Step 1

Department(DName,Manager, MSDate, E#)

Functional Dependencies

DName → Manager, MSDate

(Manager → MSDate is not considered assuming one person can manage more than one department at different times or simultaneously)

Minimal key

DName → Manager, MSDate

DName, E#→ Manager, MSDate (augmentation axiom)

Minimal key - (Dname, E#)

Normal Form Identification

-1NF- the domain of each attribute contains only atomic (indivisible) values

- Not 2NF – non-prime attributes Manager, MSDate depends on a subset of the minimal key, DName.

Decomposition

Department(DName,Manager, MSDate)

Functional dependency

DName → Manager, MSDate

Minimal key

(DName)

Left hand side of DName → Manager, MSDate is a super key, hence BCNF.

DeptLocation (DName,Manager, Address)

Functional Dependencies

DName → Manager

Minimal key

DName → Manager

DName, Address → Manager (augmentation axiom)

Minimal key - (Dname, Address)

Normal Form Identification

-1NF- the domain of each attribute contains only atomic (indivisible) values

- Not 2NF – non-prime attributes Manager depends on a subset of the minimal key, DName.

Decomposition

DeptLocation(DName, Address)

Minimal key

(DName, Address)

In BCNF, as there are no non-prime attributes.

Employee(E#, Name, DOB, Supervisor#, Dname)

Functional Dependencies

E# → Name, DOB, Supervisor#, Dname

Minimal key

(E#)

Normal Form Identification

Left hand side of E# → Name, DOB, Supervisor#, Dname is a superkey, hence Employee is in BCNF.