

1 a)

- ~~$BCDE \rightarrow A$~~
- ~~$BCDE \rightarrow F$~~
- ~~$CE \rightarrow B$~~
- ~~$BD \rightarrow E$~~
- $B \rightarrow D$
- $D \rightarrow C$
- $D \rightarrow E$
- $C \rightarrow B$
- $F \rightarrow E$
- $AG \rightarrow E$
- $AG \rightarrow F$

- $\rightarrow D \rightarrow A$
- $\rightarrow D \rightarrow F$

$D \rightarrow C$

~~$D \rightarrow E$~~ \rightarrow can remove ($D \rightarrow F, F \rightarrow E$)

$B \rightarrow D$

$C \rightarrow B$

$F \rightarrow E$

~~$AG \rightarrow E$~~

$AG \rightarrow F$

~~11111~~

minimal cover:

$D \rightarrow A$	$B \rightarrow D$	$C \rightarrow B$	$F \rightarrow E$	$AG \rightarrow E$
$D \rightarrow F$				$AG \rightarrow F$
$D \rightarrow C$				

3 point

3NF decomposition:

DAFC
 $D \rightarrow AFC$

$AC \rightarrow DF$
 $FC \rightarrow AD$

Projected
FDs

<u>BD</u> $B \rightarrow D$ $D \rightarrow B$	<u>CB</u> $C \rightarrow B$ $B \rightarrow C$	<u>FE</u> $F \rightarrow E$	<u>AGOF</u> $AG \rightarrow F$ AGOF
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4 point

$(AC)^+ = ACBDFE$

FC = ~~FC~~BD

Since none of the relations R_i is a key, for the full relation R , we need to add a key, example: DG .

3 points

the 3NF algo will give: $ACDF, BD, BC, EF, AGF$ and DG