

IS 475/675 Database Design and Implementation Project Part 2

What is the purpose of this part of the project?

The objectives of this part of the project are to (1) design a prototype database based on the available dataset provided; (2) populate your prototype with sample data; and (3) write queries to check the validity of your design. This part of the project requires you to:

- Design a prototype physical data model that will generate the result tables listed in this document. This prototype is for the Quality Control group within the Replica Toys organization. The goal of the prototype database is to see whether the design would create a database that would support the questions requested by the Quality Control group. This prototype database will not support the Marketing Department.
- Create a prototype physical data model using the SQL Server database management system. You do not have to include each of the attributes that were on your logical model on your prototype physical data model, but you do have to include all the attributes that are in the sample data provided in the Excel workbook “ReplicaToysData.xlsx”. ReplicaToysData is available on WebCampus where you found this assignment. It is also available on k:\IS475\LabFiles\ReplicaToysData.xlsx.
- Import the data provided in the Excel workbook entitled “ReplicaToysData.xlsx”. There are three worksheets in the workbook – one that includes all tests and problem reports data (AllProblems), one that includes all the models that should be in your prototype database (ModelData), and the other than includes all People data (PersonData). Put the data in the tables in your database so that the data is not redundant.

Create each of the tables in your prototype with the SQL CREATE TABLE statement. For the test/problem report data, I recommend that you use the SQL Server Import/Export utility to import the data into an “alldata” table. Then use the INSERT INTO/SELECT FROM statement to parse the data from the single table and input it into each of the tables in your database. SQL Lab Exercise Bulk Load of Data in Week 15 teaches you how to do this task. This is an extract/transform/load process performed with SQL. The relevant pages of that lab for this task are pgs. 1-13.

- Write SQL queries to generate the requested result tables.

What are the deliverables?

1. An ERD for the prototype database. This deliverable is an ERD of the database that you implemented for the prototype. Since the prototype should include only those tables necessary to store the data in the Excel workbook and produce the required queries, this ERD will most likely not be a close replica of the logical data model that you submitted for part 1 of the project. Do NOT create all the tables in the logical model (part 1 of the project) for the prototype database. The prototype ERD should include only those entities necessary to store the data in ReplicaToysData.xlsx.

2. A prototype database. Create the tables necessary to store the data in the Excel workbook with minimal data redundancy. Make sure you create appropriate data types for all fields in all tables. Create appropriate constraints. Hint: There are **xx** different problem reports and **xx** different tests in the sample data set provided in the Excel workbook. There are **40** different people. “People” with different roles (i.e. employee, customer, distributor) do not have to be stored in separate entities in your database. I recommend that you create a “person” table and store all referenced people in the database.

Here are a few things to know about the data:

* Each problem report in this database is affiliated with a toy. Replica Toys uses a “fake” serial number (like 1900000-00) to represent a sample toy used for testing and quality control purposes.

* Some of the descriptions are long text fields. For example, the TestResults should be 300 characters in length. Look at the size of the text fields in Excel before creating the fields in SQL Server.

* A person in the Person worksheet has a PersonType. E=Employee, C=Customer and D=Distributor, O=Other.

* A personID uniquely identifies a person. That personID is referred to as OwnerID when associated with a toy, as ReporterID when associated with a ProblemReport, and as TesterID when associated with a Test.

* None of the primary keys should be surrogate primary keys in the tables that you create. All the primary key data is provided for you in the Excel workbook.

Document this deliverable as follows:

CREATE TABLE statements. Turn in all SQL statements used to create tables.

3. SQL Queries. Turn in the code and the output for the queries using the same format as used on the SQL homework assignments (HW#6, 7, 8). Please place the code before the output generated in the printed output for each requested query. Do not copy the result tables from this document. Copy the result tables produced by your SQL code. Even if your result table is empty – copy it. Even if your result table is actually an error message – copy it.

Provide documentation/comments for all views and CTEs so that I understand the purpose of the views and/or CTEs in your code. Be sure to include the code for all views used for the queries! I will not have time to chase down the views and ask you to submit them!!

4. .Txt or .sql version of the SQL Queries. Upload a file (only one file, not separate files for each query!) with just the SQL code for your queries and no output. The file can be a .txt or .sql file - just make sure that they are not “pictures” of your SQL code. Do not turn in a .pdf file for this deliverable. I may want to test your queries with your database, so I need a copy of the SQL code for the queries that is run-able when copied to SQL Server.

5. The name of the database where your test tables reside. I need to know the name of the database that you used to store your tables so I can look at your database and run your queries online.

What are the required SQL queries?

1. `SELECT * FROM each_tbl`. Turn in the contents of all tables in the prototype database that you create and populate from the Excel workbook. For the test and person tables, turn in a snip of the last 15 rows in your tables. Make sure that you do a `SELECT *` from each table that is on your ERD of the prototype database. Also make sure that somewhere in the snip of the result table you include the total number of rows in the result table. I am including a sample result table only from the Person table containing only the last 15 rows of the table.

Be sure to do a `SELECT *` from each of your final tables on your ERD related to this application. You do not have to do a `SELECT *` from a temporary table (i.e. an “alldata” table) used to load the data.

	PersonID	LastName	FirstName	PhoneNumber	PersonType
26	26	Ventura	Holger	(774) 898-9193	C
27	27	Grahn	Anfisa	(960) 622-7174	C
28	28	Sarka	Bambang	(410) 501-9449	C
29	29	Medved	Hale	(312) 460-9967	C
30	30	Campbell	Alda	(991) 667-8767	D
31	31	Lupo	Henning	(760) 515-6427	E
32	32	Admiraal	Finees	(217) 627-3683	E
33	33	Koenigsmann	Vjera	(704) 935-8988	E
34	34	Comtois	Jeetendra	(828) 863-0901	E
35	35	Holub	Ruslana	(359) 269-4430	C
36	36	Watkins	Jannis	(487) 707-3414	C
37	37	Dunai	Marcus	(643) 719-1131	C
38	38	Mann	Thea	(205) 524-1965	C
39	39	Gladwyn	Sieghild	(405) 247-9199	O
40	40	Wolter	Anna	(436) 138-1973	C

Query executed successfully. | issql\students (13.0 SP2) | UNR\dte (62) | test01 | 00:00:00 | 40 rows

2. Create a result table that contains all the ProblemReports in the database. Include the columns shown below. The result table is sorted by ReportID. I am providing the complete result table to help facilitate your testing but you should snip only the last 10 rows of your table to include on your deliverable.

	ReportID	ReportDate	CompleteDate	ProblemDescription	ReporterLastName	ModelNumber	ModelName	PricePaid
1	1	2022-11-02 00:00:00.000	2022-11-10 00:00:00.000	Wheel detached from toy while in operation.	Arrigucci	JSSLUX	Jaguar Sedan Luxury	1655.99
2	2	2022-11-11 00:00:00.000	2022-11-16 00:00:00.000	Toy does not accept a charge.	Medved	LAMHUR	Lamborghini Huracan	2344.95
3	3	2022-11-16 00:00:00.000	2022-11-22 00:00:00.000	Battery life is significantly shorter than expected.	Comtois	LXSED5	Lexus Sedan Large	1630.99
4	4	2022-11-20 00:00:00.000	2022-11-29 00:00:00.000	While travelling down a hill, toy suffered brake fail...	Samuel	LXSED1	Lexus Sedan hybrid design	890.00
5	5	2022-11-26 00:00:00.000	NULL	Steering wheel detached in operation.	Stasiuk	MASGHI	Maserati Ghibli	1699.00
6	6	2022-11-30 00:00:00.000	NULL	Battery caught fire during use	Hearn	LXSED1	Lexus Sedan hybrid design	890.00
7	7	2022-12-10 00:00:00.000	2022-12-10 00:00:00.000	Actual car delivered in error.	Arterberry	LXSED5	Lexus Sedan Large	1587.50
8	8	2022-12-18 00:00:00.000	NULL	Submersible mode does not properly engage.	Ventura	MASGHI	Maserati Ghibli	1799.00
9	9	2022-11-02 00:00:00.000	2022-11-12 00:00:00.000	Toy accelerates from rest and brakes suddenly.	Lestrangle	BMWSC9	BMW Sports Car Large	969.99
10	10	2022-11-02 00:00:00.000	NULL	Parental remote does not control toy.	Medved	JSSLUX	Jaguar Sedan Luxury	1655.99
11	11	2022-11-05 00:00:00.000	NULL	Frame on toy damaged during use.	Ventura	LAMHUR	Lamborghini Huracan	2320.50
12	12	2022-11-12 00:00:00.000	NULL	On-board electronics include switch that interfere...	Dunai	JSSLUX	Jaguar Sedan Luxury	1655.99
13	13	2022-10-21 00:00:00.000	2022-10-23 00:00:00.000	Box contained packing material and a rock, no toy.	Dickman	MASSUV	Maserati Levante	2159.30
14	14	2022-10-02 00:00:00.000	NULL	While driving around corners, the Truck tips over ...	Starrett	CHVSUV	Chevy Truck SUV	895.99
15	15	2022-10-10 00:00:00.000	2022-10-10 00:00:00.000	Paint on hood was scratched on delivery.	Ferreira	LXSED5	Lexus Sedan Large	1630.99
16	16	2022-10-24 00:00:00.000	2022-10-24 00:00:00.000	Paint color did not match specified color on box.	Lupo	LXSED3	Lexus Sedan Medium	1255.99
17	17	2022-10-03 00:00:00.000	NULL	Toy suddenly stopped while travelling at speed a...	Lange	BMWSC9	BMW Sports Car Large	969.99
18	18	2022-10-11 00:00:00.000	2022-10-11 00:00:00.000	Side mirrors appeared to be from a different model.	Ferreira	BMWSC9	BMW Sports Car Large	969.99
19	19	2022-10-18 00:00:00.000	2022-11-03 00:00:00.000	Seat was damaged on delivery.	Kappel	LXSED5	Lexus Sedan Large	1630.99
20	20	2022-10-23 00:00:00.000	2022-11-02 00:00:00.000	Battery life is significantly shorter than expected.	Arterberry	LXSED3	Lexus Sedan Medium	1255.99
21	21	2021-10-25 00:00:00.000	2022-01-15 00:00:00.000	Toy starts without input from the operator	Ventura	JSSLUX	Jaguar Sedan Luxury	1645.99
22	22	2021-10-15 00:00:00.000	2022-02-12 00:00:00.000	Steering pulls to the left	Koenigsmann	LXSED3	Lexus Sedan Medium	1255.99
23	23	2022-11-18 00:00:00.000	NULL	Side mirror fell off during operation	Nagi	CHVSUV	Chevy Truck SUV	875.99
24	24	2022-11-12 00:00:00.000	NULL	When traveling uphill, the toy stopped accelerating	Andres	JSSLUX	Jaguar Sedan Luxury	1655.00
25	25	2022-09-23 00:00:00.000	NULL	The seat detached from the post during operatio...	Koenigsmann	LXSED3	Lexus Sedan Medium	1255.99
26	26	2021-10-12 00:00:00.000	2021-12-15 00:00:00.000	Toy started without rider	Stasiuk	MASGHI	Maserati Ghibli	1699.00
27	27	2022-09-15 00:00:00.000	2022-10-15 00:00:00.000	Side mirror fell off while toy was in garage	Koenigsmann	LXSED3	Lexus Sedan Medium	1255.99
28	28	2022-09-22 00:00:00.000	NULL	Toy does not charge from the electrical outlet	Koenigsmann	MASGHI	Maserati Ghibli	1799.99
29	29	2022-11-11 00:00:00.000	NULL	Toy was not painted correctly causing rough secti...	Koenigsmann	LXSED3	Lexus Sedan Medium	1255.99
30	30	2022-09-14 00:00:00.000	2022-09-25 00:00:00.000	Seat ripped within two days of use	Arterberry	LXSED5	Lexus Sedan Large	1587.50
31	31	2022-11-26 00:00:00.000	NULL	Toy starts very slowly unless starting downhill	Dunai	LXSED5	Lexus Sedan Large	111.11
32	32	2022-10-04 00:00:00.000	2022-10-24 00:00:00.000	New paint shows early signs of wear	Cavey	MASGHI	Maserati Ghibli	111.11
33	33	2022-11-10 00:00:00.000	NULL	Battery life is short when driving on uneven terrai...	Donnelly	LXSED5	Lexus Sedan Large	111.11
34	34	2022-10-15 00:00:00.000	2022-11-15 00:00:00.000	Toy won't start in very wet conditions	Starrett	LINSUV	Lincoln Navigator	2399.99
35	35	2022-11-15 00:00:00.000	2022-11-18 00:00:00.000	Toy didn't stop immediately during braking	Ibbott	LINAV1	Lincoln Aviator	248.99

Query executed successfully.

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3. Quality Control wants to be sure that tests are run on every ProblemReport where there is an injury reported. The purpose of this query is to find out whether there are any ProblemReports that have a reported injury (InjuryYN = 'yes') that are closed (complete date is not null) and that had no tests conducted for it (the reportID is not in the Test table). Here is the result table:

	ReportID	SerialNumber	ReportDate	CompleteDate	InjuryYN	InjuryDescription	ProblemDescription
1	35	2126673-01	2022-11-15 00:00:00.000	2022-11-18 00:00:00.000	Yes	Operator slid off toy during slow braking and scraped ankle	Toy didn't stop immediately during braking

4. Enhance the results of the query for question #3 to include the name of the Person who reported the problem and the Model Name of the model toy. Here is the result table:

	ReportID	SerialNumber	ReportDate	CompleteDate	ReporterLastName	ModelName	InjuryYN	InjuryDescription	ProblemDescription
1	35	2126673-01	2022-11-15 00:00:00.000	2022-11-18 00:00:00.000	Ibbott	Lincoln Aviator	Yes	Operator slid off toy during slow braking...	Toy didn't stop immediately during braking

5. Summarize the ProblemReports by ProblemTypeID. Be sure to include all the ProblemTypes possible in the ProblemType table, even if there are no problem reports for a given problemtypeid. Count the reports in the ProblemReport table by ProblemTypeID.

Count the injury reports in the ProblemReport table by ProblemTypeID. A ProblemReport with an injury is denoted by the value of "yes" in the InjuryYN column. I recommend using a view, CTE or a correlated subquery in the select list to create the column CountOfInjuryReports from the ProblemReport table. I used a CTE to count the injury reports in the ProblemReport table by ProblemTypeID. Here is the result table:

	ProblemTypeID	TypeDescription	CountOfReports	CountOfInjuryReports
1	1	Inadequate Finish - toy does not look good	6	0
2	2	Inadequate Operation - toy does not operate correctly	11	3
3	3	Poor Operation - toy tips over during use	1	0
4	4	Inadequate Operation Quality - toy broke during use	6	0
5	5	Poor Operation Quality - toy hurt user	3	3
6	6	Inadadequite Quality - toy finish is inconsistent	7	1
7	7	Inadequate Operation - toy does not accelerate correctly	1	0
8	8	Inadequate Operation - toy does not brake correctly	0	0
9	9	Other	0	0

6. Which problem reports were reported for a toy that has a model description that has the acronym 'SUV' anywhere within the description of the model? Include the data as shown in the columns below. Notice that the result table includes all tests that were run for a particular problem report. For example, reportID 14 had one test performed so there is one row in the result table for that report, while reportID 13 had three tests performed so it has three rows in the result table. ReportID 34 had no tests performed, but it is still included in the result table. This query does not require aggregate functions or the GROUP BY statement.

The DaysInSystem is the difference in date between the ReportDate and the CompleteDate. If the problem report is not complete (the CompleteDate is NULL), then DaysInSystem is the difference between the ReportDate and the current date. I recommend using the DATEDIFF function to calculate the difference between dates. I ran this query on December 2, 2022, so the DaysInSystem you calculate will be a little different than the ones shown for those problem reports that are not yet complete (have a null value for the CompleteDate). Sort the result table by ReportDate. The full result table is provided below:

	ReportDateOutput	ReportID	Serial#	OwnerName	CompleteDate	DaysInSystem	Model#	ModelDescription	TesterName	TestDate	TestDescription	TestComplete
1	Oct 02, 2022	14	1902386-01	Wolter, A.	Not Complete	61	CHVSUV	High Clearance Chevy Truck SUV 4 door Ext...	Patton, E.	Oct 02, 2022	Attempted to re-create by attemp...	Y
2	Oct 15, 2022	34	1908732-01	Starrett, C.	Nov 15, 2022	31	LINSUV	Lincoln Navigator presidential protection SUV	NULL	NULL	NULL	NULL
3	Oct 21, 2022	13	1902396-01	Medved, H.	Oct 23, 2022	2	MASSUV	Maserati Levante SUV low clearance sports	Cavey, K.	Oct 21, 2022	Contacted shipping regarding err...	Y
4	Oct 21, 2022	13	1902396-01	Medved, H.	Oct 23, 2022	2	MASSUV	Maserati Levante SUV low clearance sports	Cavey, K.	Oct 21, 2022	Contacted production regarding ...	Y
5	Oct 21, 2022	13	1902396-01	Medved, H.	Oct 23, 2022	2	MASSUV	Maserati Levante SUV low clearance sports	Cavey, K.	Oct 21, 2022	Contacted inventory regarding er...	Y
6	Nov 15, 2022	35	2126673-01	Ibbott, N.	Nov 18, 2022	3	LINAV1	Lincoln Aviator medium clearance SUV	NULL	NULL	NULL	NULL
7	Nov 18, 2022	23	1932000-01	Nagi, C.	Not Complete	14	CHVSUV	High Clearance Chevy Truck SUV 4 door Ext...	NULL	NULL	NULL	NULL

7. Count the problem reports by model number. Here is the result table:

	ModelNumber	CountOfProblemReports
1	BMWSC9	3
2	CHVSUV	2
3	JSSLUX	5
4	LAMHUR	2
5	LINAV1	1
6	LINSUV	1
7	LXSED1	2
8	LXSED3	6
9	LXSED5	7
10	MASGHI	5
11	MASSUV	1

8. Based on the answer for question #7, which model number has the most problem reports? Do not use the SELECT TOP 1 option to determine the answer. Add in the ModelName and the ModelDescription to the SELECT list that was used for question #7. Here is the result table:

	ModelNumber	ModelName	ModelDescription	CountOfProblemReports
1	LXSED5	Lexus Sedan Large	Lexus Sedan 4 door medium clearance leather seats convertible top	7

9. Summarize the problem reports issued for each model of vehicle in the database. Count the total number of problem reports and tests by model. Count the total number of injury reports for each model. Determine the earliest date that a problem was reported and the most recent date that a problem was reported for a given model. Count the tests for each model. Determine the earliest date that a test was done and the most recent date that a test was done for a given model. Include all models in the database, whether or not there is a problem report outstanding for that model. Sort the result table by ModelNumber. Result table:

	ModelNumber	ModelDescription	CountOfReports	CountofInjuryReports	MostRecentReportDate	EarliestReportDate	CountOfTests	MostRecentTestDate	EarliestTestDate
1	ARSTEL	Alpha Romeo Stelvio SUV low clearance sports	0	0	n/a	n/a	0	n/a	n/a
2	BMWSC3	BMW Small sports car 2 door petite seats	0	0	n/a	n/a	0	n/a	n/a
3	BMWSC8	BMW Medium sports car 2 door large seats	0	0	n/a	n/a	0	n/a	n/a
4	BMWSC9	BMW Large sports car 4 doors very low clearance	3	1	Nov 02, 2022	Oct 03, 2022	8	Nov 15, 2022	Oct 08, 2022
5	CHVSUV	High Clearance Chevy Truck SUV 4 door Extended ...	2	0	Nov 18, 2022	Oct 02, 2022	1	Oct 02, 2022	Oct 02, 2022
6	FRDTRK	Ford High Clearance Truck 2 door Fog Lights	0	0	n/a	n/a	0	n/a	n/a
7	JCSUV7	Low clearance crossover SUV combination sports ca...	0	0	n/a	n/a	0	n/a	n/a
8	JSSLUX	Jaguar Sedan 2 door medium clearance leather seat...	5	2	Nov 12, 2022	Oct 25, 2021	16	Nov 22, 2022	Oct 26, 2021
9	LAMHUR	Lamborghini Huracan sports car very low clearance	2	0	Nov 11, 2022	Nov 05, 2022	6	Nov 16, 2022	Nov 14, 2022
10	LINAV1	Lincoln Aviator medium clearance SUV	1	1	Nov 15, 2022	Nov 15, 2022	0	n/a	n/a
11	LINSUV	Lincoln Navigator presidential protection SUV	1	0	Oct 15, 2022	Oct 15, 2022	0	n/a	n/a
12	LXSED1	Lexus Sedan 2 door low clearance based on hybrid s...	2	2	Nov 30, 2022	Nov 20, 2022	9	Dec 03, 2022	Nov 21, 2022
13	LXSED3	Lexus Sedan 2 door medium clearance leather seats	6	1	Nov 11, 2022	Oct 15, 2021	3	Oct 15, 2022	Feb 10, 2022
14	LXSED5	Lexus Sedan 4 door medium clearance leather seats...	7	0	Dec 10, 2022	Sep 14, 2022	3	Dec 10, 2022	Nov 21, 2022
15	MASGHI	Maserati Ghibli Luxury Sedan Leather Seats	5	0	Dec 18, 2022	Oct 12, 2021	9	Dec 20, 2022	Oct 21, 2021
16	MASGRT	Maserati Gran Turismo Luxury Sedan Leather Seats	0	0	n/a	n/a	0	n/a	n/a
17	MASSUV	Maserati Levante SUV low clearance sports	1	0	Oct 21, 2022	Oct 21, 2022	3	Oct 21, 2022	Oct 21, 2022
18	PORSUV	Porsche Cayenne low clearance style SUV	0	0	n/a	n/a	0	n/a	n/a
19	RRVSUV	Range Rover medium clearance land rover style SUV	0	0	n/a	n/a	0	n/a	n/a