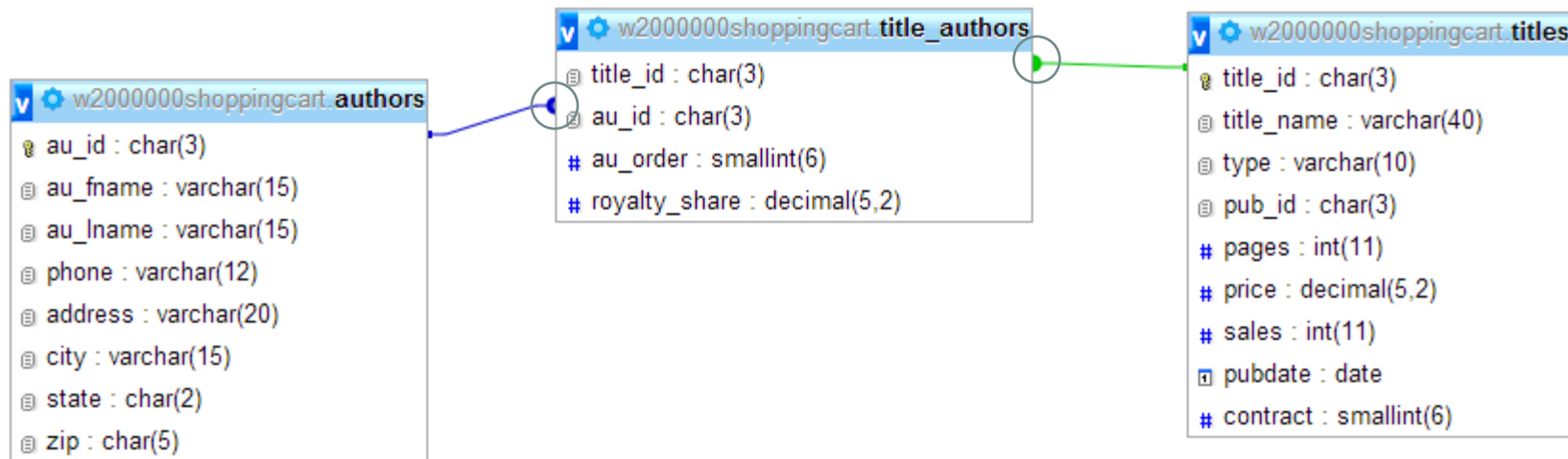# Entity Relationship Diagrams

MAD 202

ERD diagrams

- Entity Relationship Diagrams (ERD) are diagrams that detail the relationships between tables (entities).
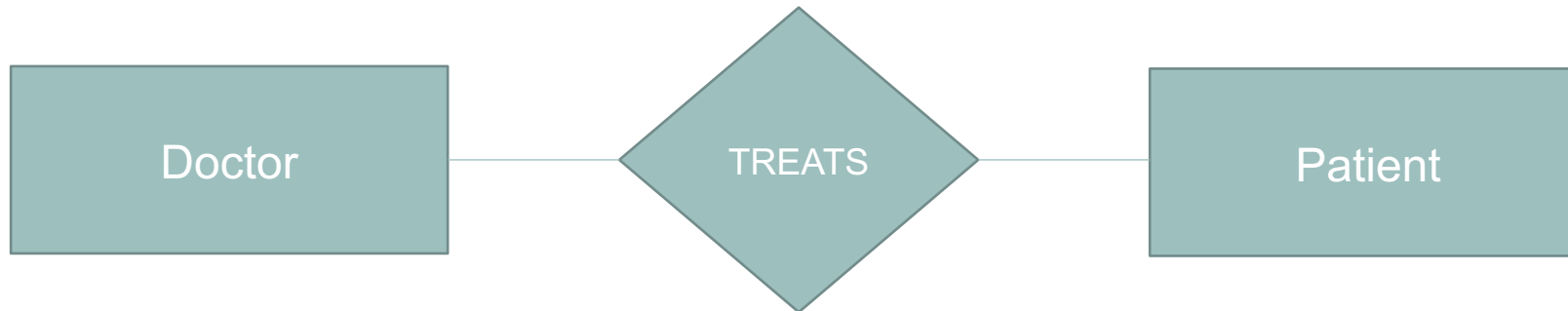
Three types of relationships

- One to One
  - Where one entity has a relationship with a single other entity
  - Student and Student ID

- One to Many
  - Where one entity has a relationship with several other entities, but each of those still has a single relationship with each entity
  - Customer has many orders, but each order has a single customer

- Many to Many
  - Each entity has a relationship with many entities and the reverse is true
  - Students and classes
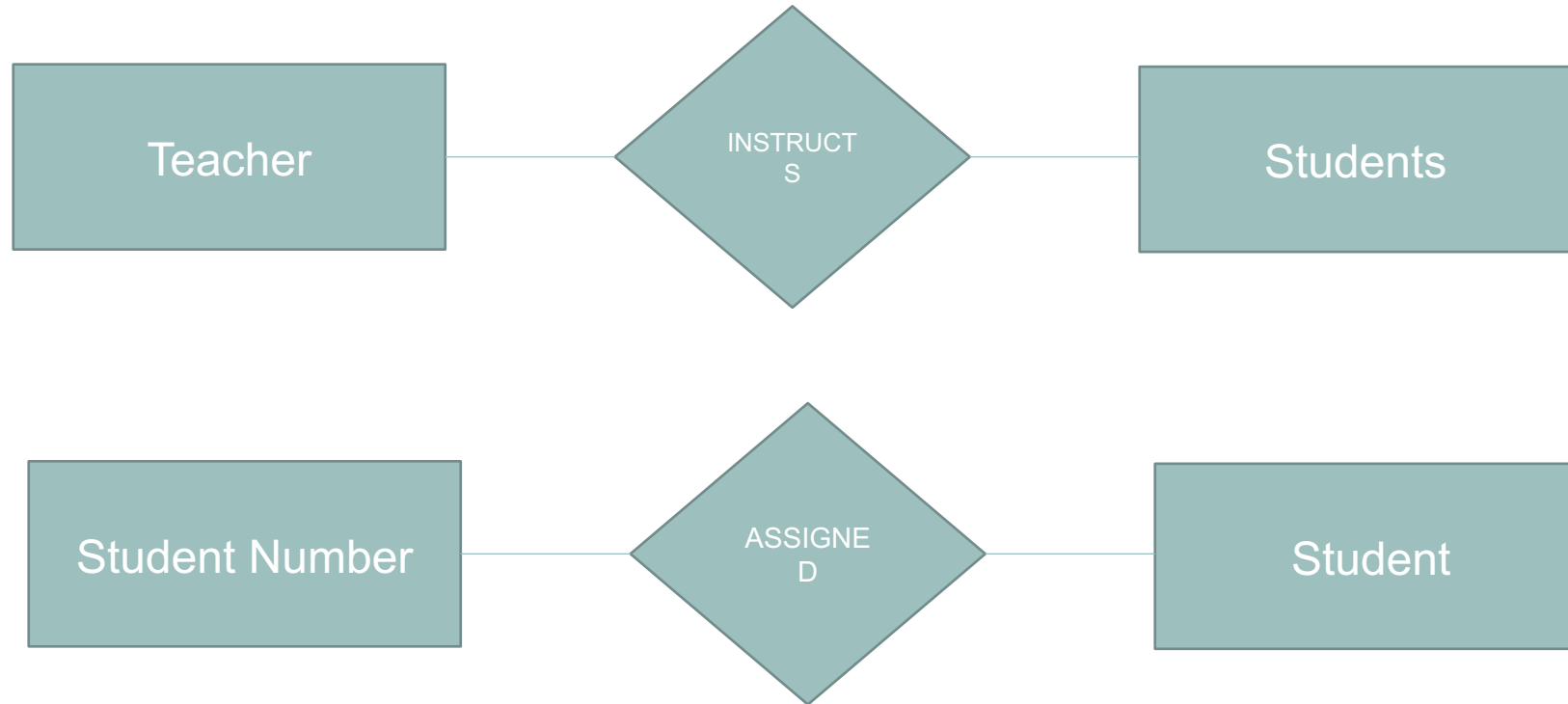   - A student has many classes and each class has many students

ERD Diagrams

- Different Diagram methods

- One method involves drawing entities as rectangles and relationships as diamonds

- For example:

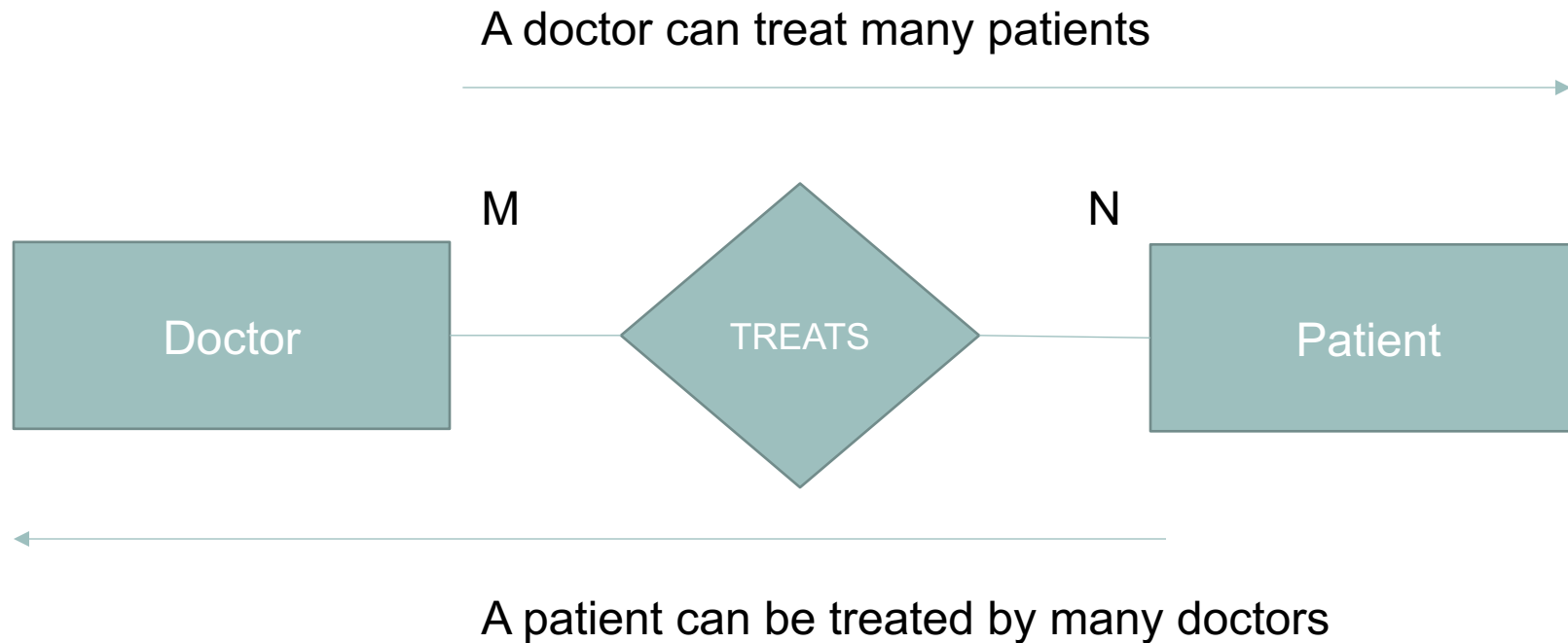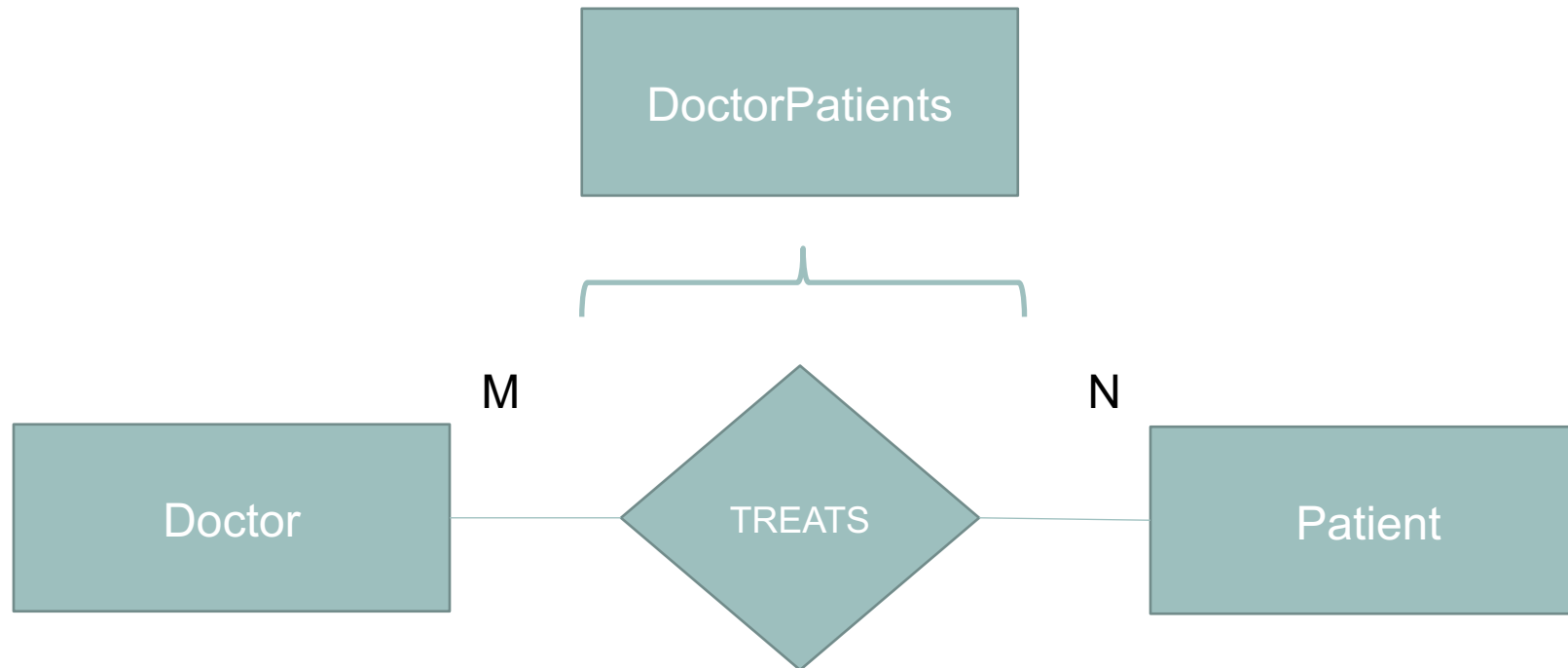- What is the relationship between a doctor and a patient?

Doctor —— TREATS —— Patient

ERD Diagrams

- Other relationships

Teacher — INSTRUCTS — Students

Student Number — ASSIGNED — Student

ERD Diagrams

- There are three kinds of relationships – they are modelled after cardinality

A doctor can treat many patients
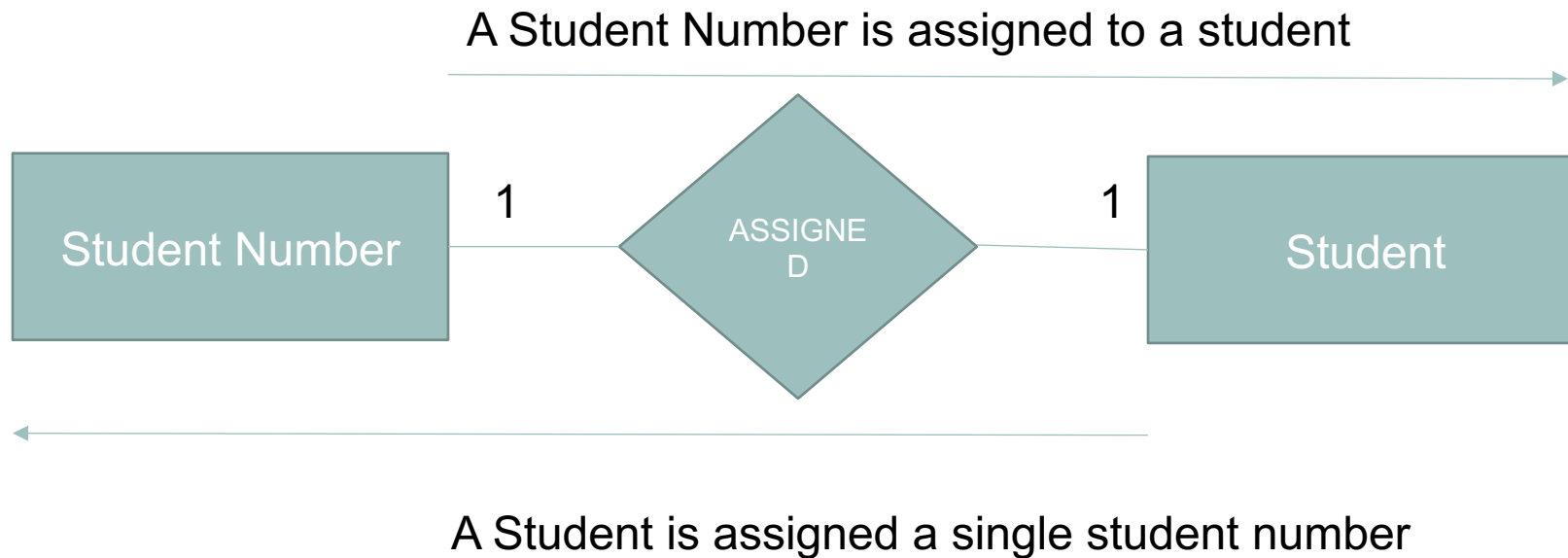
| Doctor | M | TREATS | N | Patient |

A patient can be treated by many doctors

ERD Diagrams

- Many to Many require a Junction Table

ERD Diagrams

- What is the type of relationship here?
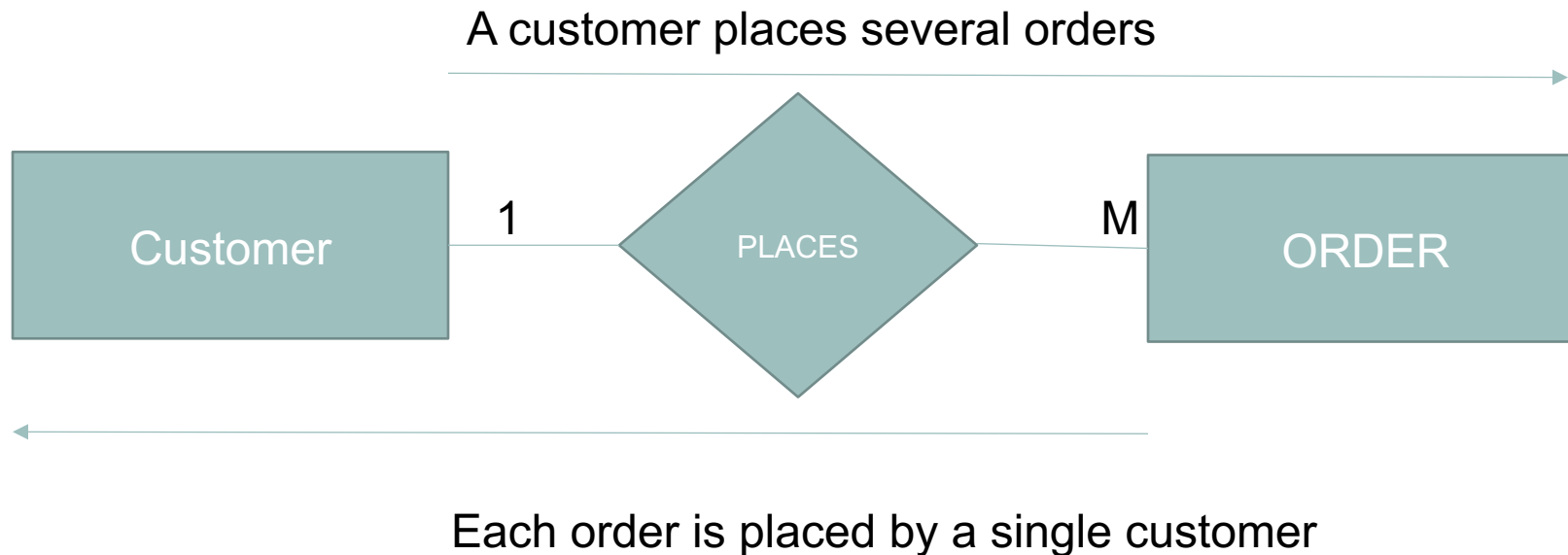
A Student Number is assigned to a student
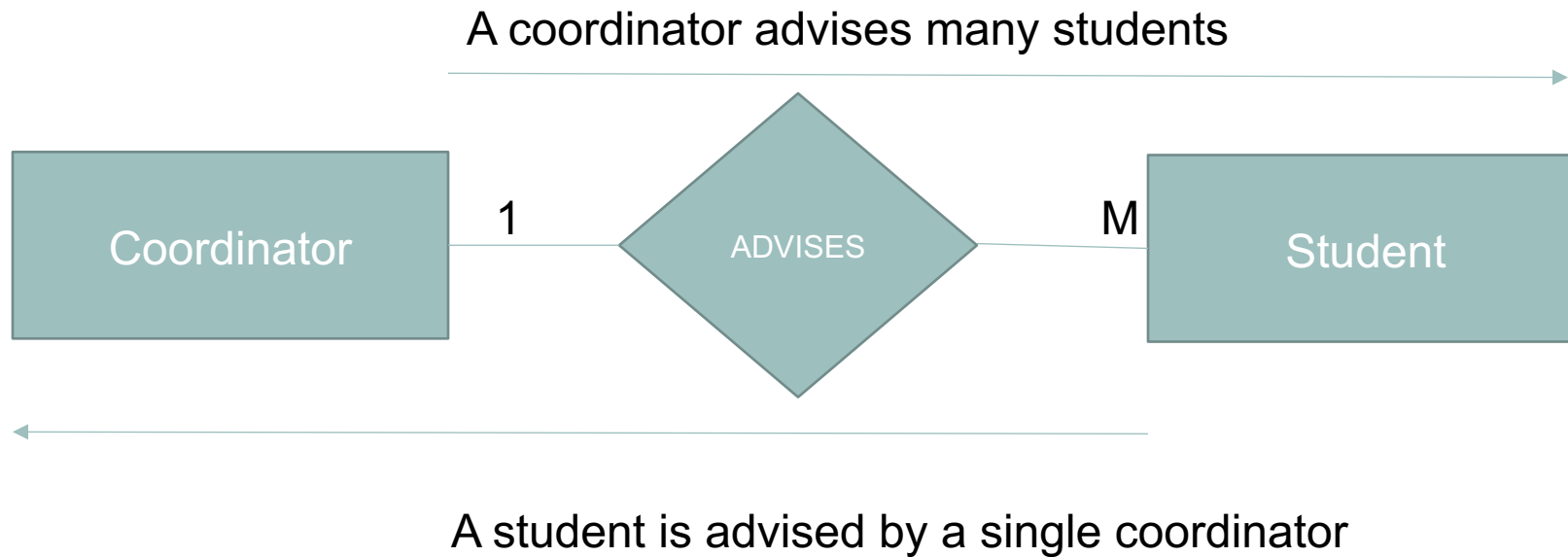
| Student Number | 1 | ASSIGNE D | 1 | Student |

A Student is assigned a single student number

ERD Diagrams

- What is the relationship here?

A customer places several orders

Each order is placed by a single customer

ERD Diagrams

- What is the relationship here?

A coordinator advises many students

| Coordinator | 1 | ADVISES | M | Student |

A student is advised by a single coordinator

ERD Diagrams

- What is the relationship here?

A passenger reserves many flights

Passenger — M — RESERVES — N — Flight

A flight is reserved by many passengers
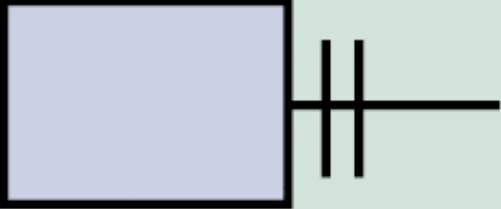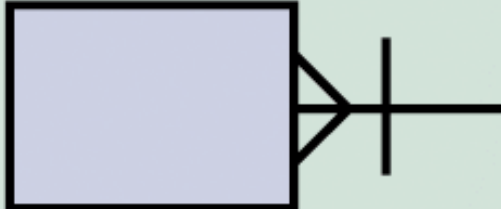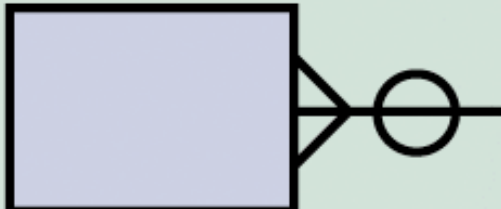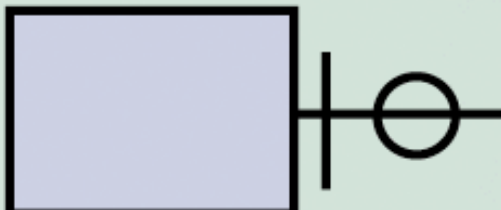
PassengerFlights

Cardinality

- Cardinality describes the numeric relationship between two entities and shows how instance of one entity relate to instances of another entity

- The interaction is modelled using cardinality notation which uses special symbols to represent the relationship

- A common method of notation is called crow's foot notation – due to the shapes

Cardinality

- Crow's Foot Notation

SYMBOL	MEANING	UML REPRESENTATION
	One and only one	1
	One or many	1..*
	Zero, or one, or many	0..*
	Zero, or one	0..1

Cardinality

EXAMPLES OF CARDINALITY NOTATION

CUSTOMER — PLACES — ORDER

One and only one CUSTOMER can place anywhere from zero to many of the ORDER entity.

ORDER — INCLUDES — ITEM ORDERED

One and only one ORDER can include one ITEM ORDERED or many.

EMPLOYEE — HAS — SPOUSE

One and only one EMPLOYEE can have one SPOUSE or NONE.

EMPLOYEE — ASSIGNED TO — PROJECT

One EMPLOYEE, or many employees, or none, can be assigned to one PROJECT, or many projects, or none.