WEEK 2

MAPPING 1 TO 1 AND 1 TO MANY RELATIONSHIPS FROM AN ER DIAGRAM INTO A RELATIONAL DATABASE

STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Look at an ER Diagram and represent each of the 1 to 1 relationships and 1 to Many relationship in the relational model.
  - Identify how the foreign keys indicate the relationship between tuples within tables in the relational model.

REPRESENTING RELATIONSHIPS USING ONLY TABLES

Suppose you have the following 2 ENTITIES from your ER diagram, now mapped to relational database as the tables: *Professor* and *Department*:

PROFESSOR

FirstName	LastName	EmpID	Office	Ext
Laura	Reid	11	ST238	86905
Doug	Vancise	22	MC 421	83355
Michael	Atkinson	15	SSC 44	83456
Stuart	Rankin	18	MC 101	87678
Jamie	Andrews	34	MC 343	86789
Irving	Robinson	56	MC 102	86733

DEPARTMENT

DeptID	DeptName	Building
MA	Math	Middlesex College
CS	Computer Science	Middlesex College
PS	Psychology	Social Science Centre

REPRESENTING 1 TO MANY RELATIONSHIPS IN RELATIONAL DATABASE MODEL

We want to show the following relationship as a table:

QUESTION: How could you model this relationship using only tables (rows or columns)?

The rules are:

1. **YOU CAN ADD AS MANY NEW COLUMNS AND ROWS AS YOU WANT TO THE EXISTING TABLES**
2. **AND IF YOU NEED A NEW TABLE YOU CAN ADD THAT ALSO,**
3. **BUT THAT IS ALL YOU CAN ADD → COLUMNS, ROWS and TABLES**

Let's say that Laura, Doug and Jamie all work for the Computer Science Department. Stuart and Irving work for the Math Department. Michael works for the Psychology Department

QUESTION: HOW CAN WE REPRESENT THIS IN OUR TABLES?

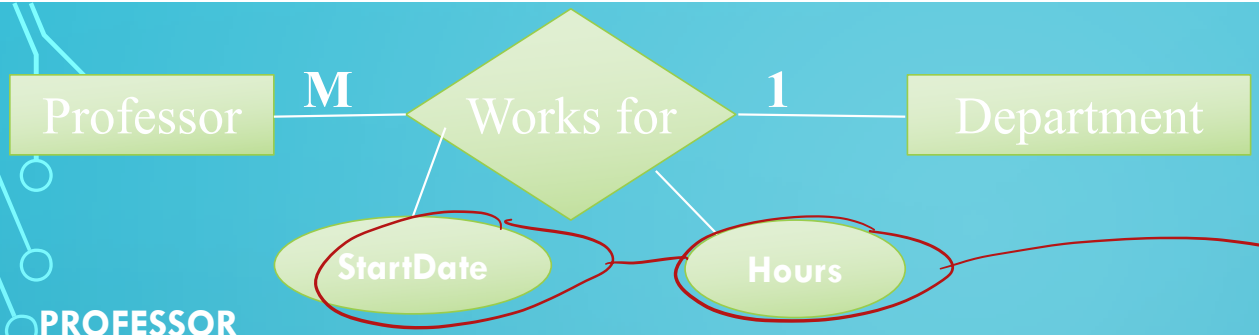
PROFESSOR

FirstName	LastName	EmpID	Office	Ext	DeptID*
Laura	Reid	11	ST238	86905	CS
Doug	Vancise	22	MC 421	83355	CS
Michael	Atkinson	15	SSC 44	83456	PS
Stuart	Rankin	18	MC 101	87678	MA
Jamie	Andrews	34	MC 343	86789	CS
Irving	Robinson	56	MC 102	86733	MA

it is a foreign key.

DEPARTMENT

DeptID	DeptName	Building
MA	Math	Middlesex College
CS	Computer Science	Middlesex College
PS	Psychology	Social Science Centre



What if we add attributes to the relationship? How do we show that?

Add extra attributes to the table.

These two are not foreign keys.

PROFESSOR

FirstName	LastName	EmpID	Office	Ext	DeptID*	Hours	StartDate
Laura	Reid	11	ST238	86905	CS	30	04/28/97
Doug	Vancise	22	MC 421	83355	CS	40	04/30/76
Michael	Atkinson	15	SSC 44	83456	PS	40	02/21/89
Stuart	Rankin	18	MC 101	87678	MA	40	02/19/78
Jamie	Andrews	34	MC 343	86789	CS	20	01/01/93
Irving	Robinson	56	MC 102	86733	MA	20	01/01/68

DEPARTMENT

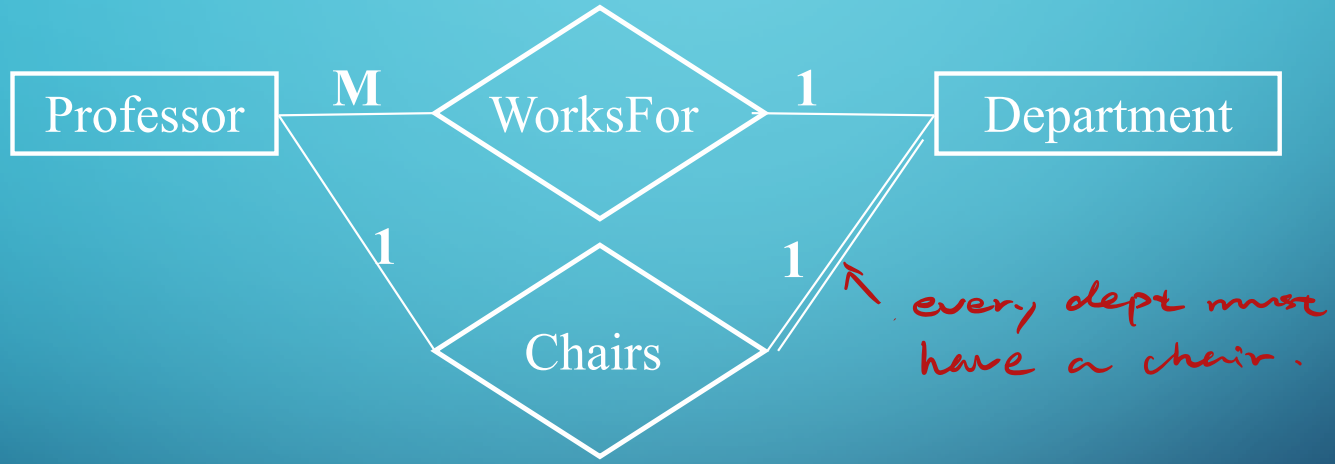
DeptID	DeptName	Building
MA	Math	Middlesex College
CS	Computer Science	Middlesex College
PS	Psychology	Social Science Centre

QUESTION: What is the primary key of table PROFESSOR?
EmpID, foreign key(s) DeptID

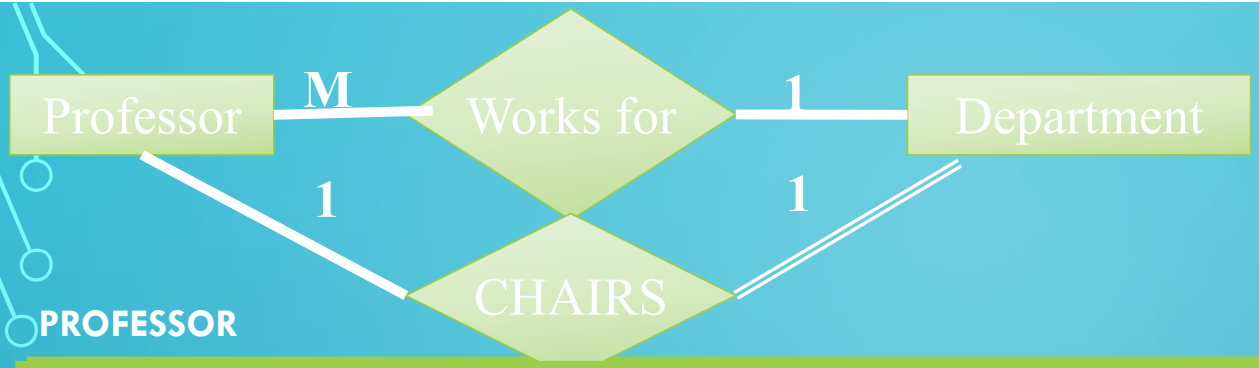
What is the primary key of table DEPARTMENT? DeptID,
foreign keys(s) None...YET!

REPRESENTING 1 TO 1 RELATIONSHIPS IN RELATIONAL DATABASE MODEL

We want to show the following additional relationship:



QUESTION: How could you model the *CHAIRS* relationship using only tables (rows or columns)?



Let's say that Jamie is chair of the Computer Science Department. Stuart is chair of the Math Department. Michael is chair of the Psychology Department

QUESTION: HOW CAN WE REPRESENT THIS IN OUR TABLES?

PROFESSOR

FirstName	LastName	EmpID	Office	Ext	DeptID*	ManageDeptID*
Laura	Reid	11	ST238	86905	CS	NULL
Doug	Vancise	22	MC 421	83355	CS	NULL
Michael	Atkinson	15	SSC 44	83456	PS	PS
Stuart	Rankin	18	MC 101	87678	MA	MA
Jamie	Andrews	34	MC 343	86789	CS	CS
Irving	Robinson	56	MC 102	86733	MA	NULL

This is also a foreign key.

DEPARTMENT

DeptID	DeptName	Building	*ManagerID
MA	Math	Middlesex College	18
CS	Computer Science	Middlesex College	34
PS	Psychology	Social Science Centre	15

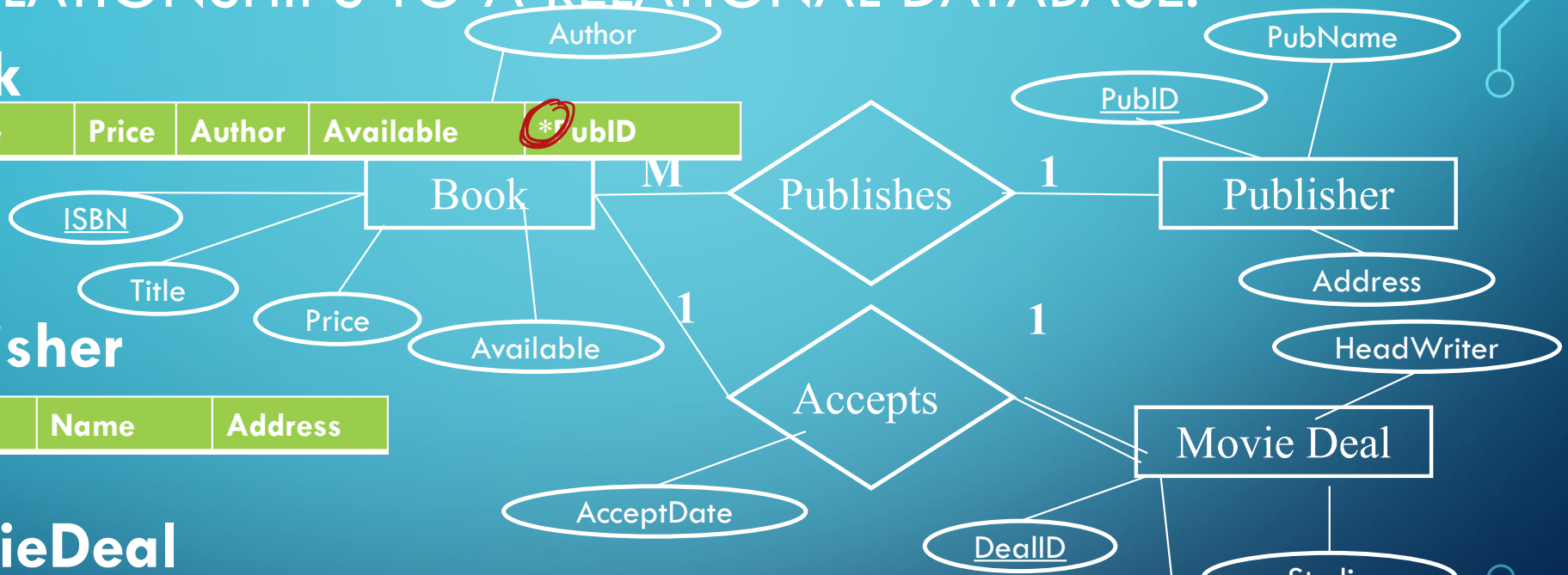
Take same side as the foreign key to avoid NULL value.

Since it is a total participation, there's no NULL it is another way indicating the chair in each department

QUESTION: What is the primary key of table PROFESSOR? EmpID, foreign key(s) DeptID

What is the primary key of table DEPARTMENT? DeptID, foreign keys(s) ManagerID

ANOTHER EXAMPLE OF HOW TO MAP ER RELATIONSHIPS TO A RELATIONAL DATABASE:



Book

ISBN	Title	Price	Author	Available	*PubID

Publisher

Pub_ID	Name	Address

MovieDeal

Deal_ID	NegotiatorName	StudioName	HeadScreenWriter	*ISBN	AcceptDate	egName

This would avoid Null value at the book table.