

Memo: # 0 (Bike and Electric Auto Rental)**DBDS** DataBase Design Specialists, Inc.

"We are always 5NF."

To: _____
From: Design Team Leader
Subject: New project, communications, and deliverables
Date: October 11, 2021

New Project:

We have just won the contract to design and implement a prototype database for a company that has a bicycle and electric automobile rental business – the **Bike and Electric Auto Rental (BEAR)** project. You have been selected as the DA (Data Architect) for this project. The motivation for this project is to keep a record of what is going on within the rental business.

You will be receiving a series of memos to detail the project as information becomes available. Since we are off-site, much of the information will be gathered through electronic mail communication with the principals in the project.

There are many sites that rent these vehicles. Three sites are to be part of the test data: Downtown site (DS), Airport Site (AS) and Suburban Site (SS).

Communications:

The BEAR contact person is Bob Bureaucrat. He has just joined the BEAR project as project director. He has selected Sam Supervisor, the Suburban Site manager, as an additional contact person. Remember, these folks are our customers and know the details of the project; however, they are not database experts so do not ask them technical (DBMS) questions. We have covered this ideas in our training project.

You may communicate with Bob Bureaucrat and Sam Supervisor using electronic mail (**actually Canvas messages**). Send your messages destined for Bob or Sam to me (with their name added as a prefix to the subject line) and I will forward the mail to them and their responses back to you. They have asked that you limit each piece of mail to **one question** of 10 lines or less. They have also asked that you limit your questions to 1 or 2 per week, as they are both working on other projects. Also, Bob Bureaucrat is out of the office much of the time. If he is not in the office, questions will be returned. He will try to let us know in advance when he will be available.

I would suggest that you number your questions or use descriptive subject headings on the mail messages so you can correlate the answer with the question. I am sure they will use the REPLY function to answer your questions.

As an aid to the customer, I have supplied some predefined answer files and have installed them on their computers. Some of the responses are:

The question is not relevant to the BEAR effort.
The question is too complex, please revise it.
I do not understand the question. I am confused by ...
Bob Bureaucrat is out of the office. Please resubmit later.

Deliverables:

We are going to use the methodology described in our design meetings. You are to supply the usual deliverables at the end of the project, i.e.,

- List of (charts of) functional dependencies
- A relational database design (5NF) - a Logical Data Model (LDM), and a corresponding Physical Data Model (PDM)
- A prototype of the relational database design (RDD) generated by ERWin using SQL Server 2019
- Results, from the prototype database, for typical queries (questions) using the customer supplied data

Your technical report should coordinate the problem statement and the items listed above. Please prepare your reports in machine-readable form (as a Word docx file). I will use portions of your work in my final report to the customer. In addition, please keep an organized record of your development efforts. Periodically I will have to ask you for the current status so that I can present interim reports to the customer.

Completion Date:

The project completion date will be announced later. The first deliverable will be requested in a few days.



Memo: # 1 (Bike and Electric Auto Rental)**DBDS** DataBase Design Specialists, Inc.

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To:**From:** Design Team Leader**Subject:** Enterprise overview**Date:** October 11, 2021

The basis of the BEAR project is the rental process for bicycles and electric automobiles. The goal is to keep track of the vehicles (bikes and autos) that renters rent from various sites. For the initial design the renter is required to return the vehicle to the site from which it was rented.

Interviews were conducted with BEAR personnel, including Bob Bureaucrat, and Sam Supervisor (Suburban Site manager) and other site managers. Excerpts from those interviews are listed below:

Question - How do you identify a specific vehicle?

Sam Supervisor - We give each vehicle a number, we call it VNumber, to help us keep track of that specific vehicle.

Question - How many sites are used in the research studies?

Bob Bureaucrat - There are 3. But we currently have a proposal under consideration to expand the scope of the project.

Question - What vehicles are available at the Suburban Site?

Sam Supervisor - Right now we rent both bikes and electric cars.

Question - What kinds of vehicles are at the Downtown Site?

Bob Bureaucrat - Bikes

Mary Manager - Yes, right now we have only bicycles, but we are looking for parking for cars.

Question - What kinds of vehicles are at the Airport Site?

Fred Foreman - We have only electric cars. It is not safe to ride bikes around the airport.

Question - What does the sample data look like?

Sam Supervisor - I do know that the rental rate structure at our site is very different for bikes (hourly rate with a maximum charge) and cars (a base rate plus a charge for every minute you have the car).

Bob Bureaucrat - I don't know the details, but I can have the staff look it up for you if you'd like.

... time passes ...

Bob Bureaucrat - The back of this page has example data to be used for this project.

#	RenterID	DOB	VNumber	License	StartTime	EndTime	PurchaseDate	Status	#Rents	SiteID	Address	Type	Size	Type	HourRate	MaxCharge
1	1	1995-01-02	B0001	IN24340020	2020-12-10 10:30	2020-12-10 12:30	Aug 2020	R	3	SS	233 Main St.	B	26	R	8.00	56.00
2	1	1995-01-02	B0011	IN24340020	2020-12-16 09:30	2020-12-16 12:30	Oct 2020	A	2	DS	233 Main St.	B	26	R	8.00	56.00
3	3	2000-10-04	B0001	IN67800000	2020-12-11 10:00	2020-12-11 16:00	Aug 2020	R	3	SS	444 W State.	B	26	R	8.00	56.00
4	4	1997-06-06	B0001	KY44230100	2020-12-16 10:30	2020-12-16 18:30	Aug 2020	R	3	SS	PO Box 2388.	B	26	R	8.00	56.00
5	8	1995-04-12	B0003	IN24500001	2020-12-16 09:30	2020-12-16 12:30	Aug 2020	A	1	SS	42 Blvd P1	B	24	R	6.00	43.00
6	8	1995-04-12	T0002	IN24500001	2020-12-19 10:30	2020-12-19 12:30	Aug 2020	A	4	SS	42 Blvd P1	B	26	T	10.00	70.00
7	9	1997-06-06	B0011	TX99923411	2020-12-10 10:30	2020-12-10 12:30	Oct 2020	A	2	DS	888 Tudor Dr	B	26	R	8.00	56.00

#	RenterID	DOB	VNumber	License	StartTime	EndTime	PurchaseDate	Status	#Rents	SiteID	Address	Type	VIN	Miles	BaseRate	MinuteRate
8	1	1995-01-02	E0012	IN24340020	2020-11-26 09:30	2020-11-26 18:30	Sep 2020	R	3	AS	233 Main St.	E	EV10000234	2505	9.00	0.40
9	2	1990-11-03	E0012	IN24388033	2020-11-27 10:30	2020-11-27 18:30	Sep 2020	R	3	AS	123 1st St.	E	EV10000234	2505	9.00	0.40
10	2	1990-11-03	E0014	IN24388033	2020-11-26 10:30	2020-11-26 14:30	Sep 2020	R	3	AS	123 1st St.	E	EV10000235	3505	9.00	0.40
11	4	1997-06-06	E0444	KY44230100	2020-11-29 09:30	2020-11-30 09:30	Nov 2020	A	3	SS	PO Box 2388.	E	EV10000500	1200	10.00	0.40
12	8	1995-04-12	E0012	IN24500001	2020-10-14 09:30	2020-10-15 13:30	Sep 2020	R	3	AS	42 Blvd P1	E	EV10000234	2505	9.00	0.40
13	8	1995-04-12	E0523	IN24500001	2020-12-26 09:30	2021-01-02 18:30	Dec 2020	A	0	SS	42 Blvd P1	E	EV10000600	500	11.00	0.50
14	9	1997-06-06	E0524	TX99923411	2020-12-29 06:00	2020-12-31 13:00	Dec 2020	M	0	SS	888 Tudor Dr	E	EV10000601	10	11.00	0.50

(The # column is **not part of the data**, only for reference)

Question - What do these abbreviations mean?

Bob Bureaucrat - Here are the code tables we use

Status	Type	Type
R – Rented	B – Bicycle	R – Road
A – Available	E – Electric Vehicle	T – Tandem
M – Maintenance		

SiteID	Name	Location
AS	Airport Site	44 Airport Dr.
DS	Downtown Site	423 Main St.
SS	Suburban Site	22 Center Circle

RenterID	Name
1	Anne Green
2	John Dough
3	Bill Smith
4	Gail White
8	Evan Black
9	Bill Brown

DOB – Date Of Birth of the renter

Question - Why are there two "Types"?

Bob Bureaucrat - One is the type of vehicle, the other the type of bike

Question - What are "Miles"?

Bob Bureaucrat - About once a month we update the miles based on current odometer reading.

Question - How are the charges for the bike and electric vehicle determined?

Bob Bureaucrat - We are reviewing the charge formulas. For now, just use the given data values.