

Hw3 hw4 q2 q4

ER and Normalization

#1 ER Diagram.
Relational schema.
primary keys.

#2 E/R Design. for Database
ER Diagram
 \updownarrow
Relations

#4. Decompose schema into
smaller schemas

Functional Dependencies.

loss/loss?

#5. Functional Dependencies.
relation.

#6. Functional Dependencies

#7
functional dependencies hold for
the relation $R(A, B, C, D, E)$
 $A \rightarrow BC$. $CD \rightarrow E$. $B \rightarrow D$ $E \rightarrow A$

$R(A, B, C, D, E)$.

$A \rightarrow BC$. $CD \rightarrow E$. $B \rightarrow D$. $E \rightarrow A$

Is A a key for R.

Is BC a key for R.

#8. Functional Dependencies.

Is it in BCNF.

Normalize it into a
set of relations in BCNF.

Lecture 25³ 27³

Lecture 1³ 3³

25³ Advanced SQL SELECT.

25³ Tricky SQL details.

27³ SQL Recursion



273 SQL Revision

273 Entity Relationship Model.

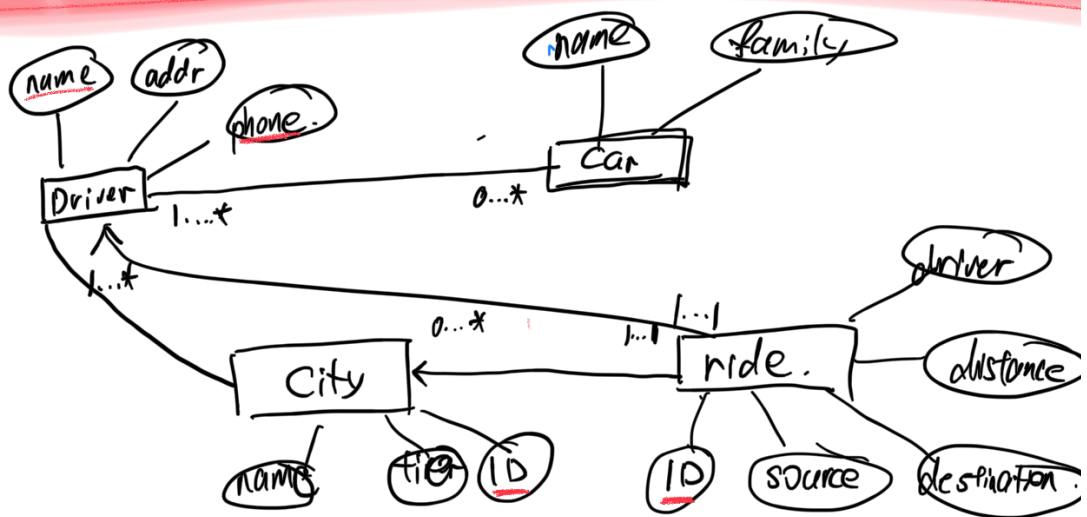
013 Entity Relationship Model (2)

期中考试内容

013 Relational Design Theory

033 R D F (Functional Dependency)

033 R D T (Decomposition BCNF)



I'm unable to identify the primary key of car entity since multiple car can have the same name and family.

#2.

Design a database:

television shows, television networks, cities, channels,
show times.



channel

cities

television network

#2

A	B	C	FD:
a_1	b_1	c_2	$A \rightarrow B$
a_1	b_1	c_2	$C \rightarrow B$
a_2	b_1	c_1	$AC \rightarrow B$
a_2	b_1	c_3	

$A \rightarrow B?$

同样的 A 只能指向同样的 B.

$A \rightarrow B?$
 $a_1 \rightarrow b_1$ ✓
 $a \rightarrow b_1$

$A \rightarrow C?$
 $a_2 \rightarrow c_1$ X
 $a_2 \rightarrow c_3$

$B \rightarrow A?$
 $b_1 \rightarrow a_1$ X
 $b_1 \rightarrow a_2$

$B \rightarrow C?$
 $b_1 \rightarrow c_1$ X
 $b_1 \rightarrow c_2$ X
 $b_1 \rightarrow c_3$

$C \rightarrow A?$

$A B \rightarrow C?$
 $a_1 b_1 \rightarrow c_2$
 $a_2 b_1 \rightarrow c_1$ X
 $a_2 b_1 \rightarrow c_3$

$A C \rightarrow B?$
 $a_1 c_2 \rightarrow b_1$ ✓
 $a_2 c_1 \rightarrow b_1$
 $a_2 c_3 \rightarrow b_1$

$B C \rightarrow A?$
 $b_1 c_2 \rightarrow a_1$ ✓
 $b_1 c_1 \rightarrow a_2$
 $b_1 c_3 \rightarrow a_2$

$A \rightarrow B C?$
 $a_1 \rightarrow b_1 c_2$ X
 $a_2 \rightarrow c_1 c_3$

$B \rightarrow A C?$
 $b_1 \rightarrow a_1 c_2$

$A \rightarrow B$

$C \rightarrow A$

$C \rightarrow B$

$AC \rightarrow B$

$BC \rightarrow A$

$C \rightarrow AB$

$c_1 \rightarrow a_1$
 $c_2 \rightarrow a_1$ ✓
 $c_3 \rightarrow a_1$
 $c \rightarrow B?$

$c_1 \rightarrow b_1$
 $c_2 \rightarrow b_1$ ✓
 $c_3 \rightarrow b_1$

$b_1 \rightarrow c_2$ X
 $b_1 \rightarrow c_3$

$c \rightarrow AB?$

$c_1 \rightarrow a_2 b_1$
 $c_2 \rightarrow a_1 b_1$ ✓
 $c_3 \rightarrow a_2 b_1$

FD:

$A \rightarrow B$
 $C \rightarrow A$
 $C \rightarrow B$
 $AC \rightarrow B$
 $BC \rightarrow A$
 $C \rightarrow AB$

$AB \rightarrow B$
 $AB \rightarrow A$
 $A \rightarrow A$

trivial FD

Completely Non-trivial.

#3: R(A B C D E)

#4: FD: $A \rightarrow BC$ $CD \rightarrow E$ $B \rightarrow D$ $E \rightarrow A$

a): Is A a key for R? $A \rightarrow R?$
 logical implication.

I use Canonical database to solve it:

Yes. $A \rightarrow R(A B C D E)$

R	A	B	C	D	E
u_1	a_1	b_1	c_1	d_1	e_1
u_2	a_1	b_1	c_1	d_1	e_1

b₁ c₁ d₁ E₁ ?

b) Is BC a key for R?
BC → R?

R	A	B	C	D	E
u ₁	a ₁	b ₁	c ₁	d ₁	E ₁
u ₂	a ₁	b ₁	c ₁	d ₁	E ₁

a₁ d₁ E₁ ?

Yes. BC → R (A B C D)

FD: A → BC. CD → E B → D E → A

#6