

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:

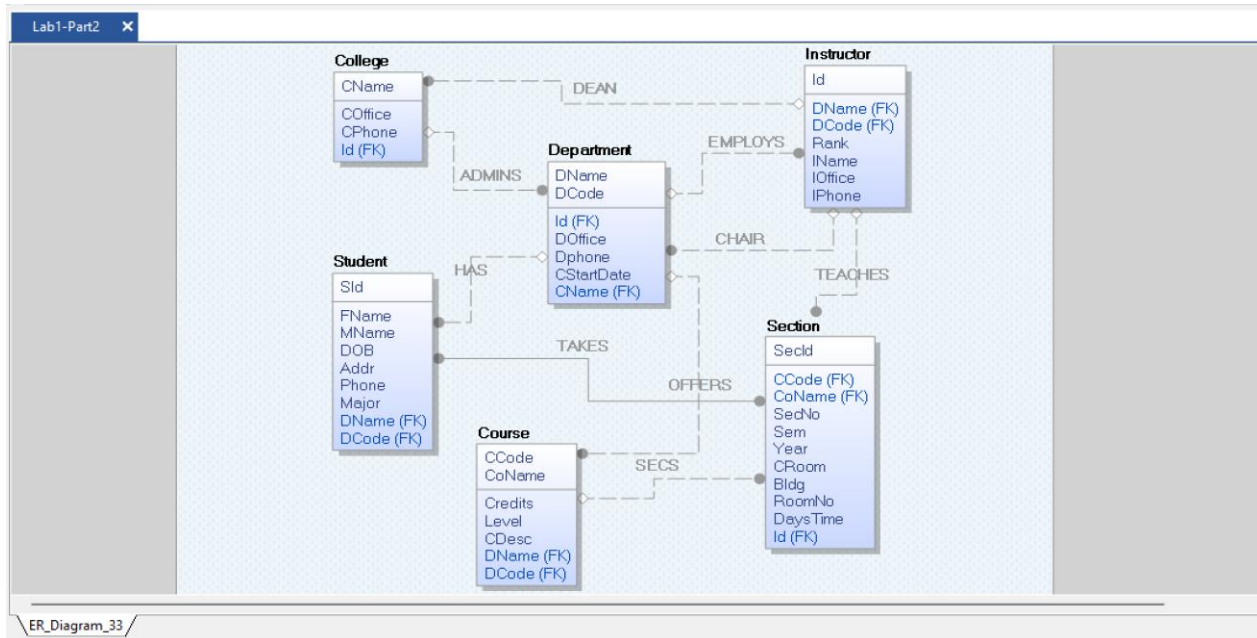
1. College
2. Department
3. Instructor
4. Student
5. Course
6. Section

The relationships in the ER diagram are as follows:

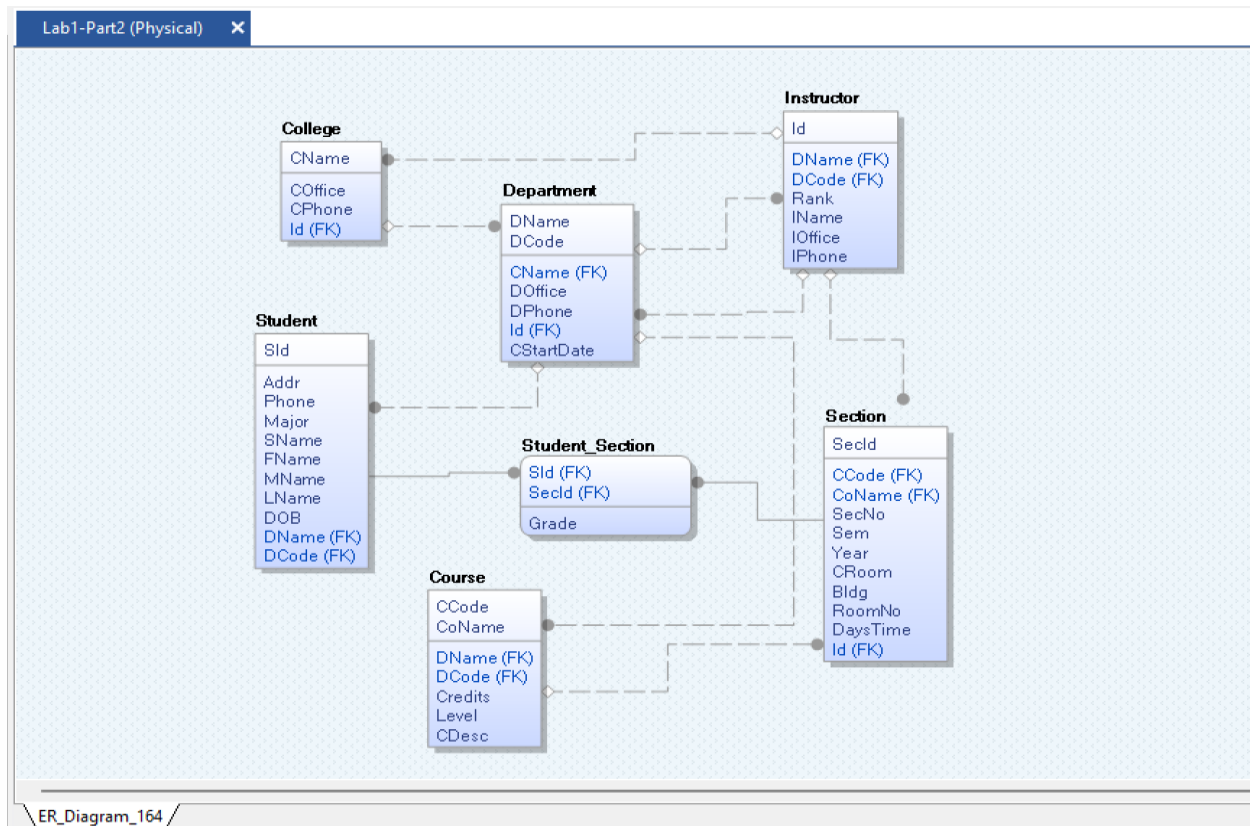
1. College Admins Department
 - a. Type: Non-Identifying Relationship
 - b. Cardinality: (0: N), (1:1)
2. Department Offers Course
 - a. Type: Non-identifying Relationship
 - b. Cardinality: (0: N), (0:1)
3. Instructor Dean College
 - a. Type: Non-identifying Relationship
 - b. Cardinality: (1: 1), (0:1)
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

```

1  CREATE TABLE [College]
2  (
3      [CName]          char(18) NOT NULL ,
4      [COffice]       char(18) NULL ,
5      [CPhone]        integer NULL ,
6      [Id]            integer NULL
7  )
8
9  go
10
11 ALTER TABLE [College]
12 ADD CONSTRAINT [XFKCollege] PRIMARY KEY CLUSTERED ([CName] ASC)
13 go
14
15 CREATE TABLE [Course]
16 (
17     [CCode]          integer NOT NULL ,
18     [CoName]         varchar() NOT NULL ,
19     [DName]          char(18) NULL ,
20     [DCode]          integer NULL ,
21     [Credits]        integer NULL ,
22     [Level]          integer NULL ,
23     [CDesc]          char(18) NULL
24 )
25 go
26
27 ALTER TABLE [Course]
28 ADD CONSTRAINT [XFKCourse] PRIMARY KEY CLUSTERED ([CCode] ASC,[CoName] ASC)
29 go
30
31 CREATE TABLE [Department]
32 (
33     [DName]          char(18) NOT NULL ,
34     [DCode]          integer NOT NULL ,
35     [CName]          char(18) NULL ,
36     [DOffice]        char(18) NULL ,
37     [DPhone]         integer NULL ,
38     [Id]             integer NULL ,
39     [CStartDate]     datetime NULL
40 )
  
```

Schema Generation Preview

This page provides a preview of the Forward Engineer Schema Generation.

Overview
Option Selection
Summary
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Preview

```

41 go
42
43 ALTER TABLE [Department]
44 ADD CONSTRAINT [XPKDepartment] PRIMARY KEY CLUSTERED ([DName] ASC, [DCode] ASC)
45 go
46
47 CREATE TABLE [Instructor]
48 (
49     [Id] integer NOT NULL ,
50     [DName] char(18) NULL ,
51     [DCode] integer NULL ,
52     [Rank] integer NULL ,
53     [IName] char(18) NULL ,
54     [IOffice] integer NULL ,
55     [IPhone] integer NULL
56 )
57 go
58
59 ALTER TABLE [Instructor]
60 ADD CONSTRAINT [XPKInstructor] PRIMARY KEY CLUSTERED ([Id] ASC)
61 go
62
63 CREATE TABLE [Section]
64 (
65     [SecId] char(18) NOT NULL ,
66     [CCode] integer NULL ,
67     [CoName] varchar() NULL ,
68     [SecNo] integer NULL ,
69     [Sem] char(18) NULL ,
70     [Year] integer NULL ,
71     [CRoom] integer NULL ,
72     [Bldg] char(18) NULL ,
73     [RoomNo] integer NULL ,
74     [DaysTime] datetime NULL ,
75     [Id] integer NULL
76 )
77 go
78
79 ALTER TABLE [Section]
80 ADD CONSTRAINT [XPKSection] PRIMARY KEY CLUSTERED ([SecId] ASC)

```

Schema Generation Preview

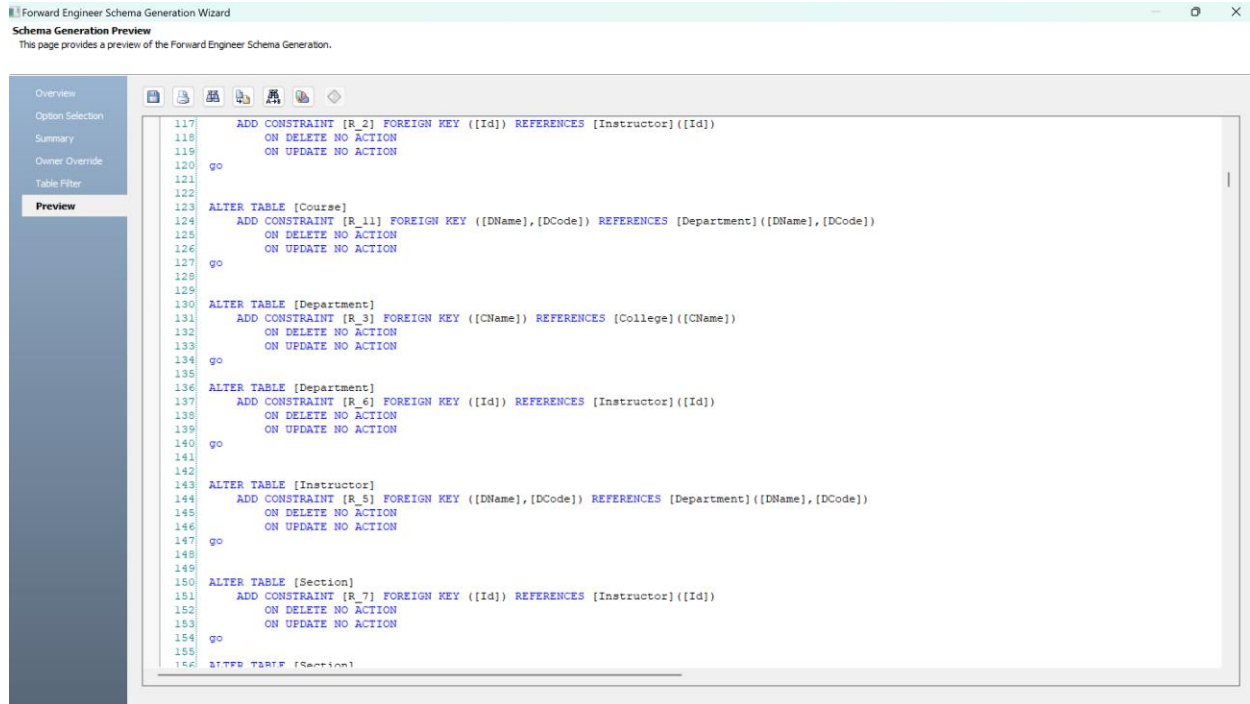
This page provides a preview of the Forward Engineer Schema Generation.

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```

77 go
78
79 ALTER TABLE [Section]
80 ADD CONSTRAINT [XPKSection] PRIMARY KEY CLUSTERED ([SecId] ASC)
81 go
82
83 CREATE TABLE [Student]
84 (
85     [Sid] integer NOT NULL ,
86     [FName] char(18) NULL ,
87     [Addr] char(18) NULL ,
88     [Phone] integer NULL ,
89     [Major] char(18) NULL ,
90     [MName] char(18) NULL ,
91     [LName] char(18) NULL ,
92     [DOB] datetime NULL ,
93     [DName] char(18) NULL ,
94     [DCode] integer NULL ,
95     [SName] char(18) NULL
96 )
97 go
98
99 ALTER TABLE [Student]
100 ADD CONSTRAINT [XPKStudent] PRIMARY KEY CLUSTERED ([Sid] ASC)
101 go
102
103 CREATE TABLE [Student_Section]
104 (
105     [Sid] integer NOT NULL ,
106     [SecId] integer NOT NULL ,
107     [Grade] char(18) NULL
108 )
109 go
110
111 ALTER TABLE [Student_Section]
112 ADD CONSTRAINT [XPKStudent_Section] PRIMARY KEY CLUSTERED ([Sid] ASC, [SecId] ASC)
113 go
114
115
116

```



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