

Normalization Exercise 6

Normalization Exercise 6 - Design Document

Database Purpose: Track internal job referrals

Exercise Description:

- Refine the design to conform to the 3rd normal form
- Meet the following business rules and design requirement

Business Rules:

- Track all internal job referrals
- Need to store the addresses history for an applicant
- Multiple applicants may have the same address
- Need to keep only the primary phone for an applicant
- Need to keep only the primary email address for an applicant
- EmployeeDepartment has a department code
- Details about a department are stored in another database

Design Requirements:

- Use Crow's Foot Notation

**Current Database Design (UNF)
Referral**

*ApplicantID
ApplicantName
Address1
Address2
Address3
Phone
Email
*JobID
JobDescription
ApplicationDate
EmployeeID
EmployeeName
EmployeeDepartment
ApplicationStatus
ReferralBonus

Unnormalized Form (UNF)

Take to 1st NF

Current Database Design (UNF)
Referral

*ApplicantID
ApplicantName
Address1
Address2
Address3
Phone
Email
*JobID
JobDescription
ApplicationDate
EmployeeID
EmployeeName
EmployeeDepartment
ApplicationStatus
ReferralBonus



*Composite Attribute,
Multi-value Attribute,
Repeating Groups,
Many-to-many relationship?*

Unnormalized Form (UNF)

Take to 1st NF

Current Database Design (UNF)

Referral

*ApplicantID
ApplicantName
Address1
Address2
Address3
Phone
Email
*JobID
JobDescription
ApplicationDate
EmployeeID
EmployeeName
EmployeeDepartment
ApplicationStatus
ReferralBonus

Composite

Repeating
Groups

Corrected Composite Attributes and Repeating Groups Conform to 1st NF

Address
*AddressID
StreetNumber
City
State
ZipCode

Referral
*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email
*JobID
JobDescription
ApplicationDate
EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment
ApplicationStatus
ReferralBonus

First Normal Form (1st NF)

Take to 2nd NF Next

Partial Dependency?

Address

*AddressID
StreetNumber
City
State
ZipCode

Referral

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email
*JobID
JobDescription
ApplicationDate
EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment
ApplicationStatus
ReferralBonus

First Normal Form (1st NF)

Take to 2nd NF Next

Address

*AddressID
StreetNumber
City
State
ZipCode

Referral

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email
*JobID
JobDescription
ApplicationDate
EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment
ApplicationStatus
ReferralBonus

Partial Dependency

Corrected Partial Dependency Conform to 2nd NF

Address	Applicant	Job	Referral
*AddressID	*ApplicantID	*JobID	*ApplicantID
StreetNumber	ApplicantLName	JobDescription	*JobID
City	ApplicantFName		ApplicationDate
State	Phone		EmployeeID
ZipCode	Email		EmployeeLName

Second Normal Form (2nd NF)

Take to 3rd NF Next

Transitive Dependency?

Address

*AddressID
StreetNumber
City
State
ZipCode

Applicant

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email

Job

*JobID
JobDescription

Referral

*ApplicantID
*JobID
ApplicationDate
EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment
ApplicationStatus
ReferralBonus

Second Normal Form (2nd NF)

Take to 3rd NF Next

Address	Applicant	Job	Referral
*AddressID	*ApplicantID	*JobID	*ApplicantID
StreetNumber	ApplicantLName	JobDescription	*JobID
City	ApplicantFName		ApplicationDate
State	Phone		EmployeeID
ZipCode	Email		EmployeeLName
			EmployeeFName
			EmployeeDepartment
			ApplicationStatus
			ReferralBonus

Transitive Dependency

Corrected Transitive Dependency and Conform to 3rd NF

Address

*AddressID
StreetNumber
City
State
ZipCode

Applicant

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email

Job

*JobID
JobDescription

Referral

*ApplicantID
*JobID
ApplicationDate
EmployeeID
ApplicationStatus
ReferralBonus

Employee

EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment

Need to Implement the Address Rules

Address

*AddressID
StreetNumber
City
State
ZipCode

Applicant

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email

Job

*JobID
JobDescription

Referral

*ApplicantID
*JobID
ApplicationDate
EmployeeID
ApplicationStatus
ReferralBonus

- Need to store the addresses history for an applicant
- Multiple applicants may have the same address

Employee

EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment

Implemented the Address Rules

Address

*AddressID
StreetNumber
City
State
ZipCode

Applicant

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email

Job

*JobID
JobDescription

Referral

*ApplicantID
*JobID
ApplicationDate
EmployeeID
ApplicationStatus
ReferralBonus

ApplicantAddress

*ApplicantID
*AddressID

Employee

EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment

Done with Normalization

Address

*AddressID
StreetNumber
City
State
ZipCode

Applicant

*ApplicantID
ApplicantLName
ApplicantFName
Phone
Email

Job

*JobID
JobDescription

Referral

*ApplicantID
*JobID
ApplicationDate
EmployeeID
ApplicationStatus
ReferralBonus

ApplicantAddress

*ApplicantID
*AddressID

Employee

EmployeeID
EmployeeLName
EmployeeFName
EmployeeDepartment

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
- Avoid unnecessary relationships
- Label PKs and FKs