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CSE 5330 – Database Systems Sec 002

Project 2: Part 1

Submitted By:

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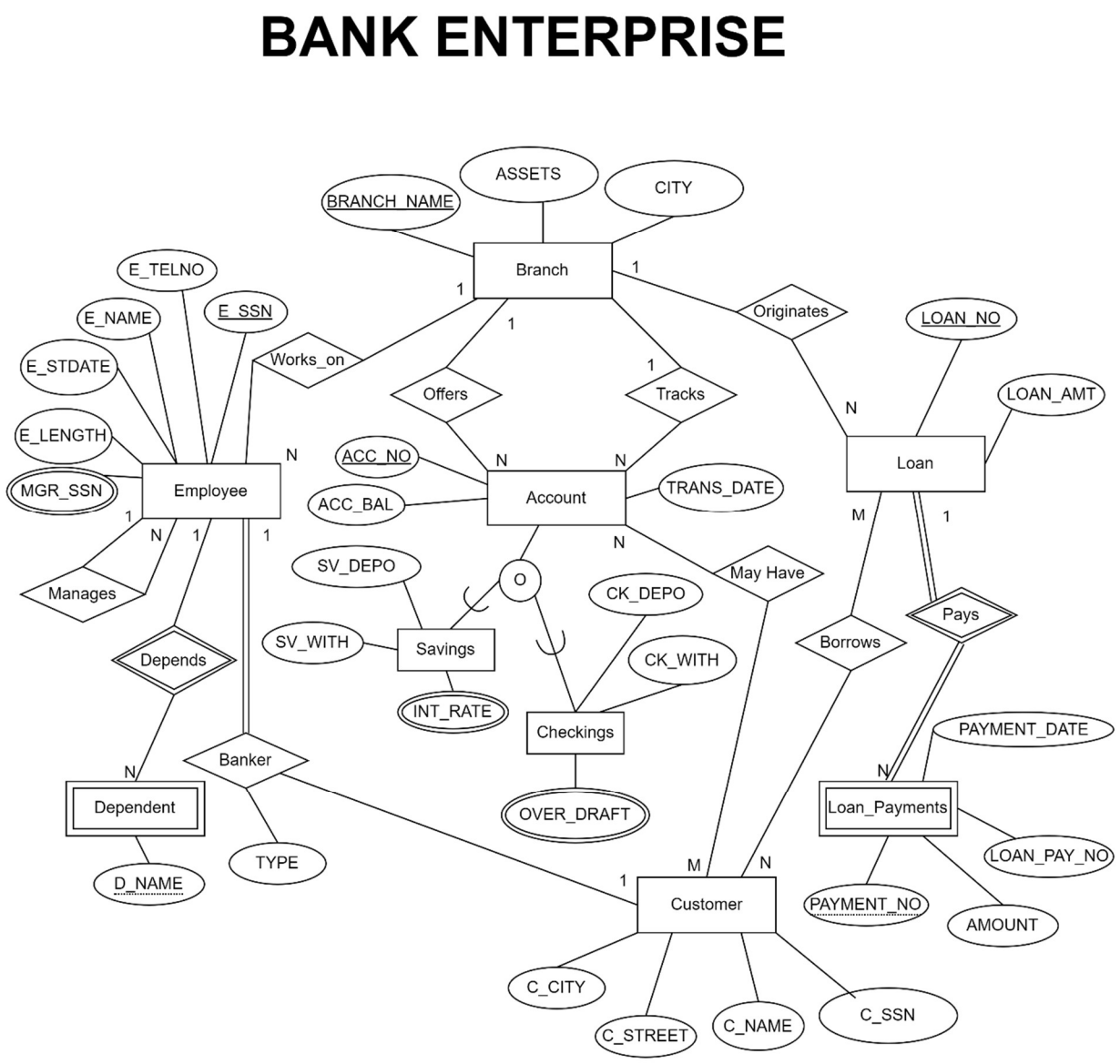
1.a) Extended Entity Relationship (EER) Schema Diagram:



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Design of Choices:

For Project 2 we have created a Bank Enterprise database as per below design considerations:

- Branch is the initial relation of the Bank Enterprise database.
- Branch entity has attributes like Branch_Name as primary key, Assets, and City.
- Branch offers Account which is another entity having Acc_No as the primary key and other attributes like Acc_Bal, Trans_Date.
- These Accounts are divided into two types which are Savings and Checkings. Savings and checkings are overlapping with each other. It has Acc_No as the referential key. Savings has the following attributes - Sv_Depo, Sv_With, and Int_Rate. Checkings has Sv_Depo, Sv_With, and Over_draft as its attributes.
- Employee and Branch entities are related with many to one relation respectively. Employee has attributes E_Ssn (primary key), E_Telno, E_Name, E_Stdate, E_Length, Mgr_Ssn. Mgr_Ssn is taken as multivalued attributes since several employees can have one manager.
- Dependent is a weak entity of Employee entity since Dependent table does not have a primary key. E_Ssn is the foreign key for Dependent entity referring from Employee.
- Employee can act as loan officer or personal banker for a particular customer.
- Customer can have accounts or can borrow loans from the branch.
- Customer has many to many relationships with Account and Loan entity.
- Customer entity provides the data related to the customer's Name, City, Street, and SSN where SSN is the primary key and is referenced by Account and Loan entities.
- Loan is originated from the branches. Loan entity has Loan_No as its primary key and Loan_amt. Loan_No is referenced by Loan_Payments is a weak entity.
- Loan_Payment keeps the track of the payments done by every customer by storing the payment_date, payment_no, and amount.

Assumptions:

- Instead of using Bank as an entity, we have used Branch as an initial entity to create the database since there were no significant attributes mentioned for creating Bank.
- Considering the fact that each branch is located in a particular city, the City attribute cannot be multivalued.
- Every manager is an employee of the bank.
- A separate entity for Dependent is created considering that an employee can have more than one dependent and cannot be entered into the Employee entity.
- D_name is considered a partial key in the Dependent entity to avoid key constraints.
- As per the given information Bank customers are identified by their SSN but to satisfy the condition of customer having more than one account C_SSN is not considered as primary key.
- Savings and checkings accounts are overlapping since a customer can have both savings and checking accounts.

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Limitations:

- Only relation specified between Customer and Employee is Banker however nothing other than type of banker is mentioned. Hence an attribute “Type” is associated with the Banker relation.

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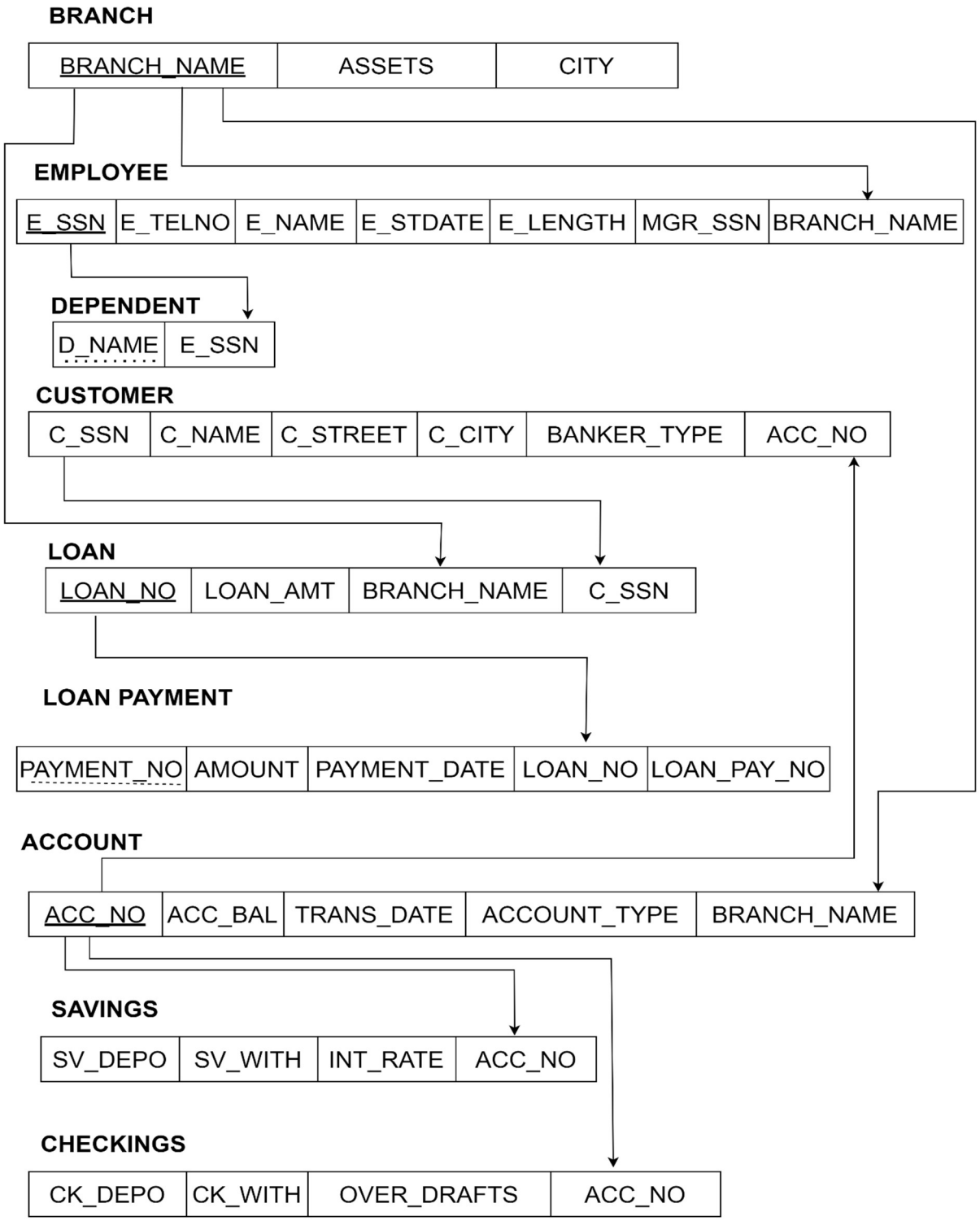
1.b) EER to Relational Schema Mapping:



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Create Table Statements:

BRANCH :

```
CREATE TABLE BRANCH (BRANCH_NAME VARCHAR(30),
ASSETS VARCHAR(30),
CITY VARCHAR(20),
PRIMARY KEY(BRANCH_NAME));
```

EMPLOYEE :

```
CREATE TABLE EMPLOYEE (
E_SSN VARCHAR(10),
E_TELNO INT,
E_NAME VARCHAR(20),
E_STDATE VARCHAR(20),
E_LENGTH INT,
MGR_SSN VARCHAR(10),
BRANCH_NAME VARCHAR(30),
PRIMARY KEY(E_SSN),
FOREIGN KEY(BRANCH_NAME) REFERENCES BRANCH(BRANCH_NAME));
```

DEPENDENT :

```
CREATE TABLE DEPENDENT (
D_NAME VARCHAR(20),
E_SSN VARCHAR(10),
PRIMARY KEY(D_NAME),
FOREIGN KEY (E_SSN) REFERENCES EMPLOYEE(E_SSN));
```

ACCOUNT :

```
CREATE TABLE ACCOUNT(
```

```
ACC_NO INT,
ACC_BAL FLOAT,
TRANS_DATE VARCHAR(10),
ACCOUNT_TYPE VARCHAR(20),
BRANCH_NAME VARCHAR(30),
PRIMARY KEY(ACC_NO),
FOREIGN KEY (BRANCH_NAME) REFERENCES BRANCH(BRANCH_NAME));
```

CUSTOMER:

```
CREATE TABLE CUSTOMER (
C_SSN VARCHAR(10),
C_NAME VARCHAR(20),
C_STREET VARCHAR(20),
C_CITY VARCHAR(20),
BANKER_TYPE VARCHAR(20),
ACC_NO INT,
FOREIGN KEY (ACC_NO) REFERENCES ACCOUNT(ACC_NO));
```

LOAN:

```
CREATE TABLE LOAN (
LOAN_NO INT,
LOAN_AMT FLOAT,
BRANCH_NAME VARCHAR(20),
C_SSN VARCHAR(10),
PRIMARY KEY (LOAN_NO),
FOREIGN KEY (BRANCH_NAME) REFERENCES BRANCH(BRANCH_NAME),
FOREIGN KEY (C_SSN) REFERENCES CUSTOMER(C_SSN));
```

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LOAN PAYMENT :

```
CREATE TABLE LOAN_PAYMENT(
PAYMENT_NO INT,
AMOUNT FLOAT,
PAYMENT_DATE VARCHAR(10),
LOAN_NO INT,
LOAN_PAY_NO INT,
PRIMARY KEY(PAYMENT_NO),
FOREIGN KEY (LOAN_NO) REFERENCES LOAN(LOAN_NO));
```

SAVINGS :

```
CREATE TABLE SAVINGS(
SV_DEPO FLOAT,
SV_WITH FLOAT,
INT_RATE FLOAT,
ACC_NO INT,
FOREIGN KEY (ACC_NO) REFERENCES ACCOUNT(ACC_NO));
```

CHECKINGS:

```
CREATE TABLE CHECKINGS(
CK_DEPO FLOAT,
CK_WITH FLOAT,
OVERDRAFTS FLOAT,
ACC_NO INT,
FOREIGN KEY (ACC_NO) REFERENCES ACCOUNT(ACC_NO));
```