CSCI 6050 Database Design and Admin.

# Lab Developing Data Models for Business Databases

1. For the following problem, define the ERD for the initial requirements and then revise the ERD for the new requirements. Your solution should have an initial ERD, a revised ERD, and a list of design decisions for each ERD. In performing your analysis, you may want to follow the approach presented in section 6.1 of your textbook.

The database supports the placement office of a leading graduate school of business. The primary purpose of the database is to schedule interviews and facilitate searches and companies. Consider the following requirements in your initial ERD:

* Student data include a unique student identifier, a name, a phone number, an e-mail address, a web address, a major, a minor, and a GPA.
* The placement office maintains a standard list of positions based on the Labor Department’s list of occupations. Position data include a unique position identifier and a position description.
* Company data include a unique company identifier, a company name, and a list of positions and interviewers. Each company must map its positions into the position list maintained by the placement office. For each available position, the company lists the cities in which positions are available.
* Interviewer data include a unique interviewer identifier, a name, a phone, an email address, and a web address. Each interviewer works for one company and conducts interviews at the placement office.
* An interview includes a unique interview identifier, a date, a time, a location (building and room), an interviewer, and a student. A student may have multiple interviews.

**Initial ER-Diagram**



Graphical user interface, text, application, email

Description automatically generated

**Summary**

**Entities**

Student : REGULAR ENTITY

Student\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Std\_name : ATTRIBUTE Type:NO DATATYPE

Std\_phone : ATTRIBUTE Type:NO DATATYPE

Std\_email : ATTRIBUTE Type:NO DATATYPE

Std\_major : ATTRIBUTE Type:NO DATATYPE

Std\_minor : ATTRIBUTE Type:NO DATATYPE

Std\_GPA : ATTRIBUTE Type:NO DATATYPE

Company : REGULAR ENTITY

Company\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Company\_city : ATTRIBUTE Type:NO DATATYPE

Company\_name : ATTRIBUTE Type:NO DATATYPE

Company\_interview : ATTRIBUTE Type:NO DATATYPE

Company\_position : ATTRIBUTE Type:NO DATATYPE

Interview : REGULAR ENTITY

Interview\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

date : ATTRIBUTE Type:NO DATATYPE

time : ATTRIBUTE Type:NO DATATYPE

location : ATTRIBUTE Type:NO DATATYPE

Interviewer : REGULAR ENTITY

Interviewer\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Int\_name : ATTRIBUTE Type:NO DATATYPE

Int\_phone : ATTRIBUTE Type:NO DATATYPE

Int\_email : ATTRIBUTE Type:NO DATATYPE

Int\_webaddress : ATTRIBUTE Type:NO DATATYPE

Company : ATTRIBUTE Type:NO DATATYPE

Position : REGULAR ENTITY

Position\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Description : ATTRIBUTE Type:NO DATATYPE

**Relationships**

takes : REGULAR RELATIONSHIP Student ONE MANDATORY to Interview MANY OPTIONAL

Conducts : REGULAR RELATIONSHIP Interview MANY OPTIONAL to Interviewer ONE MANDATORY

Works\_For : REGULAR RELATIONSHIP Company ONE MANDATORY to Interviewer MANY MANDATORY

Has\_open\_Position : REGULAR RELATIONSHIP Company MANY OPTIONAL to Position MANY OPTIONAL

After reviewing your initial design, the placement office decides to revise the requirements. Make a separate ERD to show your refinements. Refine your original ERD to support the following new requirements:

* Allow companies to use their own language to describe positions. The placement office will not maintain a list of standard positions.
* Allow companies to indicate availability dates and number of openings for positions.
* Allow companies to reserve blocks of interview time. The interview blocks will not specify times for individual interviews. Rather a company will request a block of X hours during a specific week. Companies reserve interview blocks before the placement office schedule individual interviews. Thus, the placement office needs to store interviews as well as interview blocks.
* Allow students to submit bids for interview blocks. Students receive a set amount of bid dollars that they can allocate among bids. The bid mechanism is a pseudo-market approach to allocating interviews, a scarce resource. A bid contains a unique bid identifier, a bid amount, and a company. A student can submit many bids and an interview block can receive many bids.

**Revise ER-Diagram**



Graphical user interface, text, application

Description automatically generated

**SUMMARY**

**Entities**

Student : REGULAR ENTITY

Student\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Std\_name : ATTRIBUTE Type:NO DATATYPE

Std\_phone : ATTRIBUTE Type:NO DATATYPE

Std\_email : ATTRIBUTE Type:NO DATATYPE

Std\_major : ATTRIBUTE Type:NO DATATYPE

Std\_minor : ATTRIBUTE Type:NO DATATYPE

Std\_GPA : ATTRIBUTE Type:NO DATATYPE

Company : REGULAR ENTITY

Company\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Company\_city : ATTRIBUTE Type:NO DATATYPE

Company\_name : ATTRIBUTE Type:NO DATATYPE

Company\_interview : ATTRIBUTE Type:NO DATATYPE

Company\_position : ATTRIBUTE Type:NO DATATYPE

Interview : REGULAR ENTITY

Interview\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

date : ATTRIBUTE Type:NO DATATYPE

time : ATTRIBUTE Type:NO DATATYPE

location : ATTRIBUTE Type:NO DATATYPE

Interviewer : REGULAR ENTITY

Interviewer\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Int\_name : ATTRIBUTE Type:NO DATATYPE

Int\_phone : ATTRIBUTE Type:NO DATATYPE

Int\_email : ATTRIBUTE Type:NO DATATYPE

Int\_webaddress : ATTRIBUTE Type:NO DATATYPE

Company : ATTRIBUTE Type:NO DATATYPE

Position : REGULAR ENTITY

Position\_Id : [PK] ATTRIBUTE Type:NO DATATYPE

Description : ATTRIBUTE Type:NO DATATYPE

BIDS : REGULAR ENTITY

BID\_ID : [PK] ATTRIBUTE Type:NO DATATYPE

BID\_AMOUNT : ATTRIBUTE Type:NO DATATYPE

BID-COMPANY : ATTRIBUTE Type:NO DATATYPE

INTERVIEW\_BLOCK : REGULAR ENTITY

BLOCK\_ID : [PK] ATTRIBUTE Type:NO DATATYPE

BLOCK\_PERIOD : ATTRIBUTE Type:NO DATATYPE

**Relationships**

takes : REGULAR RELATIONSHIP Student ONE MANDATORY to Interview MANY OPTIONAL

Conducts : REGULAR RELATIONSHIP Interview MANY OPTIONAL to Interviewer ONE MANDATORY

Works\_For : REGULAR RELATIONSHIP Company ONE MANDATORY to Interviewer MANY MANDATORY

Has\_open\_Position : REGULAR RELATIONSHIP Company MANY OPTIONAL to Position MANY OPTIONAL

COMPANY\_BLOACK\_RELATION : REGULAR RELATIONSHIP Company ONE MANDATORY to INTERVIEW\_BLOCK MANY OPTIONAL

Company\_Bids\_Relation : REGULAR RELATIONSHIP Company MANY OPTIONAL to BIDS MANY OPTIONAL

STUDENT\_BID\_RELATION : REGULAR RELATIONSHIP Student ONE MANDATORY to BIDS MANY MANDATORY

1. For the Entertainment Viewing ERD showed below, identify and resolve errors and note incompleteness in the specifications. Your solution should include a list of errors and a revised ERD. For each error, identity the type of error (diagram or design) and the specific error within each error type. Note that the ERD may have both diagram and design errors. Specifications for the ERD are as follows:
   * The Entertainment Viewing database supports entry of the viewing habits of users and queries about movies, television shows, actors, and user preferences for actors.
   * For movies, the database should record the unique movie identifier, unique title, genre, list of noteworthy actors, format, studio, duration, date released to theaters, and list of subtitle languages.
   * For shows, the database should record the unique show identifier, unique title, duration, list of noteworthy actors, network, optional scheduled time (day and start time), date of first viewing, and number of seasons of show.
   * For actors the database should record the unique actor identifier, first name, last name, age, gender, and list of awards. An actor can appear in many shows and movies.
   * For users, the database records the unique user identifier, unique email address, first name, last name, postal code, gender, county, and age group.
   * For viewing habits, the database should record the user, show or movie viewed, date/time viewed, and method of viewing (broadcast time or recorded).



**ER-Diagram**

**Graphical user interface, text, application, email

Description automatically generated**

**Summary**

**Entities**

SHOW : REGULAR ENTITY

SHOW ID : [PK] ATTRIBUTE Type:NO DATATYPE

SHOW NAME : ATTRIBUTE Type:NO DATATYPE

SHOW TITLE : ATTRIBUTE Type:NO DATATYPE

SHOW DURATION : ATTRIBUTE Type:NO DATATYPE

SHOW NETWORK : ATTRIBUTE Type:NO DATATYPE

SHOW NUMSEASONING : ATTRIBUTE Type:NO DATATYPE

SHOW DAY : ATTRIBUTE Type:NO DATATYPE

SHOW STARTIME : ATTRIBUTE Type:NO DATATYPE

ACTOR : REGULAR ENTITY

ACTOR\_ID : [PK] ATTRIBUTE Type:NO DATATYPE

ActFirstName : ATTRIBUTE Type:NO DATATYPE

ActLastName : ATTRIBUTE Type:NO DATATYPE

ActAge : ATTRIBUTE Type:NO DATATYPE

ActGender : ATTRIBUTE Type:NO DATATYPE

ActAwards : ATTRIBUTE Type:NO DATATYPE

User : REGULAR ENTITY

User\_id : [PK] ATTRIBUTE Type:NO DATATYPE

UserFirstName : ATTRIBUTE Type:NO DATATYPE

UserLastName : ATTRIBUTE Type:NO DATATYPE

UserAgeGroup : ATTRIBUTE Type:NO DATATYPE

UserGender : ATTRIBUTE Type:NO DATATYPE

UderPostalCode : ATTRIBUTE Type:NO DATATYPE

UserCountry : ATTRIBUTE Type:NO DATATYPE

Movie : REGULAR ENTITY

MovieId : [PK] ATTRIBUTE Type:NO DATATYPE

Mov Name : ATTRIBUTE Type:NO DATATYPE

Mov Duration : ATTRIBUTE Type:NO DATATYPE

Mov Studio : ATTRIBUTE Type:NO DATATYPE

Mov RelDate : ATTRIBUTE Type:NO DATATYPE

Mov Director : ATTRIBUTE Type:NO DATATYPE

Movie Subtitles : ATTRIBUTE Type:NO DATATYPE

Mov Genre : ATTRIBUTE Type:NO DATATYPE

ViewEvent : WEAK ENTITY

View Method : ATTRIBUTE Type:NO DATATYPE

View Date Time : ATTRIBUTE Type:NO DATATYPE

User\_id : [PK] ATTRIBUTE (from User) Type:NO DATATYPE

ACTOR\_ID : [PK] ATTRIBUTE (from ACTOR) Type:NO DATATYPE

**Relationships**

views : IDENTIFYING RELATIONSHIP User ONE MANDATORY to ViewEvent MANY OPTIONAL

view Movie : REGULAR RELATIONSHIP ViewEvent MANY OPTIONAL to Movie ONE OPTIONAL

Actor Info : IDENTIFYING RELATIONSHIP ViewEvent MANY OPTIONAL to ACTOR ONE MANDATORY

ViewedShow : REGULAR RELATIONSHIP SHOW ONE OPTIONAL to ViewEvent MANY OPTIONAL

1. Convert the ERD shown below into tables. List the conversion rules used and the resulting changes to the tables.



Create table Employee

(

EmpNo Number(8) ,

EmpName varchar2(50),

CONSTRAINT PKEmployee PRIMARY KEY (EmpNo)

)

Create table Skill

(

SkillNo Number(50),

SkillName varchar2(50),

CONSTRAINT PKSkill PRIMARY KEY (SkillNo)

)

Create table Project

(

ProjNo Number(5),

ProjName varchar2(50),

CONSTRAINT PKProject PRIMARY KEY (ProjNo)

)

CREATE TABLE Provides(  
EmpNo Number(8),  
SkillNo Number(50),  
ProjNo Number(5),  
Hrs Number(5),  
PRIMARY KEY(EmpNo,SkillNo,ProjNo),  
FOREIGN KEY(EmpNo) REFERENCES Employee(EmpNo),  
FOREIGN KEY(SkillNo) REFERENCES Skill(SkillNo),  
FOREIGN KEY(ProjNo) REFERENCES Project(ProjNo)  
);