Homework 5

due February 24, 2023

Problem 1:

Using your "domain knowledge", find the functional dependencies and multi-valued functional dependencies in the following "Supplier" table with attributes SupNr, Name, Country, Postal Code, Town Street, Street Number, PartDescription, Volume, Date, Contact Name, Phone Number. You do not have to give trivial FDs nor FDs that follow from the ones you already established.

SupNr	Name	Country	Postal Code	Town	Street	Street Number	PartNr	PartDescription	Volume	Date	Contact Name	Phone Number
10023	Acme	UK	EC	London	High Street	136a	20101	Widget for Gimble	300	02-01-2023	Liz Bower	+44 1632 960107
10023	Acme	UK	EC	London	High Street	136a	20101	Widget	300	02-01-2023	Liz Bower	+44 1632 960092
10023	Acme	UK	EC	London	High Street	136a	20115	Brumble for Gimble	250	02-03-2023	Liz Bower	+44 1632 960107
10023	Acme	UK	EC	London	High Street	136a	20115	Brumble	250	02-03-2023	Liz Bower	+44 1632 960092
10109	Wiley Coyote	USA	72956	Van Buren	Co-Op Dr	717	20101	Widget for Gimble	125	02-04-2023	Frank Abbot	(479) 410-2086
10109	Wiley Coyote	USA	72956	Van Buren	Co-Op Dr	717	20101	Widget for Gimble	125	02-04-2023	Will Smith Jr	(479) 410-2087
10109	Wiley Coyote	USA	72956	Van Buren	Co-Op Dr	717	20101	Widget for Gimble	125	02-04-2023	Will Smith Jr	(479) 532-1099

Problem 2:

Assume a decomposition of $R(A, B, C, D, E)$ with FDs $AB \rightarrow C$, $CD \rightarrow E$, $BC \rightarrow E$ and $BCE \rightarrow A$ into $R(A, B, C)$, $R(B, C, D)$ and $R(B, D, E)$. Is this decomposition lossless? Use the Chase to order prove this or to find a counterexample.

Problem 3:

Assume a decomposition of $R(A, B, C, D, E)$ with FDs $B, C \rightarrow A$, $A, B, C \rightarrow E$, and $B, D \rightarrow E$ into $R(A, B, C)$, $R(B, C, D)$ and $R(B, D, E)$. Is this decomposition lossless? Use the Chase to order prove this or to find a counterexample.

Problem 4:

Show by example of a relation that the following implications are **wrong**:
1. $A \rightarrow B$ implies $B \rightarrow A$
2. $AB \rightarrow C$ and $A \rightarrow C$ imply $B \rightarrow C$