



# WEEK 1

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

participation = total  
partial.

# 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.

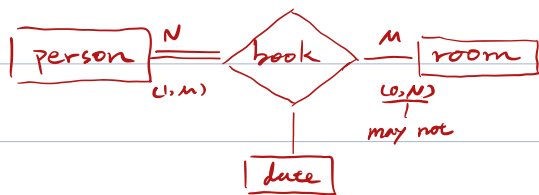
# CAN WE HAVE ENTITIES THAT DO NOT PARTICIPATE IN A RELATIONSHIP? *i.e. Student take courses.*

- For example: In the relationship: Artist PAINTS Picture, does **every** Picture have to be painted? *Yes* Does **every** Artist have to paint a picture? *No.*
- In the relationship: Woman GIVES BIRTH TO Child, does **every** Woman have to give birth? *No* Does **every** Child have to have been given birth to? *Yes.*  
*Child have equal participation*
- 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** --> <sup>participate cardinality.</sup> (min, max) where  $0 \leq \min \leq \max$  and  $\max \geq 1$ . 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?**



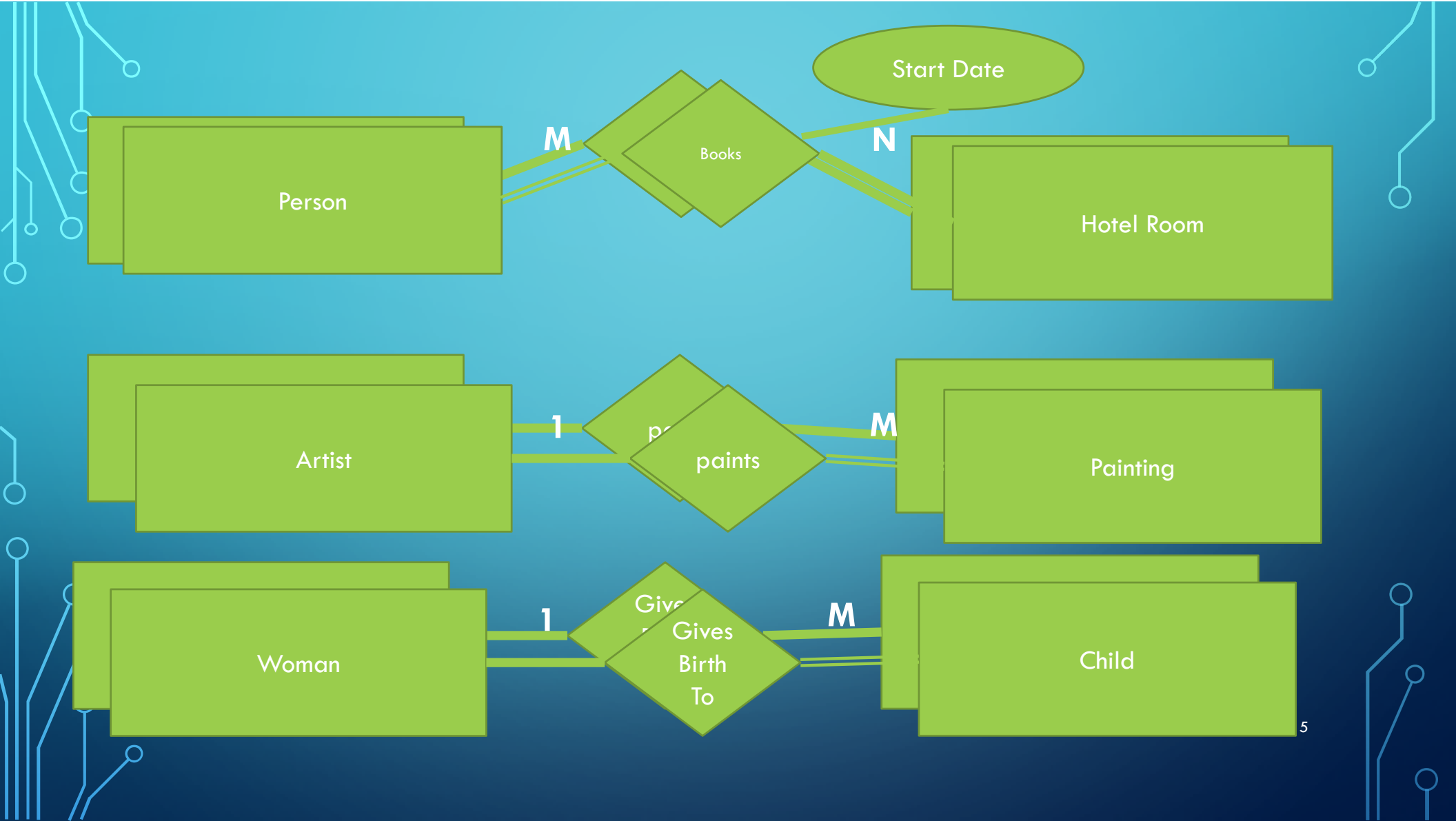
everyone (in system) have to book a room  
but not every room have to be booked.

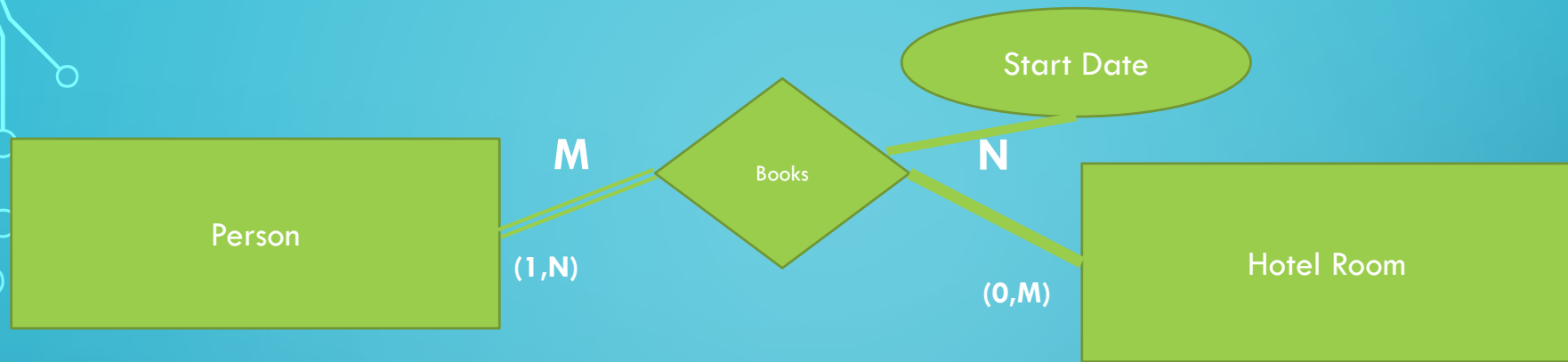
the maximum number a person could book is  $N$ ;

for a room to be booked is  $N$

artist  $\frac{1}{(0, N)}$  paint  $\frac{N}{(1, 1)}$  painting

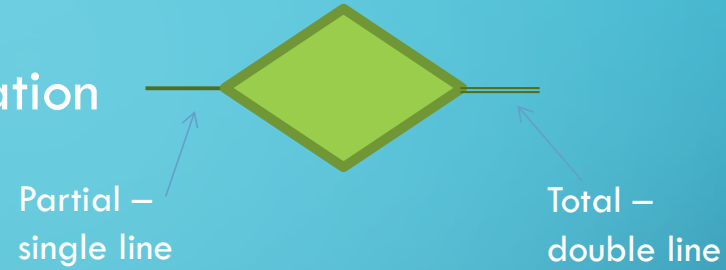
woman  $\frac{1}{(0, N)}$  birth  $\frac{N}{(1, 1)}$  child



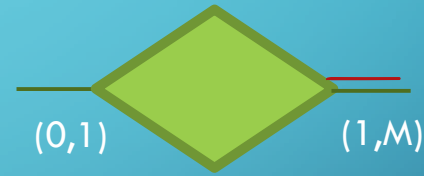


# E-R DIAGRAM NOTATION SO FAR:

- Relationship Participation



- (Min, Max) Notation





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



*A branch is allocated with minimum 5 employee.  
Not all employee is allocated in branch.*

# 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](https://draw.io) to finish the diagram.