Normalization Exercise 3

Design Document

Normalization Exercise 3

Database Purpose: Track Students' Degrees

The current database design is listed below:

StudentDegreeMajor	
PK	StudentID
	StudentName
	StudentBirthDate
	StudentAddress
PK	DegreeID
	DegreeName
	DegreeDescription
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName
	DateEarned

Exercise Description:

- Refine the design to conform to the 3rd normal form and meet the following business rules and design requirements.

Business Rules:

- Track all degrees earned by a student, including the date a degree was earned.
- Assume only one address is tracked for each student.
- Assume a major is offered by only one department.

Design Requirements:

- Use Crow's Foot Notation.
- Specify the primary key in each entity by placing PK beside the PK attribute(s).
- Specify the foreign key in each entity by placing FK beside the FK attribute(s).

Unnormalized Form (UNF)
Take to 1st NF

StudentDegreeMajor	
PK	StudentID
	StudentName
	StudentBirthDate
	StudentAddress
PK	DegreeID
	DegreeName
	DegreeDescription
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName
	DateEarned

Corrected Composite Attributes and Conform to 1st NF

StudentDegreeMajor	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode
PK	DegreeID
	DegreeName
	DegreeDescription
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName
	DateEarned

First Normal Form (1st NF)
Take to 2nd NF Next

StudentDegreeMajor	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode
PK	DegreeID
	DegreeName
	DegreeDescription
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName
	DateEarned

Corrected Partial Dependency and Conform to 2nd NF

StudentDegreeMajor	
PK	StudentID
PK	DegreeID
PK	MajorID
	DateEarned

Student	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode

Degree	
PK	DegreeID
	DegreeName
	DegreeDescription

Major	
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName

Second Normal Form (2nd NF)
Take to 3rd NF Next

StudentDegreeMajor	
PK	StudentID
PK	DegreeID
PK	MajorID
	DateEarned

Student	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode

Degree	
PK	DegreeID
	DegreeName
	DegreeDescription

Major	
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName

Corrected Transitive Dependency and Conform to 3rd NF

StudentDegreeMajor	
PK	StudentID
PK	DegreeID
PK	MajorID
	DateEarned

Student	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode

Degree	
PK	DegreeID
	DegreeName
	DegreeDescription

Major	
PK	MajorID
	MajorName
	DepartmentID

Department	
PK	DepartmentID
	DepartmntName

What To Do Next?

- Create entities in Design Tool
- Don’t add any additional entity or attribute
- Establish relationships between entities
- Pay attention to Multiplicity
- Pay attention to type of relationship
  - Identifying vs Non-Identifying
- Label PKs and FKs