**数据库系统课程第五次作业**

19级软件工程1班 陈涵 201936380086

**8.6** Compute the closure of the following set F of functional dependencies for relation schema r (A, B, C, D, E).

A→BC

CD→E

B→D

E→A

List the candidate keys for R.

**Answer:**

because A→BC

A→B

because A→B, B→D

A→D

because A→BC

A→C

because A→C, A→D

A→CD

because A→CD, CD→E

A→E

Above all, A is a super key of r, and A is one of the smallest attribute sets, so A is a candidate key of R.

Because of E→A, E is also a candidate key of R.

**8.27** Using the functional dependencies of Practice Exercise 8.6, compute B+.

**Answer:**

*result*=B

because B→D

*result*=*result* ∪ D

B+ =*result*=BD

**8.29** Consider the following set F of functional dependencies on the relation

schema r (A, B, C, D, E, F):

A→BCD

BC→DE

B→D

D→A

a. Compute B+.

b. Prove (using Armstrong’s axioms) that AF is a super key.

c. Compute a canonical cover for the above set of functional dependencies F; give each step of your derivation with an explanation.

**Answer:**

a.

*result*=B

because B→D

*result*=*result* ∪ D=BD

because D→A

*result*=*result* ∪ A=ABD

because A→BCD

A→C

*result*=*result* ∪ C=ABCD

because BC→DE

BC→E

*result*=*result* ∪ E=ABCDE

B+ = ABCDE

b.

because A→BCD

A→BC

because A→BC, BC→DE

A→DE

because A→BC, A→DE

A→ABCDE

because A→ABCDE

AF→ABCDEF

Because AF→ABCDEF, AF can derive all attributes in r, AF is a super key of r (A, B, C, D, E, F).

c.

set is now {A→BCD, BC→DE, B→D, D→A}

because A→BCD

A→BC

because BC→DE

BC→D

A→D

D is extraneous in A→BCD

set is now {A→BC, BC→DE, B→D, D→A}

because BC→DE

BC→D

because B→D

D is extraneous in BC→DE

set is now {A→BC, BC→E, B→D, D→A}

because A→BC

A→C

because B→D, D→A, A→C

B→C

C is extraneous in BC→E

set is now {A→BC, B→E, B→D, D→A}

because B→E, B→D

B→DE

set is now {A→BC, B→DE, D→A}

The canonical cover of F is {A→BC, B→DE, D→A}.