

Exercise 1,2,3

1(a)

(a) Canonical

$$F = \{ABH \rightarrow C, A \rightarrow D, C \rightarrow E, BGH \rightarrow F, F \rightarrow A, F \rightarrow D, E \rightarrow F, BH \rightarrow E\}$$

(b) Minimize the left-hand side

$$BH_F^+ = \{B, H\}_F^+ = \{B, E, H\}_F^+ = \{B, E, F, H\}_F^+ = \{A, B, E, F, H\}_F^+ = \{A, B, D, E, F, H\}_F^+ = \{A, B, C, D, E, F, H\}_F^+$$

$ABH \rightarrow C$ replace with $BH \rightarrow C$

$BGH \rightarrow F$ replace with $BH \rightarrow F$

$$F = \{BH \rightarrow C, A \rightarrow D, C \rightarrow E, BH \rightarrow F, F \rightarrow A, F \rightarrow D, E \rightarrow F, BH \rightarrow E\}$$

(c) Remove

$BH \rightarrow E$, because of $BH \rightarrow C$ and $C \rightarrow E$

$BH \rightarrow F$, because of $BH \rightarrow C$, $C \rightarrow E$ and $E \rightarrow F$

$F \rightarrow D$, because of $F \rightarrow A$ and $A \rightarrow D$ $F = \{BH \rightarrow C, A \rightarrow D, C \rightarrow E, F \rightarrow A, F \rightarrow D, E \rightarrow F\}$

1(b)

(a) $R_{BH}(\underline{B}, \underline{H}, C)$

$R_{BH}(\underline{A}, D)$

$R_{BH}(\underline{C}, E)$

$R_{BH}(\underline{F}, E)$

$R_{BH}(\underline{E}, F)$

$R_{BGH}(\underline{B}, \underline{G}, \underline{H})$ - minimal key

2(a)

A	B	C
1	Java	English
1	C++	French
1	Python	Russian
1	Java	French
1	Java	Russian
1	C++	English
1	C++	Russian
1	Python	English
1	Python	French

4NF:

A	B	A	C
1	Java	1	English
1	C++	1	French
1	Python	1	Russian
1	Java	1	French
1	Java	1	Russian
1	C++	1	English
1	C++	1	Russian
1	Python	1	English
1	Python	1	French

2(b)

A	B	C	D
1	true	green	x
1	false	green	y
2	true	red	y
1	true	red	x
2	true	green	y
1	true	green	y
1	true	red	x
1	false	green	x

3(a)

$\{Person\}$ cannot be because of the first and third rows

$\{Destination\}$ cannot be because of the first and second rows

$\{Vehicle\}$ cannot be because of the first and second rows

$\{Person, Destination\}$ cannot be because of the first and last rows

$\{Person, Vehicle\}$ cannot be because of the first and third rows

$\{Destination, Vehicle\}$ cannot be because of the first and second rows

$\{Person, Destination, Vehicle\}$ is the only possible key

3(b)

Trivial MVds cannot be in Trips:

$Person \rightarrow Destination$

$Person \rightarrow Venicle$

$Destination \rightarrow Person$

$Destination \rightarrow Venicle$

$Venicle \rightarrow Person$

$Venicle \rightarrow Destination$

because this MVDs are not possible.