**Initial Translation**

| Code | Name | Addr

BANK

BANK\_BRANCH

| Addr | Branch\_no

ACCOUNT

| Acct\_no | Balance | Type

LOAN

| Loan\_no | Amount | Type

CUSTOMER

| Ssn | Phone | Name | Addr

**Translation of Relationships**

The minimal storage relationship is italicized

**BRANCHES options**

Because BANK\_BRANCH only has a weak key the Branches relationship is implicity created when we give the BANK\_BRANCH table a Code attribute as a Foreign Key Reference (FKR) to BANK.Code

**ACCOUNTS options**

1. Add Acct\_no attribute to BANK\_BRANCH schema as FKR to ACCOUNT.Acct\_no
2. *Add Branch\_no and Code attributes to ACCOUNT schema as FKR to BANK\_BRANCH.Branch\_no and BANK\_BRANCH.Code*
3. Create a new table, ACCCTS, that holds FKRs to the keys of the BANK\_BRANCH table and the ACCOUNT table

**LOANS options**

1. Add Loan\_no attribute to BANK\_BRANCH schema as FKR to LOAN.Loan\_no
2. *Add Branch\_no and Code attributes to LOAN schema as FKR to BANK\_BRANCH.Branch\_no and BANK\_BRANCH.Code*
3. Create a new table, LOANS, that holds FKRs to the keys of the BANK\_BRANCH table and the LOAN table

**A\_C options**

1. Add Ssn attribute to ACCOUNT schema as FKR to CUSTOMER.Ssn
2. Add Acct\_no attribute to CUSTOMER schema as FKR to ACCOUNT.Acct\_no
3. *Create a new table, A\_C, that holds FKRs to the key of the ACCOUNT table and the CUSTOMER table.*

**L\_C options**

1. Add Ssn attribute to LOAN schema as FKR to CUSTOMER.Ssn
2. Add Loan\_no attribute to CUSTOMER schema as FKR to LOAN.Loan\_no
3. *Create a new table, L\_C, that holds FKRs to the key of the LOAN table and the CUSTOMER table.*

Minimal storage implementation

| Code | Name | Addr |

BANK

BANK\_BRANCH

| Addr | Branch\_no | Code |

ACCOUNT

| Acct\_no | Balance | Type | Customer ssn | Branch\_no |

LOAN

| Loan\_no | Amount | Type | Customer ssn | Branch\_no |

CUSTOMER

| Ssn| Phone | Name | Addr |

A\_C | Customer\_ssn Accout number

L\_C | Customer\_ssn Loan number