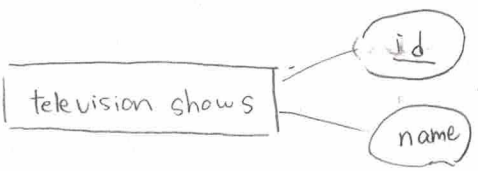
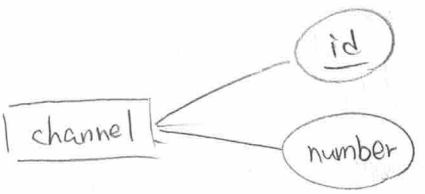
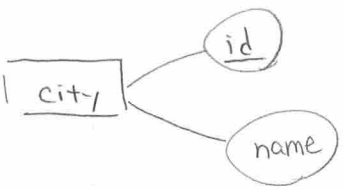
CS143 HW#5 Junhong Wang (5049411113)

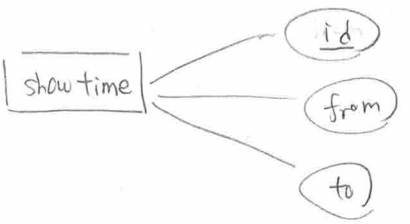
1. Entities : television shows,
television networks.
cities,
channels,
show times,

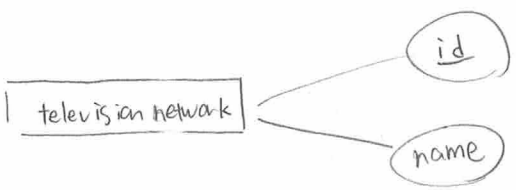
Assumption : a channel in a city is associated with a network
a show is either owned by a network or a local show

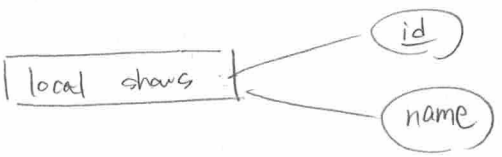


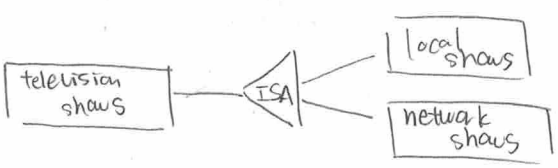


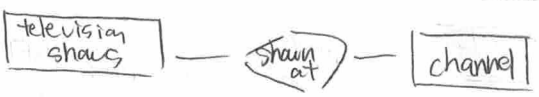




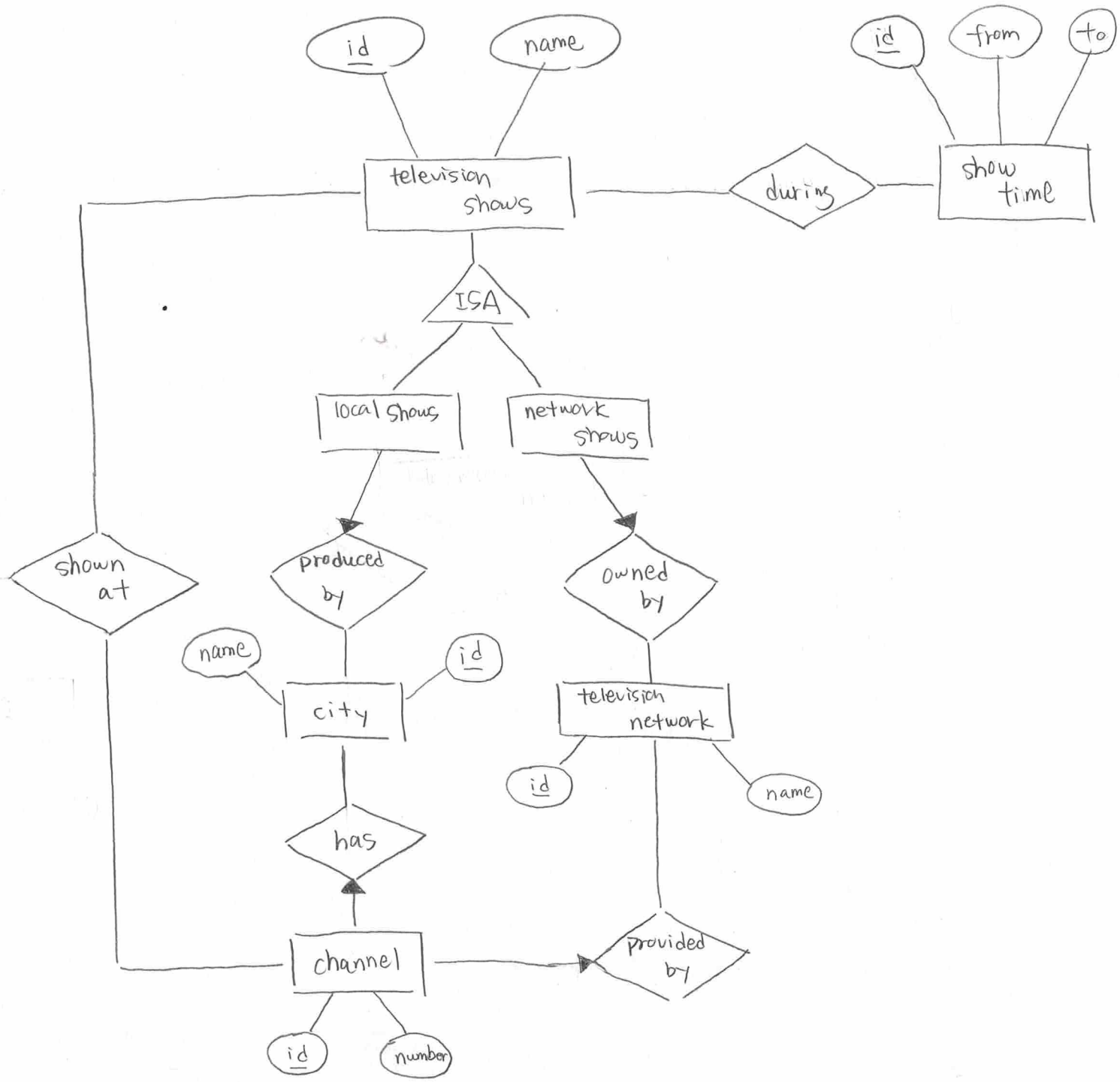








Combining everything from previous page ...



2. Parts (number)

Assembly (number , cost)

Composed Of (assembly_number , part_number , quantity)

3.

Use the chase Test

$\{A \to BC, CD \to E, B \to D, E \to A\}$

$\Downarrow$

$\{A \to B, A \to C, CD \to E, B \to D, E \to A\}$

	A	B	C	D	E	F
R1	A	B	C	d_1	e_1	F
R2	A	b_2	c_2	D	E	F_2

$\downarrow$ $A \to B$

	A	B	C	D	E	F
R1	A	B	C	d_1	e_1	F
R2	A	B	c_2	D	E	F_2

$\downarrow$ $A \to C$

	A	B	C	D	E	F
R1	A	B	C	d_1	e_1	F
R2	A	B	C	D	E	F_2

$\downarrow$ $B \to D$

	A	B	C	D	E	F
R1	A	B	C	D	e_1	F
R2	A	B	C	D	E	F_2

$\downarrow$ $CD \to E$

	A	B	C	D	E	F
R1	A	B	C	D	E	F
R2	A	B	C	D	E	F_2

Notice R1 is now same as R. Thus, we can obtain original relation R from R1 and R2. Therefore, the decomposition is lossless.

4.

$A \to B$, $C \to A$

$\begin{pmatrix} a_1 \to b_1 \\ a_2 \to b_1 \end{pmatrix}$ $\begin{pmatrix} c_2 \to a_1 \\ c_1 \to a_2 \\ c_3 \to a_2 \end{pmatrix}$

(Note $C \to B$ can be implied from $C \to A$ and $A \to B$)

5. (a) $\{A\}^+ = \{A, B, C, D\}$

$\{B\}^+ = \{B, D\}$

$\{C\}^+ = \{C\}$

$\{D\}^+ = \{D\}$

$\{E\}^+ = \{A, B, C, D, E\}$

Thus E is a candidate key

(b) $\{B, C\}^+ = \{B, C, D, E, A\}$ ($\because CD \to E$ and $E \to A$)

Thus BC is a candidate key

6.

$\{A\}^+ = \{A, B, C, D, E\}$

$\{B\}^+ = \{B, D\}$

$\{C\}^+ = \{C, E\}$

$\{D\}^+ = \{D\}$

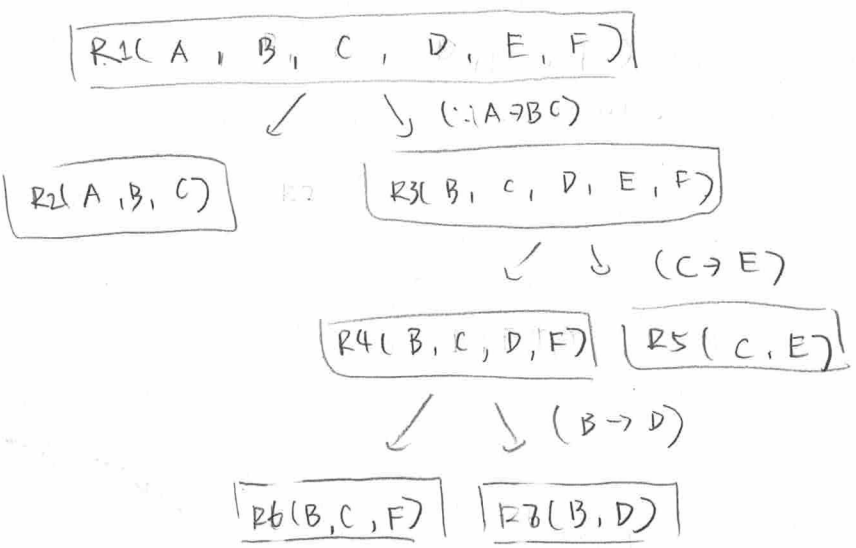
$\{E\}^+ = \{E\}$

$\{F\}^+ = \{F\}$

AF is a candidate key.

A relation is in BCNF iff every FD is an arrow out of a candidate key.

So No, this is not in BCNF.



Set of relations in BCNF:

$\{R2(A, B, C), R6(B, C, F), R7(B, D), R5(C, E)\}$