CIS-552: DATABASE DESIGN

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Lab 1: Part – 2

ER Diagram:

In this lab, I used the ErWin Data Modeler tool to create an Entity-Relationship (ER) diagram based on the conceptual schema provided.

The entities in the ER diagram are:

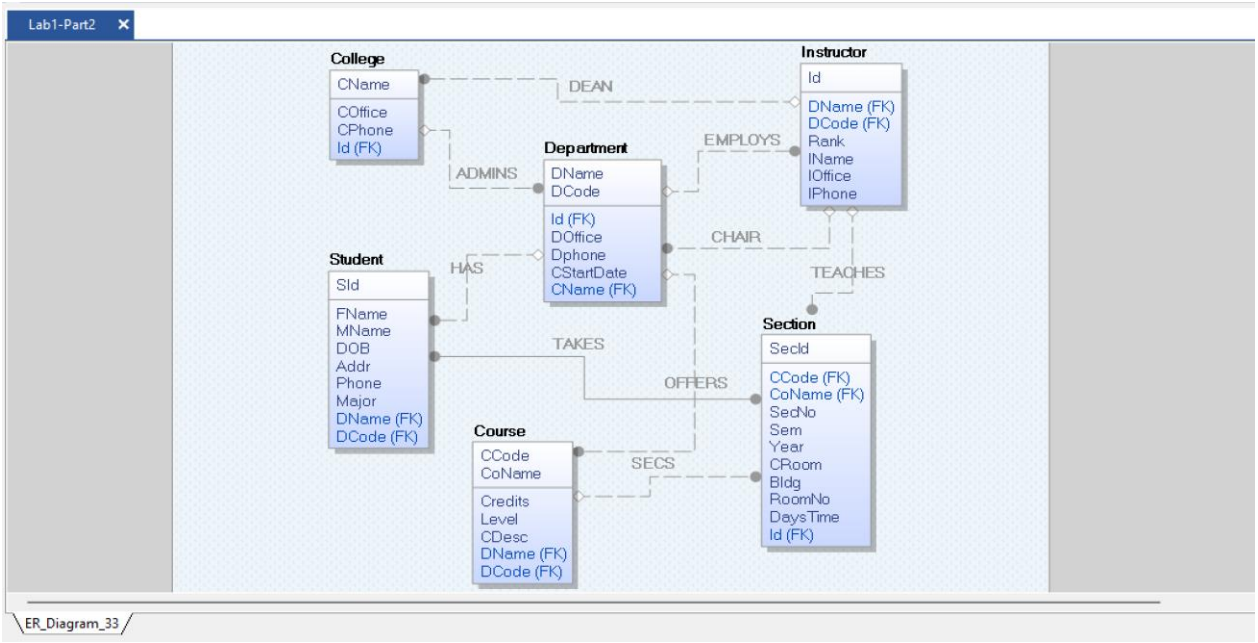
1. College
2. Department
3. Instructor
4. Student
5. Course
6. Section

The relationships in the ER diagram are as follows:

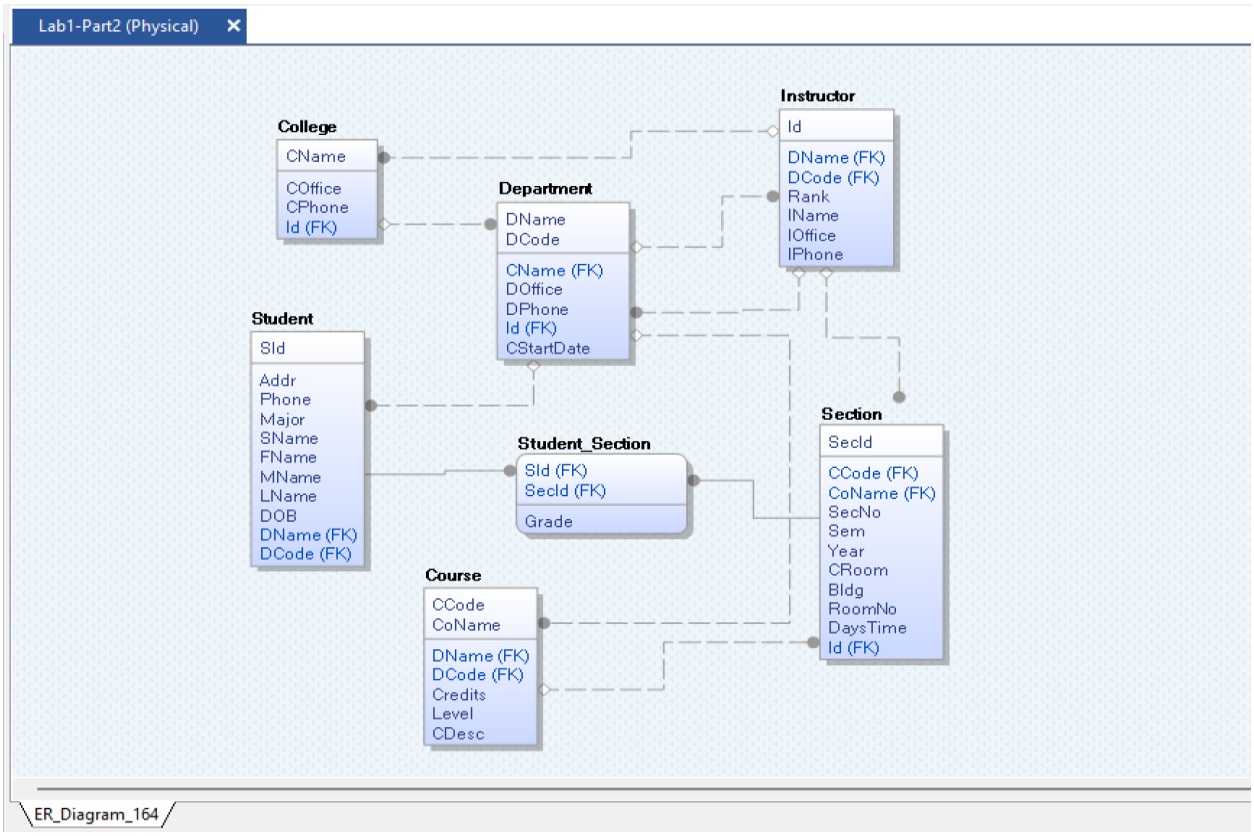
1. College Admins Department
    a. Type: Non-Identifying Relationship
    b. Cardinality: (0: N), (1:1)
2. Department Offers Course
    a. Type: Non-identifying Relationship
    b. Cardinality: (0: N), (0:1)
3. Instructor Dean College
    a. Type: Non-identifying Relationship
    b. Cardinality: (1: 1), (0:1)
4. Department Has Student
    a. Type: Non-Identifying Relationship
    b. Cardinality: (0: N), (0:1)
5. Instructor Teaches Section
    a. Type: Non-Identifying Relationship
    b. Cardinality: (0: N), (1:1)
6. Student Takes Section
    a. Type: Many-to-Many Relationship
    b. Cardinality: (0: N), (5: N)
7. Course Secs Section
    a. Type: Non-Identifying Relationship

   b. Cardinality: (0: N), (1:1)
8. Department Chair Instructor
   a. Type: Non-Identifying Relationship
   b. Cardinality: (1:1), (0:1)
9. Instructor Employs Department
   a. Type: Non-Identifying Relationship
   b. Cardinality: (1:1), (0: N)

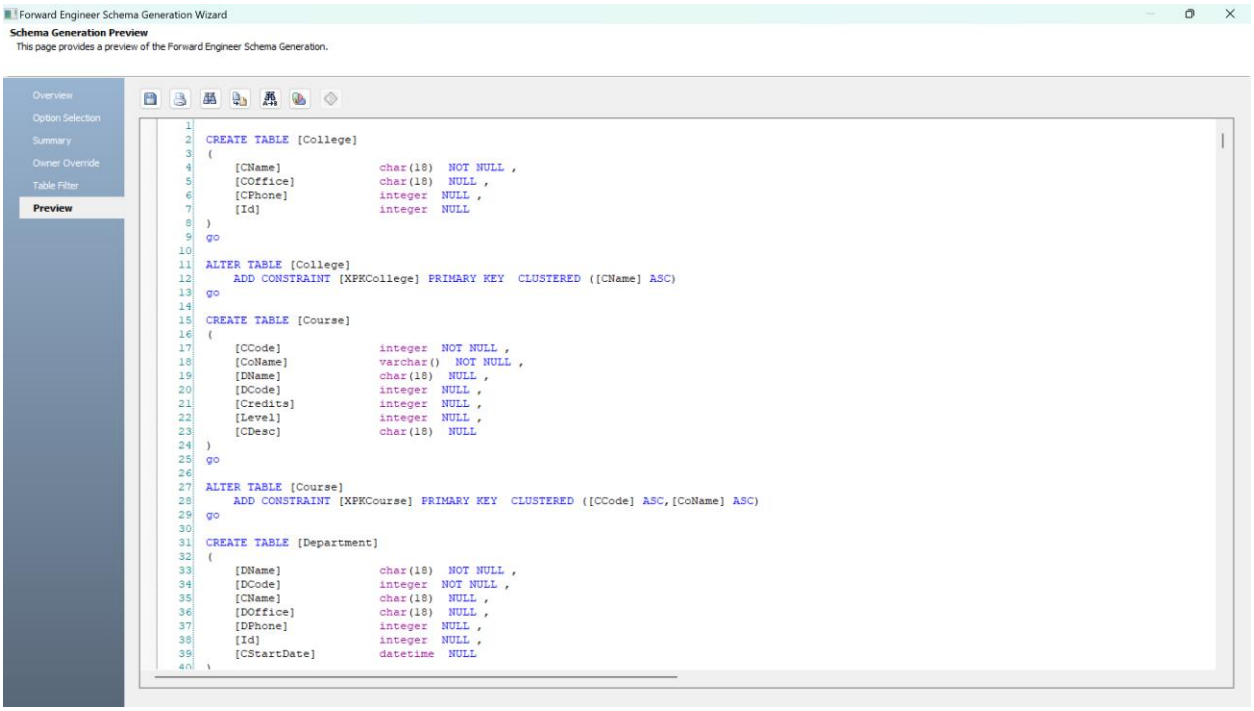
The **Logical ER diagram** is attached in the form of screenshot below:

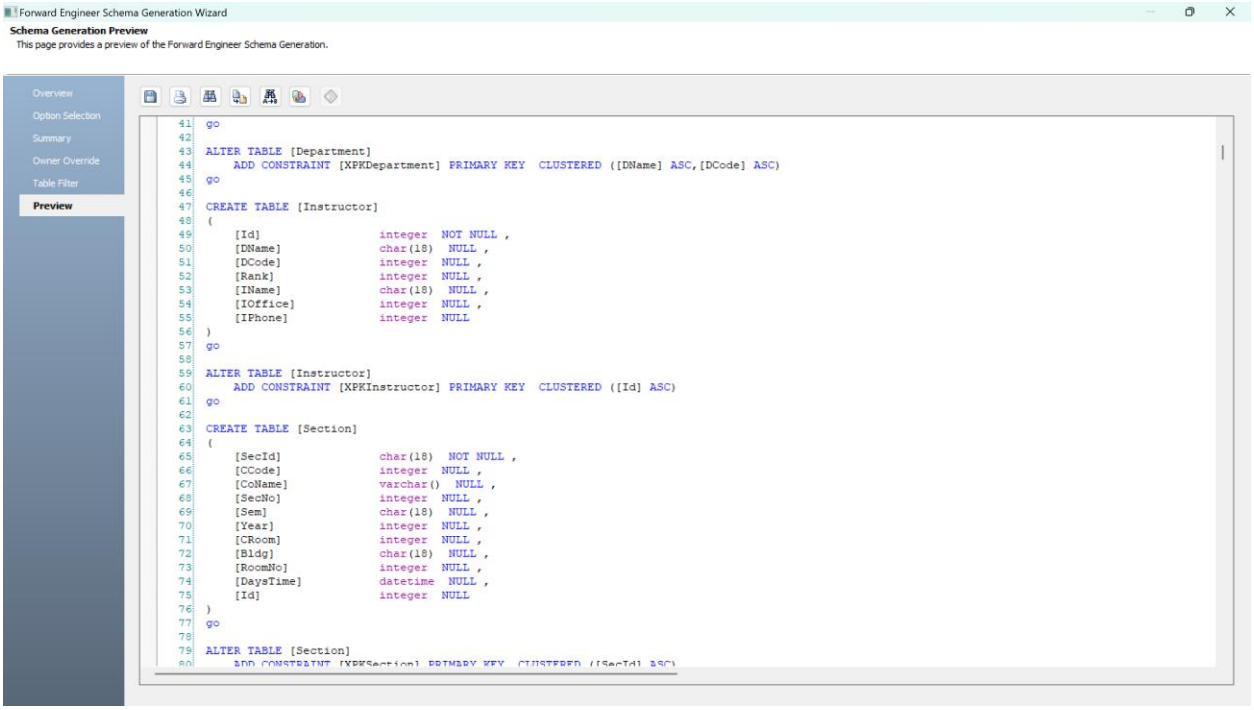


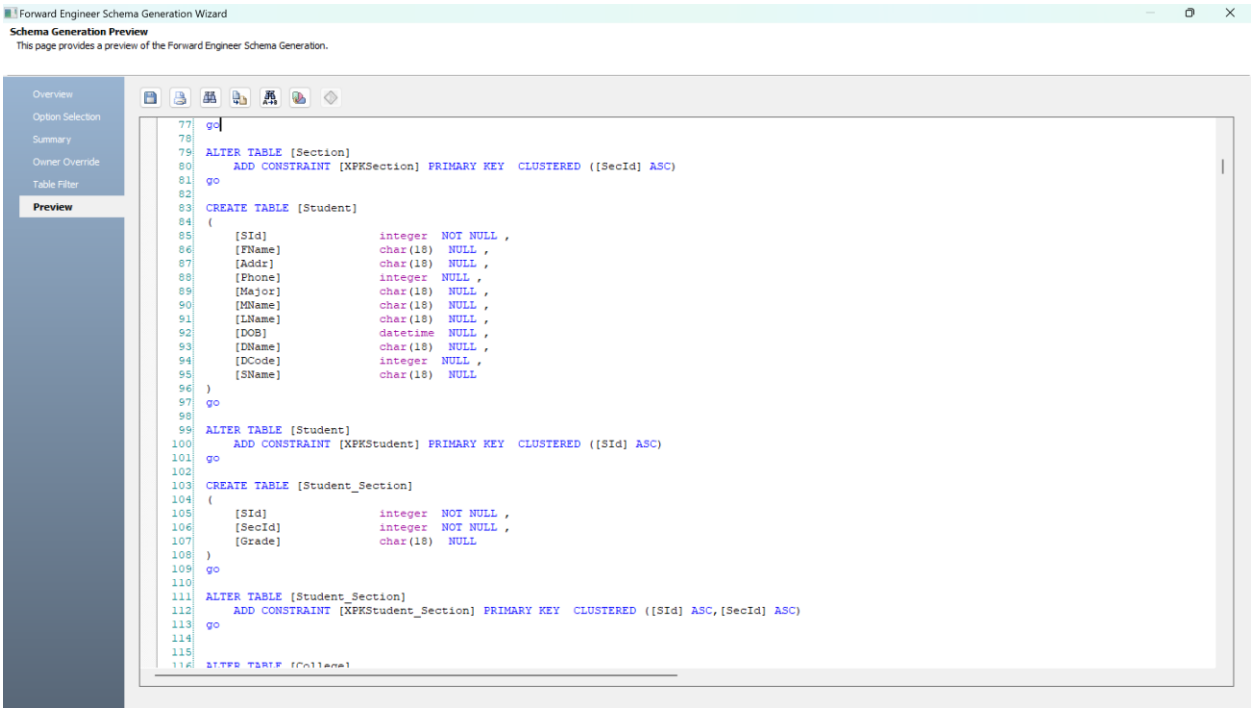
The **Physical ER diagram** has been attached in the form of screenshot below:

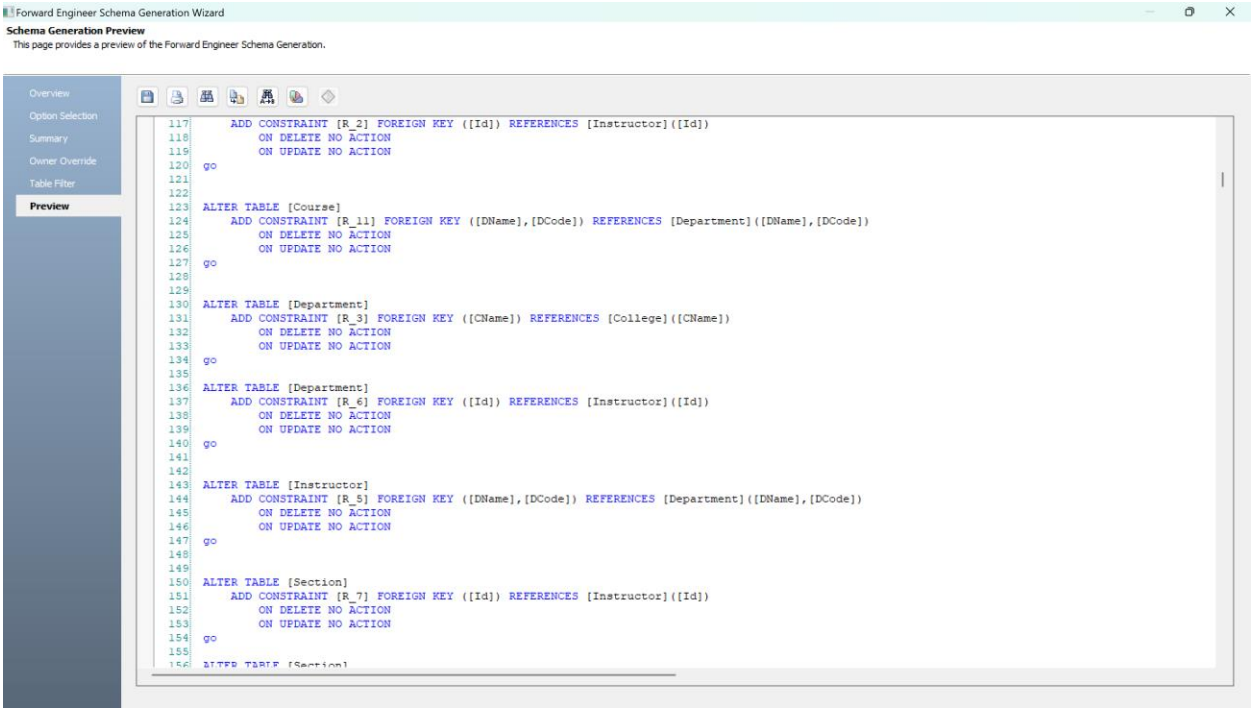


The schema generated through **forward engineering** is attached in the screenshots below.




Forward Engineer Schema Generation Wizard
Schema Generation Preview
This page provides a preview of the Forward Engineer Schema Generation.
Overview
Option Selection
Summary
Owner Override
Table Filter
Preview
go
ALTER TABLE [Department]
ADD CONSTRAINT [XPKDepartment] PRIMARY KEY CLUSTERED ([DName] ASC,[DCode] ASC)
go
CREATE TABLE [Instructor]
(
[Id] integer NOT NULL ,
[DName] char(18) NULL ,
[DCode] integer NULL ,
[Rank] integer NULL ,
[IName] char(18) NULL ,
[IOffice] integer NULL ,
[IPhone] integer NULL
)
go
ALTER TABLE [Instructor]
ADD CONSTRAINT [XPKInstructor] PRIMARY KEY CLUSTERED ([Id] ASC)
go
CREATE TABLE [Section]
(
[SecId] char(18) NOT NULL ,
[CCode] integer NULL ,
[CoName] varchar() NULL ,
[SecNo] integer NULL ,
[Sem] char(18) NULL ,
[Year] integer NULL ,
[CRoom] integer NULL ,
[Bldg] char(18) NULL ,
[RoomNo] integer NULL ,
[DaysTime] datetime NULL ,
[Id] integer NULL
)
go
ALTER TABLE [Section]


Forward Engineer Schema Generation Wizard
Schema Generation Preview
This page provides a preview of the Forward Engineer Schema Generation.
Overview
Option Selection
Summary
Owner Override
Table Filter
Preview
go
ALTER TABLE [Section]
ADD CONSTRAINT [XPKSection] PRIMARY KEY CLUSTERED ([SecId] ASC)
go
CREATE TABLE [Student]
(
[SId] integer NOT NULL ,
[FName] char(18) NULL ,
[Addr] char(18) NULL ,
[Phone] integer NULL ,
[Major] char(18) NULL ,
[MName] char(18) NULL ,
[LName] char(18) NULL ,
[DOB] datetime NULL ,
[DName] char(18) NULL ,
[DCode] integer NULL ,
[SName] char(18) NULL
)
go
ALTER TABLE [Student]
ADD CONSTRAINT [XPKStudent] PRIMARY KEY CLUSTERED ([SId] ASC)
go
CREATE TABLE [Student_Section]
(
[SId] integer NOT NULL ,
[SecId] integer NOT NULL ,
[Grade] char(18) NULL
)
go
ALTER TABLE [Student_Section]
ADD CONSTRAINT [XPKStudent_Section] PRIMARY KEY CLUSTERED ([SId] ASC,[SecId] ASC)
go



Conclusion:

Through this lab, I gained practical experience with the ErWin Data Modeler. The tool is beginner-friendly and easy to use for data modeling tasks. I installed ErWin Data Modeler, created a new .erwin file for the ER diagrams, and added entities, attributes, and defined various relationships, including identifying, non-identifying, and many-to-many relationships. Additionally, I utilized forward engineering to generate the database schema from the logical model. This lab helped me understand data modeling and the use of ErWin for both logical and physical database design.

References:

1. https://youtu.be/k0rcNgWtFss?si=95NDCNEqFda-r-LD
2. https://youtu.be/HXH7vKIvz7I?si=-DeMvsRD-b_olxIq