# WEEK 1

## ENTITY RELATIONSHIP DIAGRAMS – PARTICIPATION ON RELATIONSHIPS – PART 4

# STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Define the following terms: *Total (Mandatory) Participation, Partial (Optional) Participation* and give an example of each
  - Using lines and (min, max) notation indicate the participation of each side of a relationships on an ER diagram
  - Determine if a relationship has total or partial participation by reading the specs about a relationship.

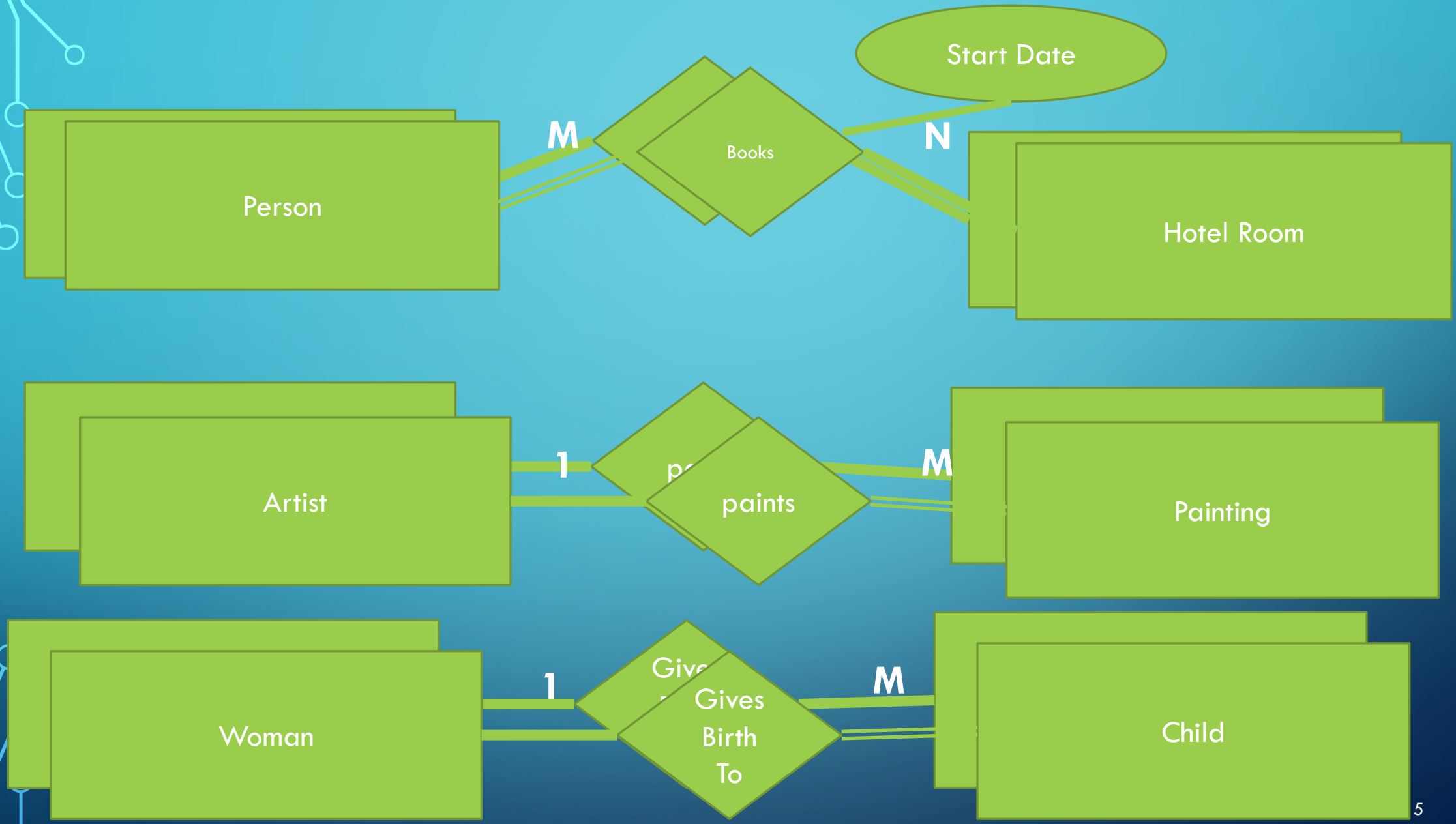
# CAN WE HAVE ENTITIES THAT DO NOT PARTICIPATE IN A RELATIONSHIP?

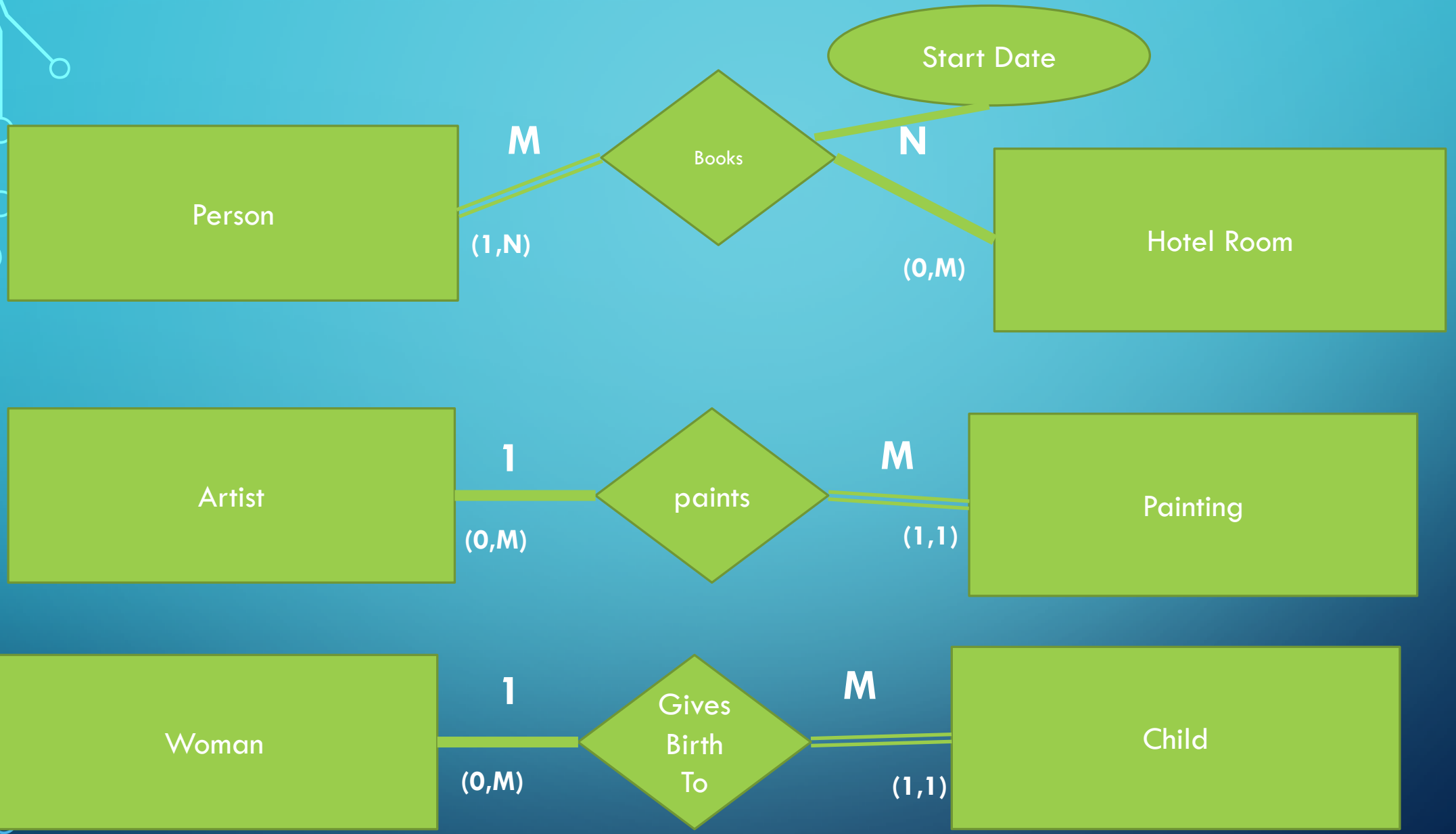
- For example: In the relationship: *Artist PAINTS Picture*, does **every** Picture have to be painted? Does **every** Artist have to paint a picture?
- In the relationship: Woman GIVES BIRTH TO Child, does **every** Woman have to give birth? Does **every** Child have to have been given birth to?
- Key word is **EVERY**. **Every** implies *TOTAL* participation. Anything less than EVERY implies *PARTIAL* participation.

- **Participation Constraint:** specifies whether the existence of an entity depends on it being related to another entity via the relationship type.
  - Total (Mandatory) - every entity in the entity set MUST BE related to the other entity set via the relationship. (For example, every employee must Work_For a department)
    - SHOW ON ER DIAGRAM WITH A DOUBLE LINE
  - Partial (Optional) - some or part of the entity set are related to the other entity set but not necessarily all. (For example, some employees manage a department but not all)
    - SHOW ON ER DIAGRAM WITH A SINGLE LINE
  - Other notation --> (min, max) where 0<=min<=max and max>=1. Each entity must participate in at least min and at most max relationships. Thus a min of 0 implies **partial** participation.

**QUESTION: What is the participation of Child in: Man FATHERS Child?**

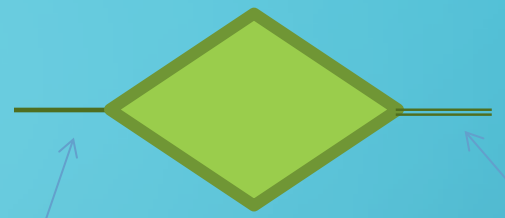
**QUESTION: What is the participation of Man in: Man FATHERS Child?**


Start Date
Person
M
Books
N
Hotel Room
Artist
1
paints
M
Painting
Woman
1
Gives Birth To
M
Child


Start Date
Person
M
Books
N
Hotel Room
(1,N)
(0,M)
Artist
1
paints
M
Painting
(0,M)
(1,1)
Woman
1
Gives Birth To
M
Child
(0,M)
(1,1)

# E-R DIAGRAM NOTATION SO FAR:

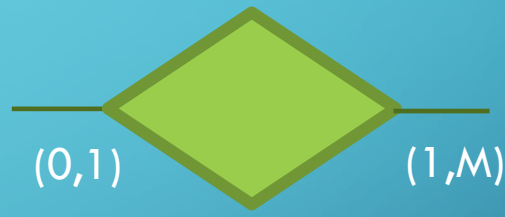
- Relationship Participation



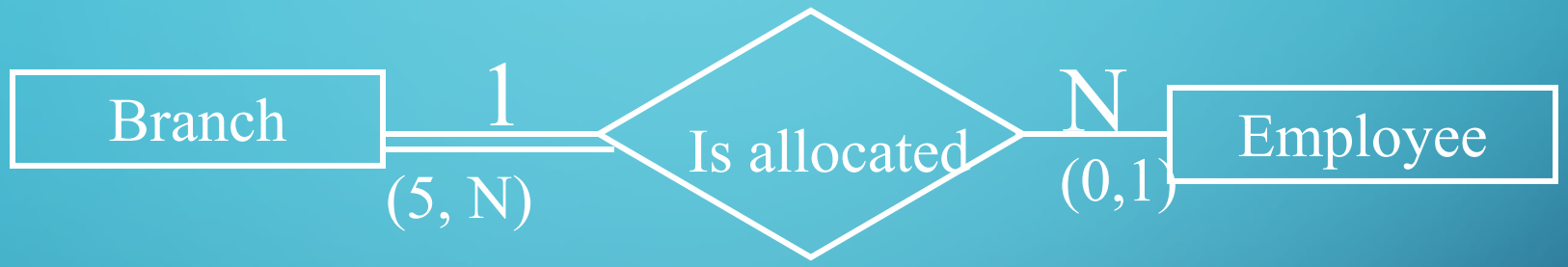
Partial – single line

Total – double line

- (Min, Max) Notation



**QUESTION: In the following ER diagram, what does the (min, max) notation imply?**



# CASE STUDY – CREATING AN ER DIAGRAM

- Suppose we plan to model a company which is organized into departments.
- Each department has a unique name, number and employee who manages it (we want to keep track of when the employee started managing the department)
- A department may have several locations
- A department controls a bunch of projects, each project has a unique number, name and a single location
- Each employee has a name, ssnumber, address, salary, sex and birthdate
- An employee is assigned to only one department but may work on several projects which are not necessarily from the same department
- Keep track of the number of hours each employee works on each project.
- Keep track of the direct supervisor of each employee
- Keep track of the dependents of each employee (name, sex, birthdate and relation)

# QUESTION: WHAT IS OUR DIAGRAM SO FAR? (IT IS STARTED BELOW)

Let's use draw.io to finish the diagram.