**Database Systems Project Part I - Modeling**

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1. **Overview**

Generally speaking, our entity relationship diagram involves 12 entity types and 18 relationship types in total. The main entity types are Account, Associate, Contract, Customer, ManagerContract and so on. And the main relationship types are Account\_Associate, Account-Account\_Member, Contract-ContractBenefit, StateCoordinators and so on.

Typically, when drawing the ER diagram, we leverage **Crow’s Foot Notation** to make it clear and concise. Besides, we will use **Chen’s notation** to describe the cardinalities of relationship types in the subsequent parts.

1. **Description of Entity Types**

**Account**

|  |
| --- |
| Attribute Types:  Account\_id (PK), AccountName, AccountName2, Location (Composite Attribute Type)  Here, Location has 5 sub-attribute types: Address1, Address2, City, State, ZIP. |
| Relationship Types:  Account-Account, Acct\_AcctAdmin, Account-AcountLegacyAlias, Account-CompanyCode, Account\_Associate, Account-BillingAccount, Account-Account\_Member |

**AcctAdmin**

|  |
| --- |
| Attribute Types:  AcctAdmin\_id (PK), AdminLastName, AdminFirstName, AdminMiddleInitial, AdminSuffix, Location (Composite Attribute Type)  Here, Location has 5 sub-attribute types: Address1, Address2, City, State, ZIP |
| Relationship Types:  Acct\_AcctAdmin |

**Account\_Member**

|  |
| --- |
| Attribute Types:  Customer\_id (PK), Account\_id (PK), StartDate |
| Relationship Types:  Account-Account\_Member, Account\_Member-Customer |

**AccountLegacyAlias**

|  |
| --- |
| Attribute Types:  AliasID (PK), AliasSource, Account\_id, AliasName, Location (Composite Attribute Type)  Here, Location has 5 sub-attribute types: Address1, Address2, City, State, ZIP |
| Relationship Types:  Account-AcountLegacyAlias |

**BillingAccount**

|  |
| --- |
| Attribute Types:  BillingAcount\_id (PK), BAcctName, BAcctName2, Location (Composite Attribute Type)  Here, Location has 5 sub-attribute types: Address1, Address2, City, State, ZIP |
| Relationship Types:  Account-BillingAccount |

**CompanyCode**

|  |
| --- |
| Attribute Types:  CompanyCode (PK), CompanyName, LegacyCompanyNo |
| Relationship Types:  Account-CompanyCode, Contract-CompanyCode |

**Customer**

|  |
| --- |
| Attribute Types:  Customer\_id (PK), CustLastName, CustFirstName, CustMiddleInitial, CustDOB, Gender, SSN\_TIN |
| Relationship Types:  Customer-Customer, Account\_Member-Customer, BenefitForBenefittingParty, ContractingPartyInRole |

**ManagerContract**

|  |
| --- |
| Attribute Types:  SitCode (PK), IssueDate, ContractType, ContractSignDate, ContractProcessDate, EndDate |
| Relationship Types:  Account\_Associate, Premium\_MgmtContract, Associate-ManagerContract |

**Associate**

|  |
| --- |
| Attribute Types:  Associate\_id (PK), AssocLastName, AssocFirstName, AssocMiddleInitial, AssocSuffix, AssocDOB, TenureDate |
| Relationship Types:  Associate-Associate, Associate-ManagerContract, CoordPosition\_ProductionAsset |

**ContractPremium**

|  |
| --- |
| Attribute Types:  PremiumCode (PK), AnnualizedPremium, ProcessDate, AppSignDate |
| Relationship Types:  Premium\_MgmtContract, ContratPremium-ContractBenefit, CoordPosition\_ProductionAsset, BenefitForBenefittingParty |

**ContractBenefit**

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| --- |
| Attribute Types:  ContractBenefit\_id (PK), PolicyCountContribution |
| Relationship Types:  Contract-ContractBenefit, ContractPremium-ContractBenefit |

**Contract**

|  |
| --- |
| Attribute Types:  ContractNumber (PK), ActivityStatus, ActivityStatusDate, CoverageType, BillingMethod, ExpirationDate, Duration |
| Relationship Types:  Contract-ContractBenefit, Contract-CompanyCode, ContractingPartyInRole |

1. **Description of Relationship Types**

**Acct\_AcctAdmin**

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| --- |
| Entity Types Involved: Account, AcctAdmin |
| Type: Many-to-Many |
| Cardinality: Account (N..N) AcctAdmin |

**Account-AccountLegacyAlias**

|  |
| --- |
| Entity Types Involved: Account, AccountLegacyAlias |
| Type: One-to-Many |
| Cardinality: Account (1:N) AccountLegacyAlias |

**Account-CompanyCode**

|  |
| --- |
| Entity Types Involved: Account, CompanyCode |
| Type: One-to-Many |
| Cardinality: CompanyCode (1:N) Account |

**Account\_Associate**

|  |
| --- |
| Entity Types Involved: Account, ManagerContract |
| Type: Many-to-Many |
| Cardinality: Account (N:N) ManagerContract |
| Attribute Types: StartDate, StopDate |

**Account-Account**

|  |
| --- |
| Entity Types Involved: Account, Account |
| Type: Many-to-Many |
| Cardinality: Account (N..N) Account |

**Account\_BillingAccount**

|  |
| --- |
| Entity Types Involved: Account, BillingAccount |
| Type: Many-to-Many |
| Cardinality: Account (N..N) BillingAccount |
| Attribute Types: RelationshipType, StartDate, BillingFrequency, SpecificationCode, AccountType |

**Account-Account\_Member**

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| --- |
| Entity Types Involved: Account, Account\_Member |
| Type: One-to-Many |
| Cardinality: Account (1..N) Account\_Member |

**Account\_Member-Customer**

|  |
| --- |
| Entity Types Involved: Customer, Account\_Member |
| Type: One-to-Many |
| Cardinality: Customer (1..N) Account\_Member |

**Contract-CompanyCode**

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| --- |
| Entity Types Involved: CompanyCode, Contract |
| Type: One-to-Many |
| Cardinality: CompanyCode (1..N) Contract |

**Contract-ContractBenefit**

|  |
| --- |
| Entity Types Involved: Contract, ContractBenefit |
| Type: One-to-Many |
| Cardinality: Contract (1..N) ContractBenefit |

**ContractPremium-ContractBenefit**

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| --- |
| Entity Types Involved: ContractBenefit, ContractPremium |
| Type: One-to-Many |
| Cardinality: ContractBenefit (1..N) ContractPremium |

**Premium\_MgmtContract**

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| --- |
| Entity Types Involved: ContractPremium, ManagerContract |
| Type: Many-to-Many |
| Cardinality: ContractPremium (N..N) ManagerContract |
| Attribute Types: Amount, CommissionRate |

**StateCoordinators**

|  |
| --- |
| Entity Types Involved: Associate, ManagerContract |
| Type: One-to-Many |
| Cardinality: Associate (1..N) ManagerContract |
| Attribute Types: EndDate |

**Associate-Associate**

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| --- |
| Entity Types Involved: Associate, Associate |
| Type: Many-to-Many |
| Cardinality:Associate (N..N) Associate |

**CoordPosition\_ProductAsset**

|  |
| --- |
| Entity Types Involved: Associate, ContractPremium |
| Type: Many-to-Many |
| Cardinality: Associate (N..N) ContractPremium |
| Attribute Types: SitCode, IssueDate, ContractType, ContractSignDate, ContractProcessDate, ManagerContractEndDate, ProductionCreditSplitPercentage, EndDate, TerritoryName, TerritoryStartDate, TerritoryEndDate, TerritoryCoordinatorEndDate, LevelName, Level, LevelAbbreviation, StateCoordinatorsEndDate |

**Customer-Customer**

|  |
| --- |
| Entity Types Involved: Customer, Customer |
| Type: Many-to-Many |
| Cardinality: Customer (N..N) Customer |

**ContractingPartyInRole**

|  |
| --- |
| Entity Types Involved: Customer, Contract |
| Type: Many-to-Many |
| Cardinality: Customer (N..N) Contract |

**BenefitForBenefitParty**

|  |
| --- |
| Entity Types Involved: Customer, ContractPremium |
| Type: Many-to-Many |
| Cardinality: Customer (N..N) ContractPremium |

1. **Verification of the Given Use Cases**

Account (N..N) BillingAccount: Please see **Account\_BillingAccount** relationship type in our ERD. The cardinality of this relationship type is Many-to-Many.

Account (N..N) Account: Please see **Account-Account** relationship type that we created in our ERD. Its cardinality is Many-to-Many, and we set two roles for it: Master and Member.

Account (N..N) AccounAdmin: Please see **Acct\_AcctAdmin** relationship type in our ERD. Its cardinality is Many-to-Many.

Account (1..N) Account\_Member: Please see **Account-Account\_Member** relationship type that we created in our ERD, whose cardinality is One-to-Many.

AccountAlias: Please see **Account-AccountLegacyAlias** relationship type that we created in our ERD, whose cardinality is One-to-Many.

Account (CompanyCode as part of the logical primary key): Please see **Account-CompanyCode** relationship type that we created in our ERD, whose cardinality is Many-to-One.

Account (N..N) ManagerContract: Please see **Account\_Associate** relationship type in our ERD, whose cardinality is Many-to-Many.

Associate (1..N) ManagerContract: Please see **StateCoordinators** relationship type in our ERD, whose cardinality is One-to-Many.

Associate Commissions vs. Production Credit:

* Commissions: Here, we used 3 entity types and 2 relationship types. First, we used **Premium\_MgmtContract** to connect ContractPremium and ManagerContract with Many-to-Many cardinality. Then, we used **StateCoordinators** to connect ManagerContract and Associate with Many-to-One cardinality.
* Production Credit: Here, we only created the relationship type **CoordPosition\_ProductionAsset** to directly connect Associate and ContractPremium. For its attribute types, we included all of the attribute types along the path from ContractPremium to Associate.

Associate (N..N) Associate: Please see **Associate-Associate** relationship type that we created in our ERD, whose cardinality is Many-to-Many. And we set two roles for it: Broker and Recruiter.

Contract (1..N) ContractPremium: Here, we used 3 entity types and 2 relationship types. First, we created **Contract-ContractBenefit** to connect Contract and ContractBenefit with One-to-Many cardinality. Then, we created **ContractPremium-ContractBenefit** to connect ContractBenefit and ContractPremium with One-to-Many cardinality.

\*\*\*Justification: The UML diagram shows it should be One-to-Many cardinality for Contract and ContractPremium. However, the given PowerPoint slides regard it as Many-to-Many.\*\*\*

Customer (N..N) Customer: Please see **Customer-Customer** relationship type that we created in our ERD, whose cardinality is Many-to-Many.

Customer (N..N) Contract: Please see **ContractingPartyInRole** relationship type in our ERD, whose cardinality is Many-to-Many.

Customer (N..N) ContractBenefit: Here, we used 3 entity types and 2 relationship types. First, we used **BenefitForBenefittingParty** to connect Customer and ContractPremium with Many-to-Many cardinality. Then, we created **ContractPremium-ContractBenefit** to connect ContractBenefit and ContractPremium with One-to-Many cardinality.

Customer (N..N) Account: Here, we used 3 entity types and 2 relationship types. First, we created **Account\_Member-Customer** to connect Account\_Member and Customer with Many-to-One cardinality. Then, we created **Account-Account\_Member** to connect Account and Account\_Member with One-to-Many cardinality.

Customer (N..N) Associate: Here, we used 3 entity types and 2 relationship types. First, we used **BenefitForBenefittingParty** to connect Customer and ContractPremium with One-to-Many cardinality. Then, we used **CoordPosition\_ProductionAsset** to connect ContractPremium and Associate with Many-to-Many cardinality.

**Appendix: Entity Relationship Diagram**

**Entity Relationship Diagram**