

**Rutgers Business School: Undergraduate — New Brunswick
Management Information Systems (33:136:370)
Instructor: J. Eckstein**

Extra Normalization Practice Problems for Final Exam

Lending Musical Instruments

Consider the following single-table database from an organization that lends musical instruments to schoolchildren. Only an illustrative subset of the rows are shown, spanning several school years. A blank value of *DateReturned* indicates that an instrument is still on loan.

Instrument Tag	YearMade	Inst Type Code	InstTypeName	ChildID	ChildName	Date Loaned	Date Returned
23482	2002	VLN	Violin	C873	Chavez, Marta	9/12/2014	6/12/2015
23419	1998	VLN	Violin	C329	Choudury, Ali	9/13/2014	6/12/2015
24239	2010	VLA	Viola	C843	Davis, Ramir	9/10/2014	6/10/2015
44001	1987	FLT	Flute	C877	Johnson, William	9/13/2014	6/15/2015
47291	1999	CLR	Clarinet	C901	Turner, Elena	9/13/2014	6/6/2015
67899	2005	ASX	Alto Saxophone	C321	Adderly, James	9/20/2014	6/18/2015
67230	2010	ASX	Alto Saxophone	C447	Mobley, Darren	9/20/2014	11/1/2014
69233	1992	TSX	Tenor Saxophone	C447	Mobley, Darren	11/2/2014	6/18/2015
55091	2001	TPT	Trumpet	C221	Morgan, Tajika	9/18/2014	6/17/2015
58902	2011	TBN	Trombone	C322	Hampton, John	9/18/2014	6/17/2015
58771	2012	TBN	Trombone	C987	Chen, Martha	9/18/2014	6/16/2015
23419	1998	VLN	Violin	C329	Choudury, Ali	9/8/2015	
24239	2010	VLA	Viola	C843	Davis, Ramir	9/8/2015	
23102	2004	VNL	Violin	C702	Rittenour, Madeline	9/8/2015	
25778	1988	CLO	Cello	C873	Chavez, Marta	9/8/2015	
44001	1987	FLT	Flute	C877	Johnson, William	9/10/2015	
47888	2006	CLR	Clarinet	C901	Turner, Elena	9/10/2015	
47291	1999	CLR	Clarinet	C171	Sharma, Rajika	9/12/2015	
67899	2005	ASX	Alto Saxophone	C321	Adderly, James	9/6/2015	
69233	1992	TSX	Tenor Saxophone	C447	Mobley, Darren	9/6/2015	
55091	2001	TPT	Trumpet	C221	Morgan, Tajika	9/8/2015	
58902	2011	TBN	Trombone	C987	Chen, Martha	9/8/2015	
58771	2012	TBN	Trombone	C322	Hampton, John	9/8/2015	

Redesign this database so that it is in third normal form, and write a database design outline. Do not introduce additional fields.

Shuttle Bus Features

The following single-table databaser contains information on the product offerings from a firm that supplies small, van-like buses to various markets. The company takes chassis produced by major vehicle manufacturers and builds them into various finished, more specialized products. The table contains information on the products offered, which chassis each product is based on, and which features each finished product has.

Model Number	Model Name	Seat Capacity	Chassis Code	Chassis Manuf	Chassis Model	Feature Code	Feature Name
SC102	Pupil Express	27	FRDA1	Ford	A-100	SCBL	School bus lights
SC102	Pupil Express	27	FRDA1	Ford	A-100	RDO	Radio
SC110	Pupil Express Plus	23	FRDA1	Ford	A-100	SCBL	School bus lights
SC110	Pupil Express Plus	23	FRDA1	Ford	A-100	RDO	Radio
SC110	Pupil Express Plus	23	FRDA1	Ford	A-100	WCLF	Wheelchair lift
SC110	Pupil Express Plus	23	FRDA1	Ford	A-100	WCTD	Wheelchair tie-down
RS100	Rental Express	20	FRDA1	Ford	A-100	RDO	Radio
RS100	Rental Express	20	FRDA1	Ford	A-100	ILRK	Internal luggage rack
RS50	Rental Sprint	14	DGSP	Dodge	Sprinter	RDO	Radio
RS50	Rental Sprint	14	DGSP	Dodge	Sprinter	ILRK	Internal luggage rack
MT55	Maxi Taxi X5	3	DGSP	Dodge	Sprinter	WCLF	Wheelchair lift
MT55	Maxi Taxi X5	3	DGSP	Dodge	Sprinter	WCTD	Wheelchair tie-down
MT60	Maxi Taxi C6	3	GMUV	GMC	Utilivan	WCLF	Wheelchair lift
MT60	Maxi Taxi C6	3	GMUV	GMC	Utilivan	WCTD	Wheelchair tie-down
MT60	Maxi Taxi C6	3	GMUV	GMC	Utilivan	RDO	Radio

Design a relational database to keep this same information in third normal form; draw an entity-relationship diagram and write a database design outline. Do not introduce additional fields.