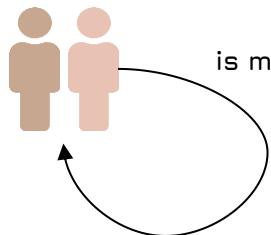
RELATIONSHIP DEGREE



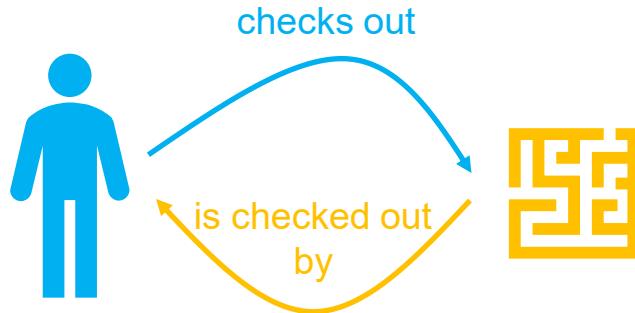
binary relationship
degree = 2

Unary, Binary, Ternary, n-ary

RELATIONSHIP DEGREE



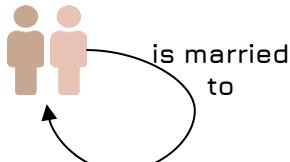
**unary relationship
degree = 1**



**binary relationship
degree = 2**

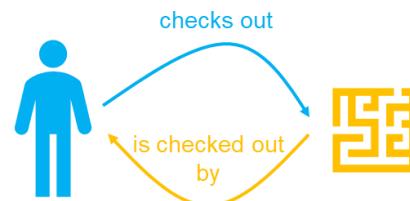
Unary, Binary, Ternary, n-ary

RELATIONSHIP DEGREE



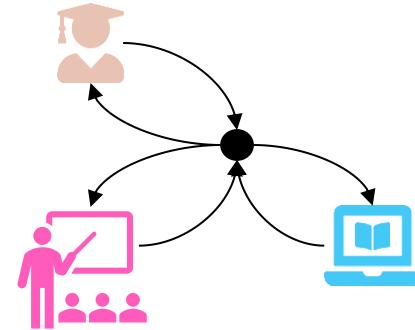
**unary relationship
degree = 1**

Entity type PERSON



**binary relationship
degree = 2**

Entity types MEMBER
and GAME

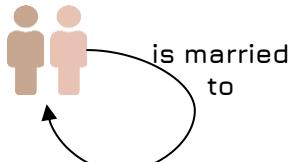


**ternary relationship
degree = 3**

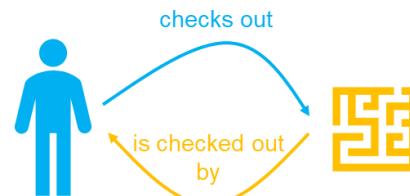
Entity types
TEACHER, COURSE
and CLASSROOM

Unary, Binary, Ternary, n-ary

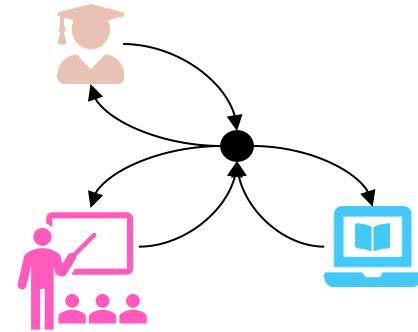
RELATIONSHIP DEGREE



**unary relationship
degree = 1**



**binary relationship
degree = 2**



**ternary relationship
degree = 3**

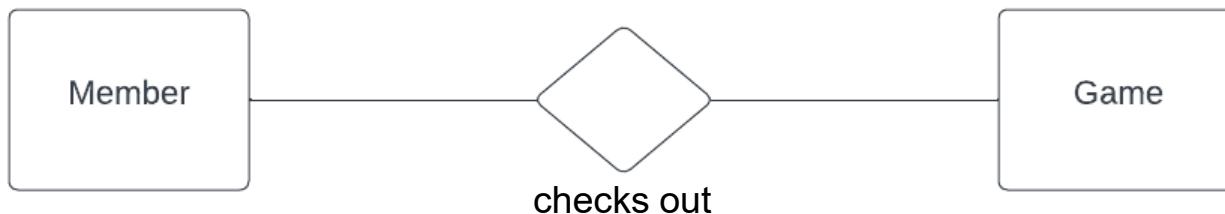
Usually, we don't go beyond ternary relationships. Higher degree relationships tend to be very to extremely complex to reason about and there is a risk of bad modelling with redundancy.

Relationship in ERD symbols

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ERD

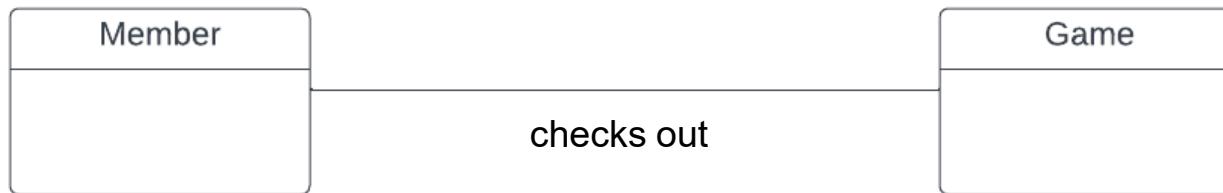
ERD RELATIONSHIP



Chen notation

ERD

ERD RELATIONSHIP



Crow's Foot notation

ERD relationships

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