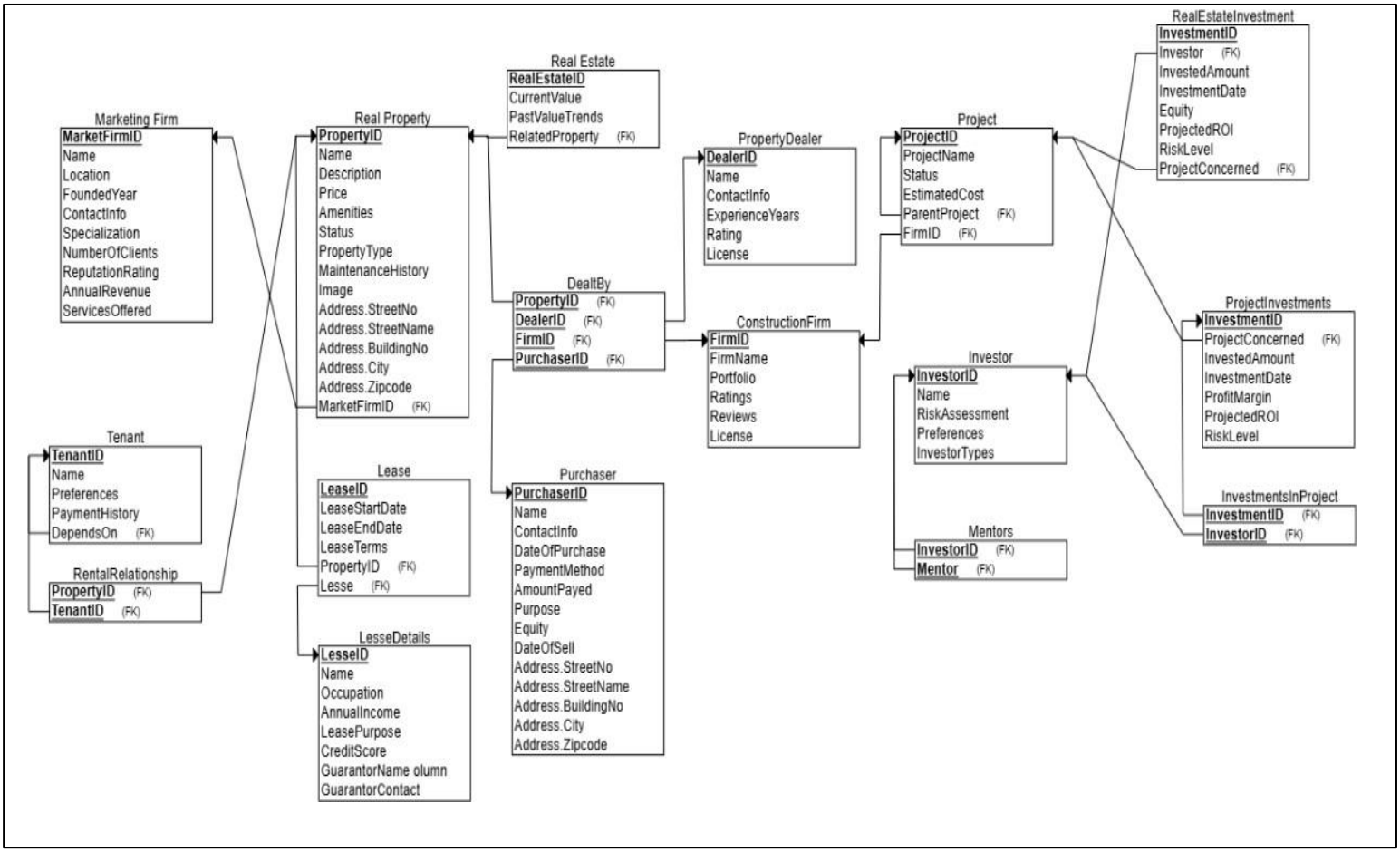
Project Phase – 3

Converting ER to relational model and further converting relational model to 1nf, 2nf and 3nf forms.

Stage 1: After mapping ER to relational model

1. For every Strong entity type, a table consisting of all its attributes was created in which one of the candidate keys was chosen as the primary key of the table.
2. For every weak entity type, table consisting of all its attributes was created in which partial key was chosen as the primary key of the table. Generally, combination of partial key and owner's primary key is made the primary key of the new table but in our case, partial key is solely enough for uniquely identifying each tuple.
3. For every 1: N relationship type, a foreign key was added to the entity on the Nth side of relationship which references the primary key of the entity on the 1-side because each entity instance on the N-side is related to at most one entity instance on the 1-side of the relationship type.
4. For every M: N relationship type, a new table was created which had foreign keys that referred to the primary keys of both the participating entity types. The combination of the foreign keys was made the primary key of the new table.
5. For n-ary relationships also, a new table was created which had foreign keys that referred to the primary keys of all the participating entity types. The combination of the foreign keys was made the primary key of the new table.
6. **ASSUMPTION: For Multivalued attributes a new table has not been made at this stage. Those cases are handled while converting the database to 1NF form.**


Marketing Firm
MarketFirmID
Name
Location
FoundedYear
ContactInfo
Specialization
NumberOfClients
ReputationRating
AnnualRevenue
ServicesOffered
Real Property
PropertyID
Name
Description
Price
Amenities
Status
PropertyType
MaintenanceHistory
Image
Address.StreetNo
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Real Estate
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CurrentValue
PastValueTrends
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Reviews
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TenantID
Name
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PaymentHistory
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Purpose
Equity
DateOfSell
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Address.City
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Name
RiskAssessment
Preferences
InvestorTypes
InvestmentsInProject
InvestmentID (FK)
InvestorID (FK)
RentalRelationship
PropertyID (FK)
TenantID (FK)
LesseDetails
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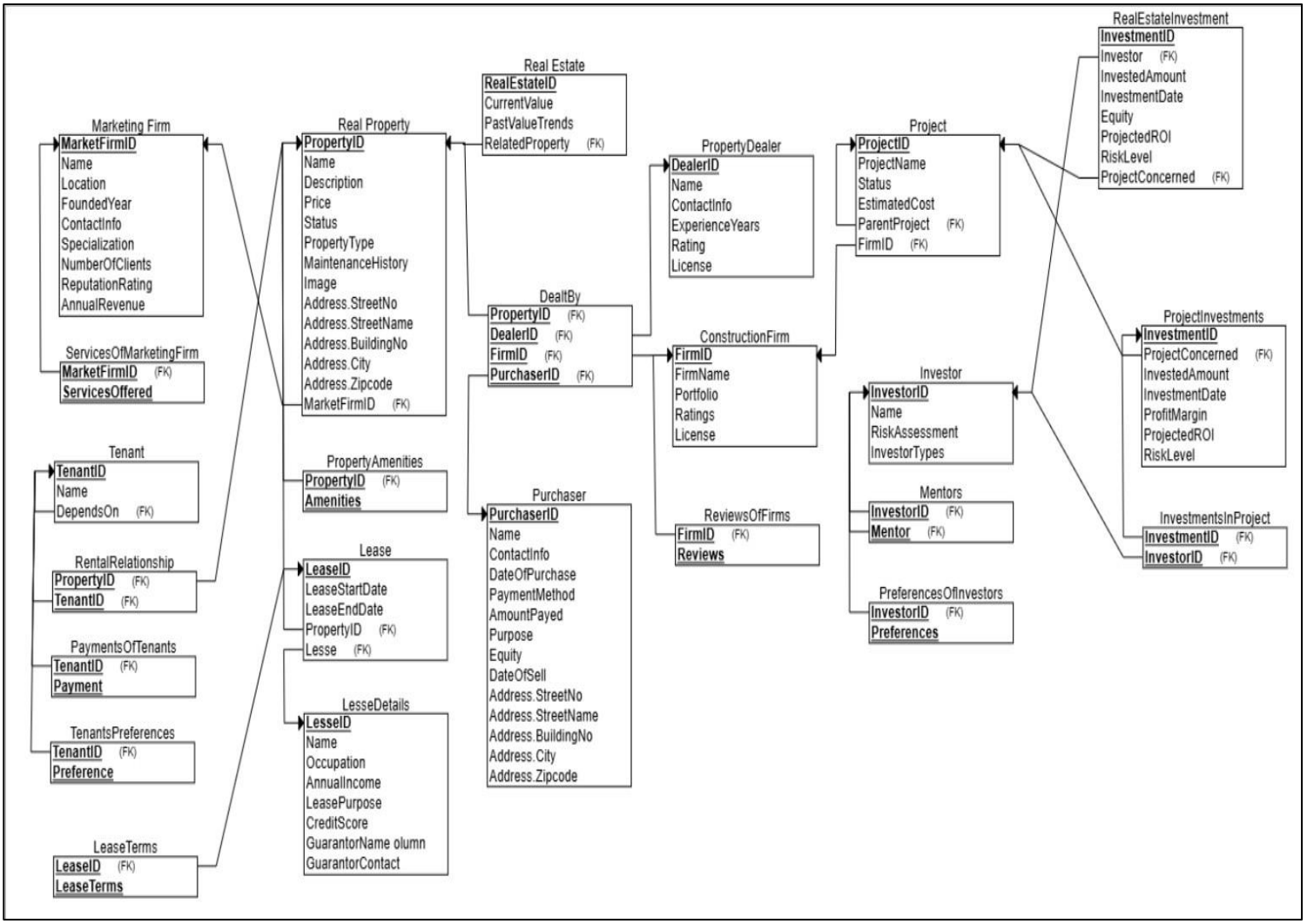
Name
Occupation
AnnualIncome
LeasePurpose
CreditScore
GuarantorName olumn
GuarantorContact
Mentors
InvestorID (FK)
Mentor (FK)

Stage 2: Relational model after conversion to 1NF

1. The multivalued attribute that violates 1NF is placed in a separate relation along with the primary key of the entity they were previously in. The primary key of this newly formed relation is the combination of both.

2. In case of multiple multivalued attributes in a relation, a new relation is made for each of them.

3. The multivalued attributes for which new relation has been created are as follows:
   a) ServicesOffered in Marketing Firm
   b) Payment and Preference in Tenants
   c) Amenities in Real Property
   d) LeaseTerms in Lease
   e) Reviews in Construction Firm
   f) Preferences in Investor



Stage 3: Relational model after conversion to 2NF

The relational model is already in 2NF form. Most relations have single attribute primary keys, so all non-prime attributes have total dependency on the primary key.

For the tables with multiple attribute primary key, there are no non-prime attributes.

Stage 4: Relational model after conversion to 3NF

In 3NF form, no nonprime attribute of R should be transitively dependent on the primary key.

If any such transitive dependency is found where X->Y and Y->Z (where X, Y and Z are set of attributes and arrow signify functional dependency), then a new relation is made which comprise of Y and Z as its attributes and Y is made the primary key of the relation and Z is removed from the original relation.

In LesseDetails relation, Guarantor Contact uniquely identifies Guarantor Name and LesseId uniquely identifies Guarantor Contact. Hence this is a transitive dependency and hence a new table “Guarantors” is made.