Data Model for Bike Repair Case Study.

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The following is an image of the data model created from the normalised data of the bike repair shop case study. There is a breakdown and explanation provided for each table listing the columns, datatypes, primary and foreign keys and any mandatory columns. The relationships between each table is then explained.

Data Model:

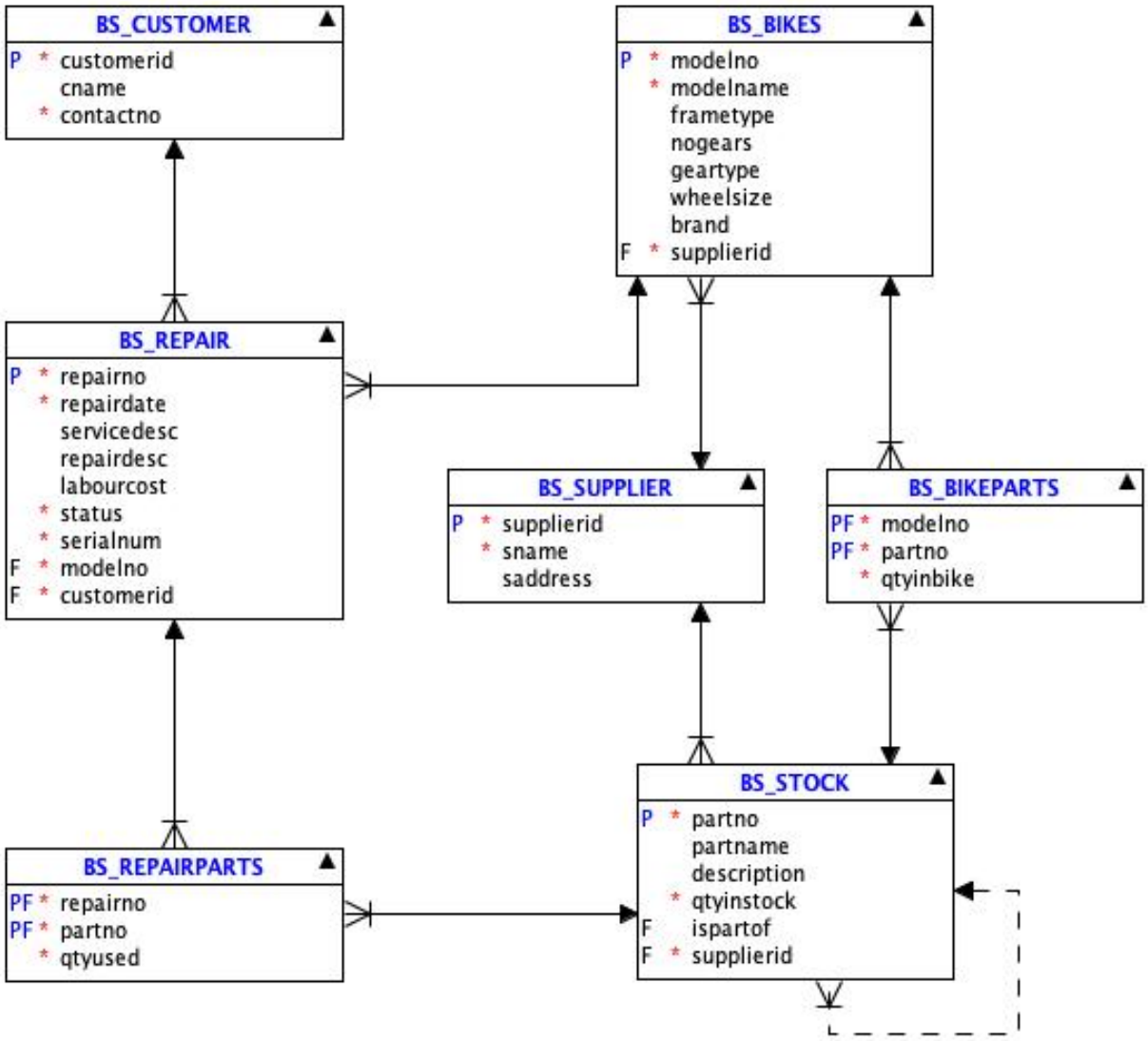

Table Explanations:

Table name: bs_customer

Summary: Contains information about each customer for the shop

Columns:

Column:	Content:	Data Type:
customerid	Unique numeric identifier for customer assigned when record created	number(10)
cname	Customer's full name	varchar2(26 byte)
contactno	Customer's contact number	number(10)

Primary Key:

Column:	Reason:
customerid	Primary unique numeric identifier for each customer

Mandatory/Not Null:

Column:	Reason:
contactno	Customer record must contain contact information for a customer

Table name: bs_supplier

Summary: Contains information about the suppliers that the bike shop uses to supply bikes and their parts

Columns:

Column:	Content:	Data Type:
supplierid	Unique numeric identifier for each supplier	number(3)
sname	Name of each supplier	varchar2(26 byte)
saddress	Address of each supplier	varchar2(26 byte)

Primary Key:

Column:	Reason:
supplierid	Primary unique numeric identifier for each supplier

Mandatory/Not Null:

Column:	Reason:
sname	Each supplier must have a name for more natural and practical usage

Table name: bs_repair

Summary: Contains detailed information about each repair the shop carries out

Columns:

Column:	Content:	Data Type:
repairno	Unique numeric identifier for each repair assigned when record created	number(10)
reapairdate	Date the customer brought the bike in for repair	date
servicedesc	Description of the problem customer is having with bike	varchar2(26 byte)
repairdesc	Description of repair carried out by shop	varchar2(26 byte)
labourcost	Cost of doing repair	number(5, 2)
status	Current stage repair is in	varchar2(1 byte)
serialnum	Serial number for bike being serviced	number(38)
modelno	Model number of bike being serviced	varchar2(26 byte)
customerid	Numeric identifier for customer that this repair belongs to	number(10)

Primary Key:

Column:	Reason:
repairno	Primary unique numeric identifier for each repair

Foreign keys:

Column:	Reason:	References:
modelno	Each repair needs to reference a valid bike model number	modelno in bs_bikes
customerid	Each repair needs to be linked to a customer	customerid in bs_customer

Mandatory/Not Null:

Column:	Reason:
repairdate	Each repair must have a date linked to it to know the priority of the repair
status	Every repair must contain a status to know if the bike has been repaired, is awaiting repair or is awaiting collection
serialnum	Each repair must contain the serial number of the bike to ensure the correct bike is being repaired
modelno	Each repair must contain the model number of the bike being serviced so any parts needed are correct for this model
customerid	Each repair must contain the customer identifier in order to ensure the correct bike is given to each customer

Table name: bs_stock

Summary: Contains information about the parts used in the bike shop, the quantity available and the parts for each bike model

Columns:

Column:	Content:	Data Type:
partno	Unique numeric identifier for each part	number(5)
partname	Name of each part	varchar2(26 byte)
description	Description of part to provide more detail	varchar2(26 byte)
qtyinstock	Amount of this part that the shop has in stock	number(5)
ispartof	Identifier of part this part is a part of	number(5)
supplierid	Numeric identifier for the supplier of this part	number(3)

Primary Key:

Column:	Reason:
partno	Primary unique numeric identifier for each part

Foreign keys:

Column:	Reason:	References:
supplierid	Each part must be linked to a supplier in order to be able to get the part	supplierid in bs_supplier
ispartof	Links to parent part of this part	partno in bs_stock

Mandatory/Not Null:

Column:	Reason:
qtyinstock	Quantity of part must be listed in order to properly maintain stock levels
supplierid	Each part must have a valid supplier

Table name: bs_repairparts

Summary: Contains information about the parts used in each repair.
This table is to facilitate the previous many:many relationship between bs_repair and bs_stock, as one repair can use many parts and one part can be used in many repairs

Columns:

Column:	Content:	Data Type:
repairno	Unique numeric identifier for each repair assigned when record created	number(10)
partno	Unique numeric identifier for part	number(5)
qtyused	Quantity of this part that is used in the repair	number(10)

Primary Key:

Column:	Reason:
repairno & partno combined	Combination of the two needed to provide a unique identification, as repair number can be listed multiple times, as can the part number

Foreign keys:

Column:	Reason:	References:
repairno	Needs to be linked to a valid repair	repairno in bs_repair
partno	Needs to be linked to a valid part in stock	partno in bs_stock

Mandatory/Not Null:

Column:	Reason:
qtyused	Quantity of part used must be listed in order to properly maintain stock levels and to calculate repair cost

Table name: bs_bikes

Summary: Contains information about each bike that the shop services

Columns:

Column:	Content:	Data Type:
modelno	Unique identifier for each bike model	varchar2(26 byte)
modelname	Name of each bike	varchar2(26 byte)
frametype	Type of frame in this bike	varchar2(26 byte)
nogears	Number of gears in this bike	varchar2(26 byte)
geartype	Type of gears in this bike	varchar2(26 byte)
wheel size	Size of the wheels in this bike	varchar2(26 byte)
brand	Brand of each bike	varchar2(26 byte)
supplierid	Numeric identifier for the supplier of this bike	number(3)

Primary Key:

Column:	Reason:
modelno	Primary unique identifier each model

Foreign keys:

Column:	Reason:	References:
supplierid	Each bike must be linked to a supplier in order to be able to get the bike and the parts within it	supplierid in bs_supplier

Mandatory/Not Null:

Column:	Reason:
modelname	Each bike must have a name for more natural and practical usage
supplierid	Each bike must have a valid supplier

Table name: bs_bikeparts

Summary: Contains information about the parts used in each bike.
This table is to facilitate the previous many:many relationship between bs_bikes and bs_stock, as one bike can use many parts and one part can be used in many bikes

Columns:

Column:	Content:	Data Type:
modelno	Unique identifier for each bike model	varchar2(26 byte)
partno	Unique numeric identifier for part	number(5)
qtyinbike	Quantity of this part that is used in this bike	number(5)

Primary Key:

Column:	Reason:
modelno & partno combined	Combination of the two needed to provide a unique identification, as model number can be listed multiple times, as can the part number

Foreign keys:

Column:	Reason:	References:
modelno	Needs to be linked to a valid bike model	modelno in bs_bikes
partno	Needs to be linked to a valid part in stock	partno in bs_stock

Mandatory/Not Null:

Column:	Reason:
qtyinbike	Quantity of part in bike must be listed in order to properly assess repairs and ensure correct orders are placed for replacements

Relationship Explanation:

Table One	Table Two	Relationship
bs_customer	bs_repair	1 : many

Explanation:

A one to many relationship exists here as a customer can come into the shop multiple times with different repairs, however each repair that the shop receives can only be linked to a single customer.

Table One	Table Two	Relationship
bs_repair	bs_repairparts	1 : many
bs_stock	bs_repairparts	1 : many

Explanation:

These two one to many relationships exist so as to facilitate the previous many to many relationship between repair and stock, as a single repair can use multiple different parts and a single part can be used in multiple different repairs. Therefore the combination of a repair number and part number can only exist once in the repair parts table to maintain integrity, whilst individually a repair number or part number can exist multiple times.

Table One	Table Two	Relationship
bs_bikes	bs_repairs	1 : many

Explanation:

A one to many relationship exists here as a bike model can be brought into the the shop multiple times with different repairs or by different customers, however each repair that the shop receives can only contain a single bike model.

Table One	Table Two	Relationship
bs_supplier	bs_bikes	1 : many

Explanation:

A one to many relationship exists here as a supplier can supply multiple different models of bike, however each bike can only be supplied by a single supplier.

Table One	Table Two	Relationship
bs_supplier	bs_stock	1 : many

Explanation:

A one to many relationship exists here as a supplier can supply multiple different parts , however each part can only be supplied by a single supplier.

Table One	Table Two	Relationship
bs_bikes	bs_bikeparts	1 : many
bs_stock	bs_bikeparts	1 : many

Explanation:

These two one to many relationships exist so as to facilitate the previous many to many relationship between bikes and stock, as a single bike can use multiple different parts and a single part can be used in multiple different bikes. Therefore the combination of a model number and part number can only exist once in the bike parts table to maintain integrity, whilst individually a model number or part number can exist multiple times.

Table One	Table Two	Relationship
bs_stock	bs_stock	1 : 0..1

Explanation:

A one to zero to one relationship exists here as a part can possibly be linked to another part as being listed as part of that parent part. However a part does not have to be linked to a parent part.