### Normalization Exercise 3

### Design Document

#### **Normalization Exercise 3**

Database Purpose: Track Students' Degrees

The current database design is listed below:

St	tudentDegreeMajor
PK	StudentID
	StudentName
	StudentBirthDate
	StudentAddress
PΚ	DegreeID
	DegreeName
	DegreeDescription
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName
	DateEarned

#### **Exercise Description:**

• Refine the design to conform to the 3<sup>rd</sup> 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 1<sup>st</sup> NF

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

## Corrected Composite Attributes and Conform to 1st NF

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

# First Normal Form (1<sup>st</sup> NF) Take to 2<sup>nd</sup> NF Next

St	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 2<sup>nd</sup> NF

St	StudentDegreeMajor	
PK StudentID	StudentID	
PK	DegreeID	
PK	MajorID	
	DateEarned	

Student	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode

Degree	
PK DegreeID	DegreeID
	DegreeName
	DegreeDescription

Major	
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName

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

St	StudentDegreeMajor	
PK	StudentID	
PK	DegreeID	
PK	MajorID	
	DateEarned	

	Student	
PK	StudentID	
	StudentLastName	
	StudentFirstName	
	StudentBirthDate	
	StreetNumber	
	City	
	State	
	ZipCode	

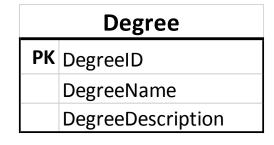
Degree	
PK	DegreeID
	DegreeName
	DegreeDescription

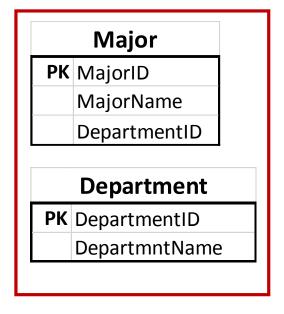
Major	
PK	MajorID
	MajorName
	DepartmentID
	DepartmntName

### Corrected Transitive Dependency and Conform to 3<sup>rd</sup> NF

StudentDegreeMajor	
PK	StudentID
PK	DegreeID
PK	MajorID
	DateEarned

Student	
PK	StudentID
	StudentLastName
	StudentFirstName
	StudentBirthDate
	StreetNumber
	City
	State
	ZipCode





#### 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