ÇANKAYA UNIVERSITY

CENG 356 – TERM PROJECT

COURIER COMPANY DATABASE

Melis ÇIKIŞ – 201426010

Ali Cem KOÇ – 201411034

Bilge NAS - 201411042

COURIER COMPANY DATABASE

- The database for courier companies.
- This database includes information about people and companies who product sender and receiver. Like that name, surname, city, telephone, email.
- If sender or receiver is company, the company may has many sales. It is checked with a unique code.
- The database should contains information about product which is sended or received.
- The product is separated according to its cost.
- Each product has when is delivered and by whom.
- Tha database has date which is delivering cargo, courier and customer.

E-R Model

a. Entities

- Customer Type
- Retail Customer
- Corporate Customer
- Product
- C-P-Index
- Cargo Type
- Cost
- Sales
- Personnel
- Personnel Type
- Date

b. Relationships

- Each retail customer and corporate customer have customer type.
- Each corporate customer includes sales about own company.
- All products have cost and cargo type.

1. **Entities**

1.1.Customer Type Entity and its Attributes

- A customer type is identified by Customer Type Id. The attributes are
  - CustomerTypeId
  - CustomerTypeName

1.2.Retail Customer Entity and its Attributes

- For each RetailCustomer a ID is used. The attributes are
  - RetailId
  - RetailName
  - RetailSurname
  - RetailCity
  - RetailCounty
  - RetailAddress
  - RetailTel1
  - RetailTel2
  - RetailEmail1
  - RetailEmail2
  - refCustomerTypeId (Foreign Key)

1.3.Corporate Customer Entity and its Attributes

- All corporate customers has a ID as a primary key. The attributes are
  - CorporateId
  - CorporateCode
  - CorporateName
  - CorporateCity
  - CorporateCounty
  - CorporateAddress
  - CorporateTel1
  - CorporateTel2
  - CorporateEmail1
  - CorporateEmail2
  - refCustomerTypeId (Foreign Key)

1.4.Cost Entity and its Attributes

- A cost is identified with Cost ID. The attributes are
    - CostId
    - CostTypeName
    - Unit
    - Cost

1.5.Cargo Type Entity and its Attributes

- For each CargoType a ID is used. The attributes are
    - CargoTypeId
    - Type

1.6.Product Entity and its Attributes

- All products has a ID as a primary key. The attributes are
    - ProductId
    - refCostId (Foreign Key)
    - Sensibility
    - Number
    - ProductCost
    - refCargoTypeId (Foreign Key)
    - CargoCost

1.7.Sales Entity and its Attributes

- A sales is identified by Customer Type Id. The attributes are
    - SalesId
    - Price

1.8.Contractual Company Entity and its Attributes

- This table is like a bridge between Corporate Customer and Sales tables. It's attributes are
    - ContractualId
    - refCompanyName
    - refCompanyCode
    - refSaleId (Foreign Key)

1.9.C-P-Index Entity and its Attributes

- For each CPIndex a ID is used. The attributes are
    - CPId
    - refRetailId (Foreign Key)
    - refCorporateId (Foreign Key)
    - refProductId (Foreign Key)

1.10. Personnel Type Entity and its Attributes

- All personnel type has a ID as a primary key. The attributes are
    - PersonnelTypeId
    - PersonalName

1.11. Personnel Entity and its Attributes

- A cost is identified with Cost ID. The attributes are
    - PersonnelId
    - refPersonnelTypeId
    - PersonnelName
    - PersonnelSurname
    - PersonnelTel1

1.12. Date Entity and its Attributes

- A customer type is identified by Customer Type Id. The attributes are
    - DateId
    - DeliverDateName

1.13. Date Entity and its Attributes

- A customer type is identified by Customer Type Id. The attributes are
    - DateId
    - DeliverDateName

1.14. Cargo History Entity and its Attributes

- This table is like a bridge between Date, C-P-Index and Personnel tables. It's attributes are
    - Status
    - refIndexId (Foreign Key)
    - refDateId (Foreign Key)
    - refPersonnelId (Foreign Key)
    - DeliverDateN

2. Relationships

- One person or company has a unique type.
    - A customer type may be in different customers.
    - The relationship between CustomerType, RetailCustomer and CorporateCustomer is a one to many relationship. This relatinshio is defines as a foreign key.

- Contractual Company:
    - A company may has different sales.
    - A sale may being the same at the different companies.
    - Contractual Company is a many to many relationship.

- A product has a unique cost.
    - A cost may be in many products.
    - The relation between Product and Cost tables is one to many relation. This relationship is defined as a foreign key.

- A product includes one cargo type.
    - One cargo type can be in different products.
    - The relation between Product and CargoType tables is one to many relation. This relationship is defined as a foreign key.

- One personnel has a unique type.
    - A personnel type may be in different personnels.
    - The relationship between PersonnelType and Personnel is a one to many relationship. This relatinshio is defines as a foreign key.

- A retail customer, corporate customer or product may has different indexes.
    - An index is unique for each customer of product.
    - The relationship between C-P-Index and RetailCustomer, CorporateCustomer, Product is a one to many relationship for each one. This relatinshio is defines as a foreign key.

- Cargo History:
    - More than one product can be delivered by diffrenet personnels at a date.
    - A personnel can deliver different products on a date.
    - Cargo History is a many to many relationship.
    - At the same time it is a Ternary Relationship between the C-P-Index, Date and Personnel tables.

Relational Model for the Courier Company Database

The following tables are created

1. CustomerType (CustomerTypeId is primary key)
2. RetailCustomer (RetailId is primary key, refCustomerTypeId is foreign key)
3. CorporateCustomer (CorporateId is primary key, refCustomerTypeId is foreign key)
4. Sales (SalesId is primary key)
5. Product (ProductId is primary key, refCostId is foreign key, refCargoType is foreign key)
6. Cost (CostId is primary key)
7. CargoType (CargoTypeId is primary)
8. CPIndex (CPId is primary key, refRetailId is foreign key, refCorporateId is foreign key, refProductId is foreign key)
9. PersonnelType (PersonnelTypeId is primary key)
10. DeliverDate (DateId is primary key)
11. Personnel (PersonnelId is primary key, refPersonnelTypeIde is foreign key)

Converting Relationships

1. Contractual Company is converted to a table as
    - ContractualCompany < ContractualId, refSalesId, refCompanyName, refCompanyCode >
    - ContractualId is primary key
    - refSalesId is foreign key

2. Cargo History is converted to a table as
    - CargoHistory < Status, refIndexId, refDateId, refPersonnelId, DeliverDateN >
    - Status is primary key
    - refIndexId, refDateId, refPersonnelId is foreign key

Some Queries

➢ The following queries are given as example:
    - Create table for Contractual Company entity
    - Insert Retail Customers
    - Select the total cargo costs of products which are going from Ankara to Istanbul

1. CREATE CONTRACTUALCOMPANY TABLE

```
CREATE TABLE ContractualCompany
(
ContractualId int IDENTITY(1,1) PRIMARY KEY,
refCompanyName nvarchar(30) NOT NULL,
refCompanyCode int NOT NULL,
refSaleId int NOT NULL,
FOREIGN KEY (refSaleId) REFERENCES Sales(SalesId)
);
```

2. INSERT RETAİL CUSTOMERS

```
INSERT INTO RetailCustomer (RetailName, RetailSurname,
                            RetailCity, RetailCounty,
                            RetailAddress, RetailTel1,
                            RetailEmail1, refCustomerTypeId)
VALUES ('Melis','Cikis','Ankara','Cankaya','Hosdere Caddesi',
                            '85208520','mls@gmail.com','1')
```

```
INSERT INTO RetailCustomer (RetailName, RetailSurname,
                            RetailCity, RetailCounty,
                            RetailAddress, RetailTel1,
                            RetailEmail1, refCustomerTypeId)
VALUES ('Ali Cem','Koc','Istanbul','Sariyer','Buyukdere Caddesi',
                           '1325896','ack@gmail.com','1')
```

3. SELECT THE TOTAL CARGO COSTS OF PRODUCTS WHICH ARE GOING FROM ANKARA TO ISTANBUL

```
SELECT SUM(Product.CargoCost) as TotalCargoCost
FROM Product, CPIndex
WHERE Product.ProductId = (SELECT CPIndex.refProductId
                           FROM RetailCustomer, CorporateCustomer, CPIndex
                           WHERE RetailCustomer.RetailCity = 'Ankara' AND
                                 CorporateCustomer.CorporateCity = 'Istanbul')
```

4. CREATE TABLES

```sql
CREATE TABLE RetailCustomer
(
RetailId int  IDENTITY(1,1) PRIMARY KEY,
RetailName nvarchar(30) NOT NULL,
RetailSurname nvarchar(30) NOT NULL,
RetailCity nvarchar(30) NOT NULL,
RetailCounty nvarchar(30) NOT NULL,
RetailAddress nvarchar(30) NOT NULL,
RetailTel1 varchar(30) NOT NULL,
RetailTel2 varchar(30),
RetailEmail1 nvarchar(30) NOT NULL,
RetailEmail2 nvarchar(30),
refCustomerTypeId int,
FOREIGN KEY (refCustomerTypeId) REFERENCES CustomerType(CustomerTypeId)
);
```

```sql
CREATE TABLE Product
(
ProductId int PRIMARY KEY,
refCostId int,
Sensibility tinyint NOT NULL,
Number int NOT NULL,
ProductCost int NOT NULL,
refCargoTypeId int NOT NULL,
CargoCost int NOT NULL,
FOREIGN KEY (refCostId) REFERENCES Cost(CostId),
FOREIGN KEY (refCargoTypeId) REFERENCES CargoType(CargoTypeId)
);
```

```sql
CREATE TABLE CargoHistory
(
Status tinyint PRIMARY KEY,
refIndexId int NOT NULL,
refDateId int NOT NULL,
refPersonnelId int NOT NULL,
DeliverDateN datetime NOT NULL,
FOREIGN KEY (refIndexId) REFERENCES CPIndex(CPId),
FOREIGN KEY (refDateId) REFERENCES DeliverDate(DateId),
FOREIGN KEY (refPersonnelId) REFERENCES Personnel(PersonnelId)
);
```

```sql
CREATE TABLE Personnel
(
PersonnelId int IDENTITY(1,1) PRIMARY KEY,
refPersonnelTypeId int NOT NULL,
PersonnelName nvarchar(30) NOT NULL,
PersonnelSurname nvarchar(30) NOT NULL,
PersonnelTel1 varchar(30) NOT NULL,
FOREIGN KEY (refPersonnelTypeId) REFERENCES PersonnelType(PersonnelTypeId)
);
```

```sql
CREATE TABLE Sales
(
SalesId int NOT NULL,
PRIMARY KEY (SalesId),
Price float
);
```

```sql
CREATE TABLE CorporateCustomer
(
CorporateId int  IDENTITY(1,1) PRIMARY KEY,
CorporateCode int,
CorporateName nvarchar(30) NOT NULL,
CorporateCity nvarchar(30) NOT NULL,
CorporateCounty nvarchar(30) NOT NULL,
CorporateAddress nvarchar(30) NOT NULL,
CorporateTel1 varchar(30) NOT NULL,
CorporateTel2 varchar(30),
CorporateEmail1 nvarchar(30) NOT NULL,
CorporateEmail2 nvarchar(30),
refCustomerTypeId int,
FOREIGN KEY (refCustomerTypeId) REFERENCES CustomerType(CustomerTypeId)
);
```

```sql
CREATE TABLE DeliverDate
(
DateId int IDENTITY(1,1) PRIMARY KEY,
DeliverDateName nvarchar(30) NOT NULL
);
```

```sql
CREATE TABLE PersonnelType
(
PersonnelTypeId int IDENTITY(1,1) PRIMARY KEY,
PersonalName nvarchar(30) NOT NULL
);

CREATE TABLE CPIndex
(
CPId int PRIMARY KEY,
refRetailId int NOT NULL,
refCorporateId int NOT NULL,
refProductId int NOT NULL,
FOREIGN KEY (refRetailId) REFERENCES RetailCustomer(RetailId),
FOREIGN KEY (refCorporateId) REFERENCES CorporateCustomer(CorporateId),
FOREIGN KEY (refProductId) REFERENCES Product(ProductId)
);

CREATE TABLE CargoType
(
CargoTypeId int PRIMARY KEY,
Type nvarchar(30) NOT NULL
);

CREATE TABLE Cost
(
CostId int PRIMARY KEY,
CostTypeName nvarchar(30) NOT NULL,
Unit int NOT NULL,
Cost float NOT NULL
);
```

E-R MODEL

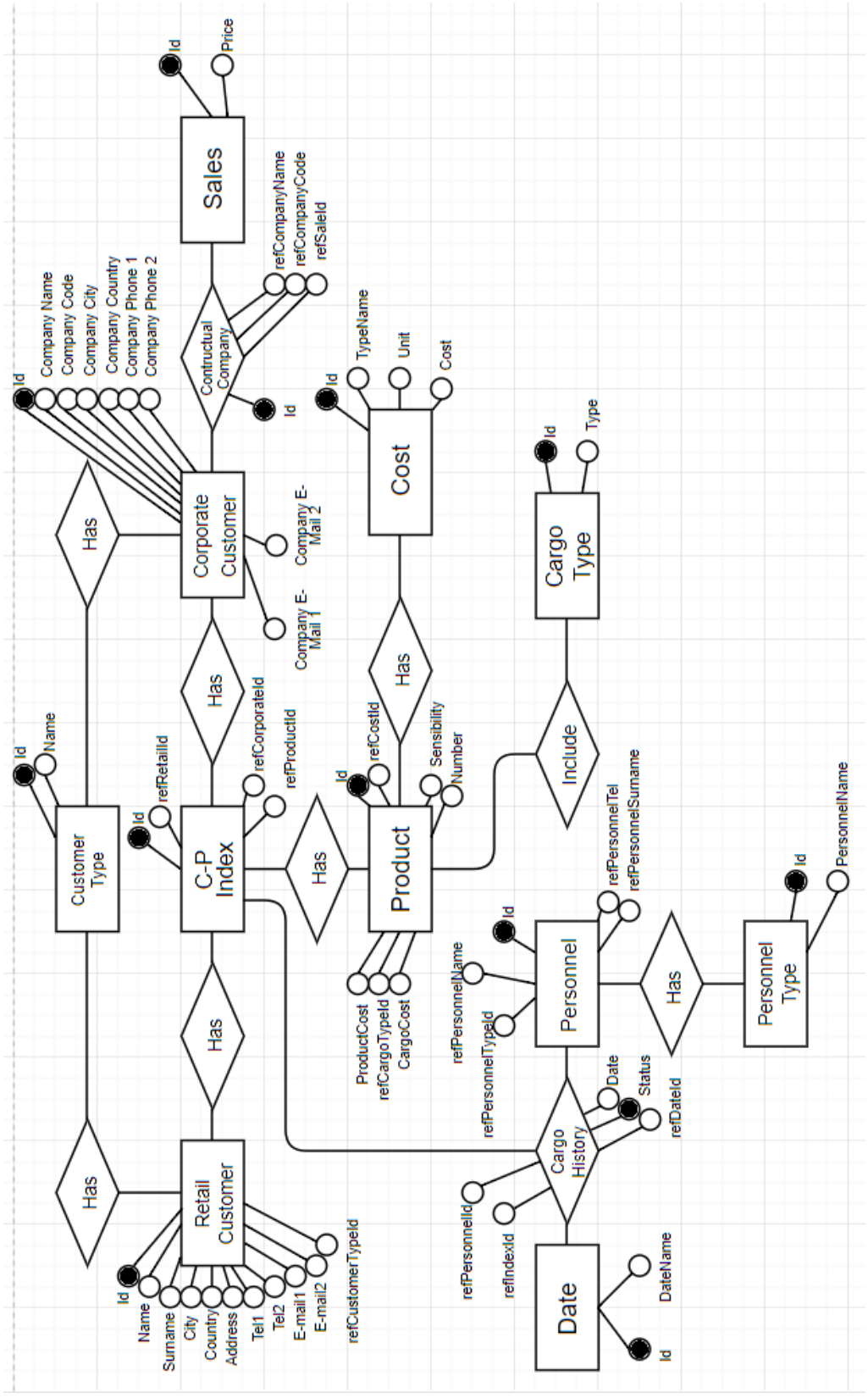
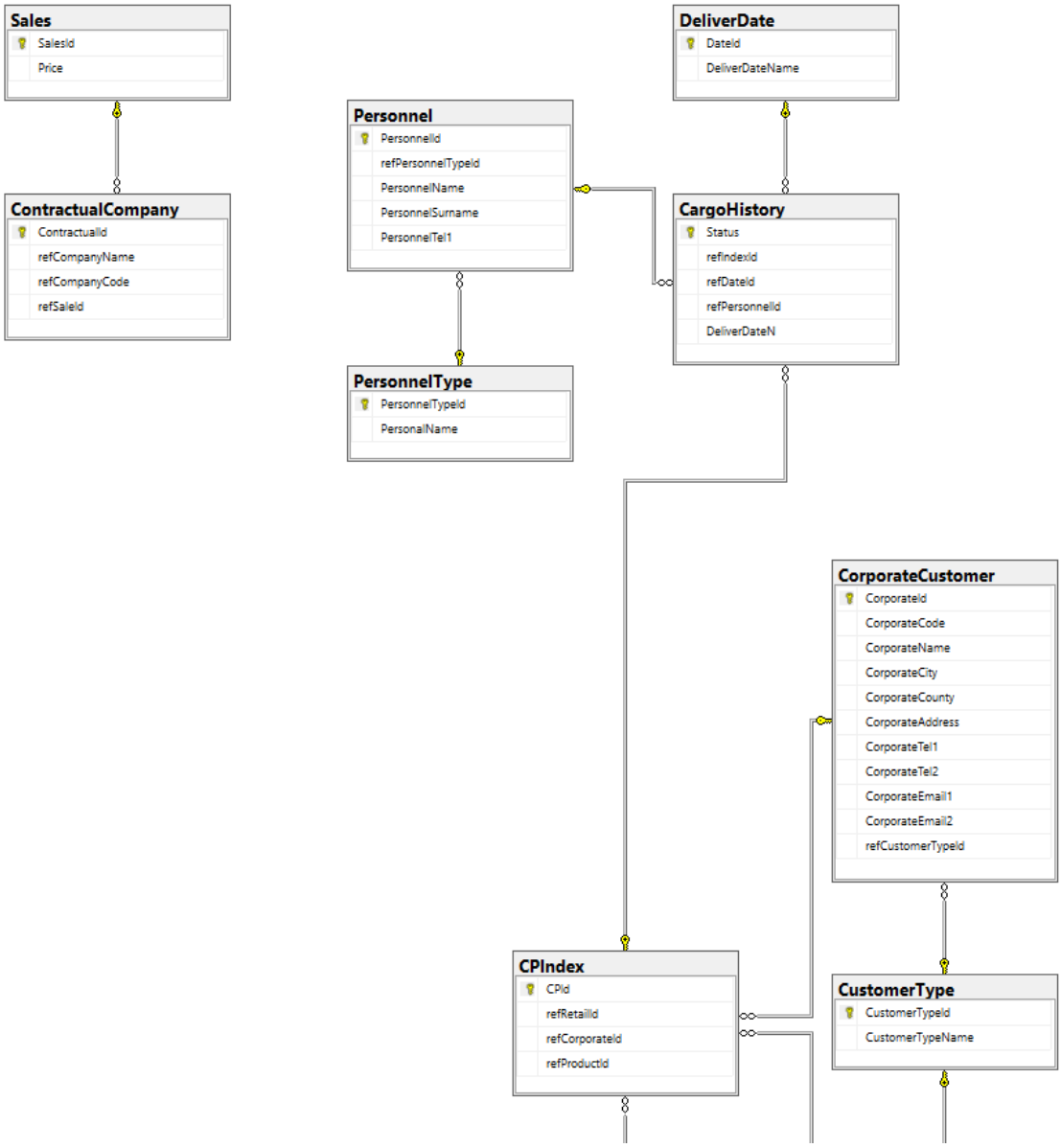

Sales
Id
Price
refCompanyName
refCompanyCode
refSaleId
Contructual Company
Id
Company Name
Company Code
Company City
Company Country
Company Phone 1
Company Phone 2
Corporate Customer
Company E-Mail 1
Company E-Mail 2
Has
Cost
Id
TypeName
Unit
Cost
Has
Cargo Type
Id
Type
Include
Customer Type
Id
Name
C-P Index
Id
refRetailId
refCorporateId
refProductId
Has
Product
Id
refCostId
Sensibility Number
Has
Has
Has
Retail Customer
Id
Name
Surname
City
Country
Address
Tel1
Tel2
E-mail1
E-mail2
refCustomerTypeId
ProductCost
refCargoTypeId
CargoCost
refPersonnelName
refPersonnelTypeId
Id
Personnel
refPersonnelTel
refPersonnelSurname
Has
Personnel Type
Id
PersonnelName
Cargo History
refPersonnelId
refIndexId
Date
Status
refDateId
Date
Id
DateName

Diagram 1:


Sales
SalesId
Price
ContractualCompany
ContractualId
refCompanyName
refCompanyCode
refSaleId
Personnel
PersonnelId
refPersonnelTypeId
PersonnelName
PersonnelSurname
PersonnelTel1
PersonnelType
PersonnelTypeId
PersonalName
DeliverDate
DateId
DeliverDateName
CargoHistory
Status
refIndexId
refDateId
refPersonnelId
DeliverDateN
CorporateCustomer
CorporateId
CorporateCode
CorporateName
CorporateCity
CorporateCounty
CorporateAddress
CorporateTel1
CorporateTel2
CorporateEmail1
CorporateEmail2
refCustomerTypeId
CPIndex
CPId
refRetailId
refCorporateId
refProductId
CustomerType
CustomerTypeId
CustomerTypeName