

Group Assignment 1 – E-R Diagram – Final Draft

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LIBR 242, Group 5

Russell Cortez

Adam Garfinkel

Melissa Lafranchise

Weston Rowan

Jennifer Vasquez

Analysis of The Automata, Inc.

Goals

- The company's goal is to profitably and efficiently sell and produce vehicles on time and per customer order.
- Department goals:
 - o Customer Service's goals are to efficiently and correctly take orders, hand off orders to the correct sub-department within Construction, track payment information, store production records, and deliver completed vehicles to customers.
 - o Construction and its sub-departments' goals are to efficiently and correctly schedule production, order appropriate parts, monitor the stages of production to stay on schedule, deliver completed vehicles and their production records to Customer Service.
 - o Purchasing's goals are to maintain the appropriate inventory of commonly used parts, order new parts as necessary to fulfill orders, maintain both affordable and trustworthy suppliers for various parts, and deliver these parts to Construction quickly and correctly.

Problems and Constraints

- Need to determine if there are data access restrictions for any of the three departments.

Business Rules

- A new customer can be set up in the database prior to the submission of his/her first order.
- All technicians within a construction sub-department are cross-trained on all production stages for the particular vehicle produced by that sub-department. Hence, any technician can work in any production stage for a specific vehicle type.
- There are four production stages for each vehicle assembly line. They are the same four stages for each vehicle type.
- Each construction sub-department will limit its hiring to a maximum of 10 technicians.
- Part types are general categories like tires, engines, and axels.
- The minimum number of parts required to build any vehicle is 100. There is no limit on the maximum number of parts, and it is dependent on customer preferences/selections.

Scope

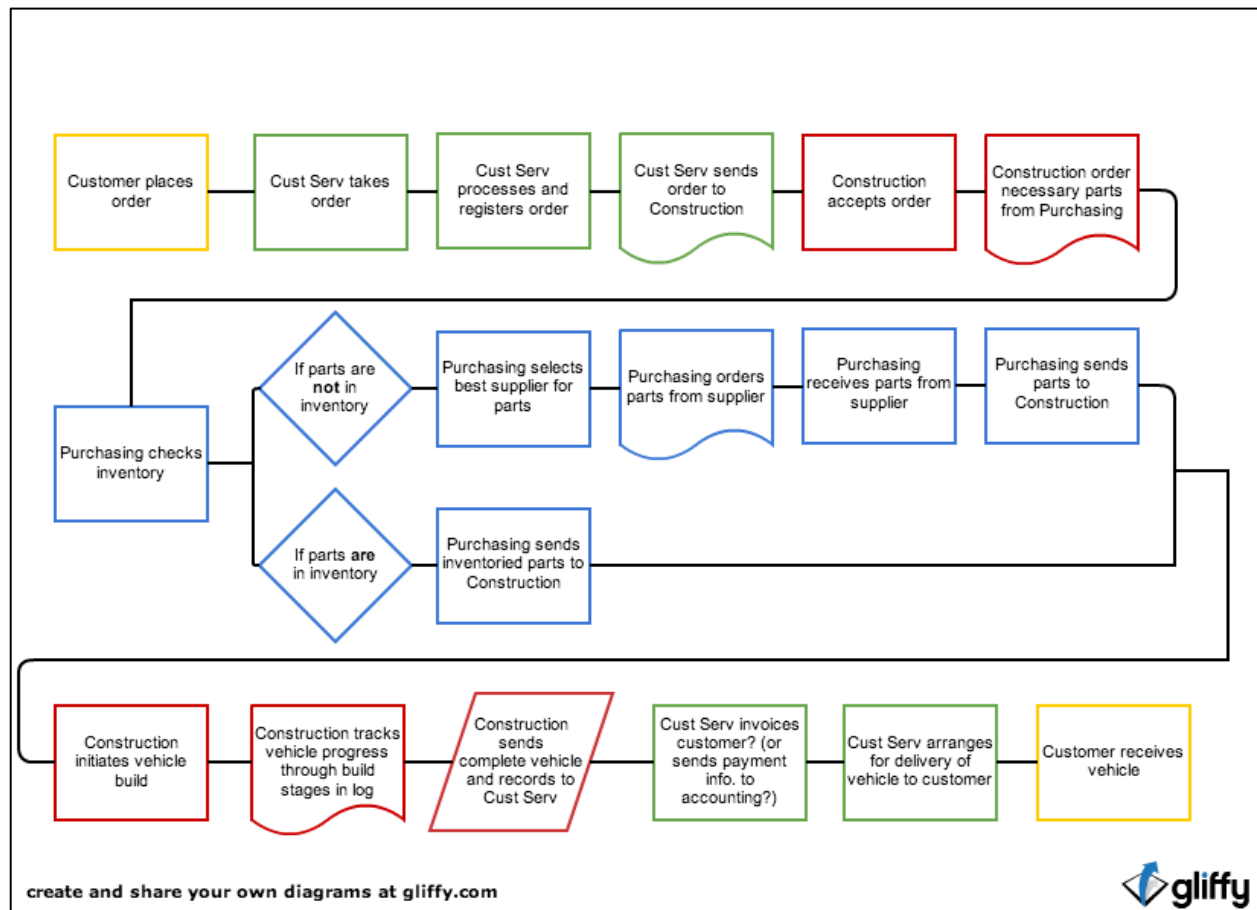
- Address the database needs of three departments—Customer Service, Construction, and Purchasing—with the goal of facilitating their work through data storage and information retrieval.
- No payment or shipping data needs to be represented in this database.

Boundaries

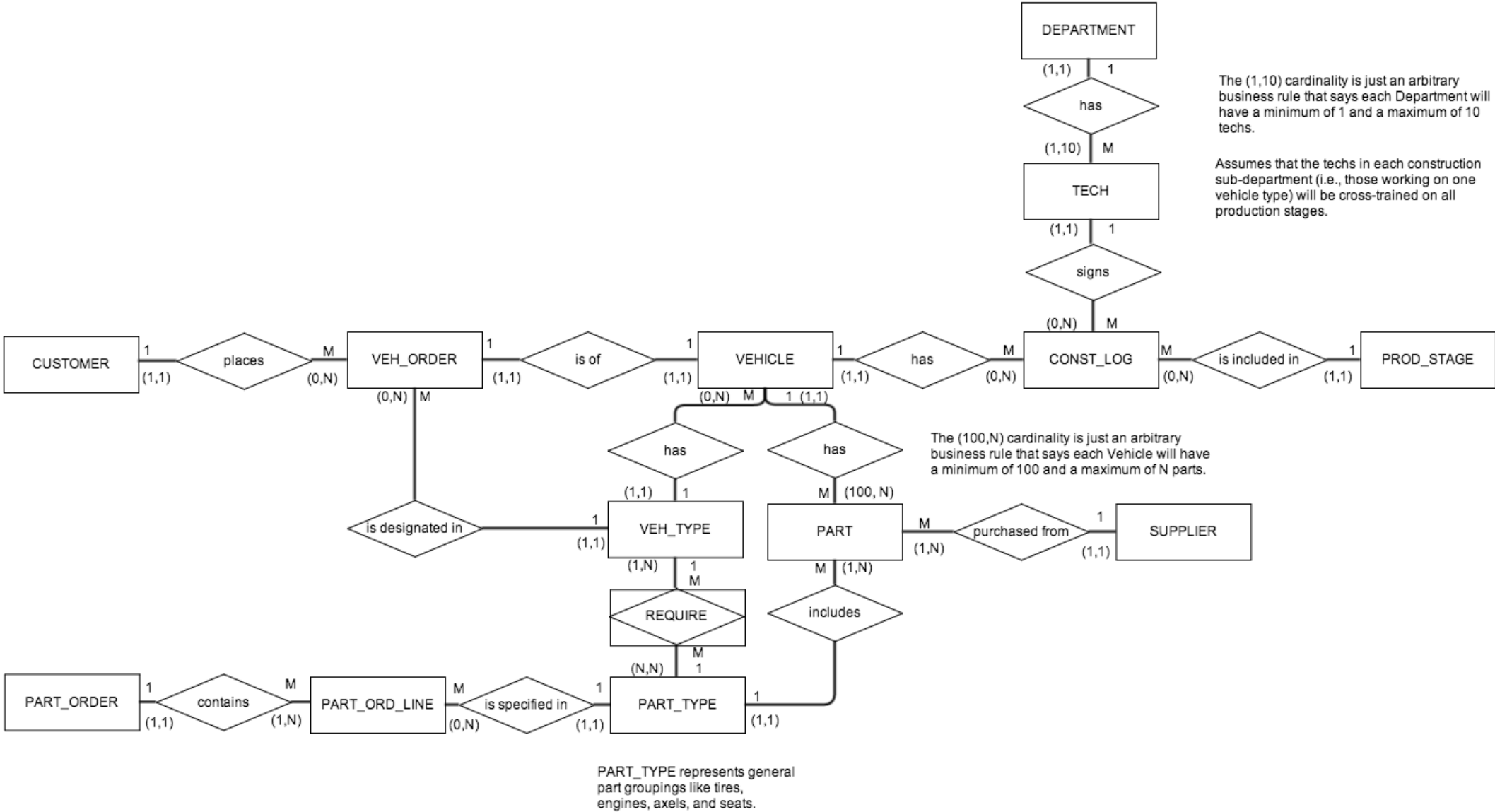
- Provide the conceptual and logical design of the database, the Oracle database itself and web access to that database by April 27, 2014.
- Other hardware, software, and budget details are unknown.

Data Flow Diagram

The diagram below is a simplified Data Flow Diagram—a graphical re-cap of the order and production processes described in the case scenario.



Entity Relationship Diagram



Entity Relationships Narratives

A customer may place many vehicle orders, but each vehicle order is only associated with one customer.

A vehicle order is of a specific vehicle. There is one vehicle order per vehicle.

A vehicle type includes many specific vehicles, but each vehicle has only one vehicle type.

A vehicle type is designated in many vehicle orders, but a vehicle order designates only one vehicle type.

Many vehicle types include many part types, and many part types are included in many vehicle types. (Bridge = REQUIRE)

A part type is specified in many part order lines, but each part order line only specifies one part type.

A part order contains many part order line items, but each part order line item is contained by only one part order.

A part type includes many parts, but each part is included in only one part type.

Each individual part in an actual vehicle is purchased from one supplier. One supplier might supply many parts in an actual vehicle.

A vehicle has many construction log entries, but each construction log entry belongs to only one vehicle.

A production stage is included in many construction log entries, but each construction log entry is for only one production stage.

A technician signs many construction log entries, but each construction log entry is signed by only one technician.

A department has many technicians, but each technician belongs to only one department.

Data Dictionary

PRELIMINARY DATA DICTIONARY - AUTOMATA Rev3								
TABLE NAME	ATTRIBUTE NAME	CONTENTS	TYPE	FORMAT	RANGE	REQUIRED	PK or FK	FK REFERENCE D TABLE?
CUSTOMER	CUST_ID	Customer identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	CUST_NAME	Customer name	VARCHAR(30)	Xxxxxxxx		Y		
	CUST_ADDRESS	Customer address	CHAR(30)	9999 Xxxxxx Xxx		Y		
VEHICLE ORDER	VEH_ORD_ID	Vehicle order identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	VEH_ORD_DATE	Date of vehicle order	CHAR(8)	xx/xx/xxxx		Y		
	VEH_ORD_COLOR	Color of vehicle ordered	CHAR(15)	Xxxxxxxxxxx		Y		
	VEH_TYPE_ID	Vehicle type	CHAR(20)	Xxxxxxxxxxx			FK	VEHICLE TYPE
	CUST_ID	Customer identification number	CHAR(5)	99999	AAAAA-99999	Y	FK	CUSTOMER
VEHICLE	VEH_NUM	Vehicle identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	

	VEH_ORD_ID	Vehicle order identification number	CHAR(5)	99999	AAAAA-99999	Y	FK	VEHICLE ORDER
	VEH_TYPE_ID	Vehicle type	CHAR(20)	Xxxxxxxxxx	AAAAA-99999		FK	VEHICLE TYPE
VEHICLE TYPE	VEH_TYPE_ID	Vehicle type	CHAR(20)	Xxxxxxxxxx	AAAAA-99999	Y	PK	
	VEH_TYPE_DESC	Description of the vehicle type	CHAR(20)	Xxxxxxxxxxx		Y		
CONSTRUCTION LOG	CONST_LOG_ID	Construction log identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	VEH_NUM (FK)	Vehicle identification number	CHAR(5)	99999	AAAAA-99999	Y	FK	VEHICLE
	PROD_STG_ID	Production stage identification number	CHAR(5)	99999	AAAAA-99999		FK	PRODUCTION STAGE
	TECH_ID	Technician's identification number	CHAR(5)	99999	AAAAA-99999		FK	TECHNICIAN
TECH	TECH_ID	Technician identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	TECH_NAME	Technician name	VARCHAR(20)	Xxxxxxxxxxx				
	DEPT_ID	Department	CHAR(5)	99999	AAAAA	Y	FK	DEPARTMENT

		identification number			-99999			T
DEPARTMENT	DEPT_ID	Department identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	DEPT_DESC	Department description	CHAR(20)	Xxxxxxxxxxx		Y		
PART TYPE	PART_TYPE_ID	Part type identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	PART_TYPE_DESC	Part type description	CHAR(20)	Xxxxxxxxxxx		Y		
REQUIRE (Bridge)	VEH_TYPE_ID	Vehicle type	CHAR(20)	Xxxxxxxxxxx	AAAAA-99999	Y	PK/FK	VEHICLE TYPE
	PART_TYPE_ID	Part type identification number	CHAR(5)	99999	AAAAA-99999	Y	PK/FK	PART TYPE
PRODUCTION STAGE	PROD_STG_ID	Production stage identification number	CHAR(5)	99999	AAAAA-99999	Y	PK/FK	
	PROD_STG_DESC	Description of the production stage	CHAR(20)	Xxxxxxxxxxx		Y		
PART_ORDER	PART_ORD_ID	Part order identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	PART_ORD_DATE	Part order date	CHAR(8)	xx/xx/xxxx		Y		
SUPPLIER	SUPP_ID	Supplier identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	

	SUPP_NAME	Name of supplier	CHAR(20)	Xxxxxxxxxx x		Y		
PARTS ORDER LINE	PART_ORD_ID	Part order identification number	CHAR(5)	99999	AAAAA-99999	Y	PK/FK	PART ORDER
	PARTS_ORD_LINE_ID	Part order line item identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	PART_TYPE_ID	Part type identification number	CHAR(5)	99999	AAAAA-99999	Y	FK	PART TYPE
	PART_ORD_LINE_QTY	Quantity of part ordered	CHAR(5)	99999		Y		
	PART_ORD_LINE_PRICE	Price of part ordered	CHAR(8)	999999.99		Y		
PART	PART_ID	Part identification number	CHAR(5)	99999	AAAAA-99999	Y	PK	
	PART_DESC	Description of part	CHAR(20)	Xxxxxxxxxx x		Y		
	PART_IN_STOCK	Notes if part is in stock and quantity	CHAR(5)	99999		Y		
	VEH_NUM	Vehicle identification number	CHAR(5)	99999	AAAAA-99999		FK	VEHICLE
	SUPP_ID	Supplier identification number	CHAR(5)	99999	AAAAA-99999		FK	SUPPLIER

	PART_TYPE_ID	Part type identification number	CHAR(5)	99999	AAAAA -99999	Y	FK	PART TYPE
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Preliminary Data Tables

CUSTOMER		
CUST_ID (PK)	CUST_NAME	CUST_ADDRESS
C1000	Frank Allen	Main St.
C1001	George Carlise	Alpine Way
C1002	Steve Coogan	Ocean Ave

VEHICLE		
VEH_NUM (PK)	VEH_ORD_ID (FK)	VEH_TYPE_ID (FK)
VH200	VO-1	LIMO
VH300	VO-2	CAR
VH400	VO-3	CAR

CONST_LOG			
CONST_LOG_ID (PK)	VEH_NUM (FK)	PROD_STG_ID (FK)	TECH_ID (FK)
C001	VH200	FRAME	T4
C002	VH300	FRAME	T1
C003	VH400	ENGINE	T2
C004	VH200	ENGINE	T4
C005	VH300	ENGINE	T1
C006	VH400	INTERIOR	T2
C007	VH400	EXTERIOR	T1

VEHICLE_ORDER				
VEH_ORD_ID (PK)	VEH_ORD_DATE	VEH_ORD_COLOR	VEH_TYPE_ID (FK)	CUST_ID (FK)
VO-1	2/14/14	black	LIMO	C1000
VO-2	2/18/14	red	CAR	C1001
VO-3	1/30/14	white	CAR	C1002

VEH_TYPE	
VEH_TYPE_ID (PK)	VEH_TYPE_DESC
CAR	2014 CAR
TRUCK	2014 TRUCK
LIMO	2014 LIMO
RV	2014 RV

TECH		
TECH_ID (PK)	TECH_NAME	DEPT_ID (FK)
T1	Julia Apple	CAR_DEPT
T2	Peter Tree	CAR_DEPT
T3	Beth Smith	TRUCK_DEPT
T4	Ryan Simpson	LIMO_DEPT

ANY TECH CAN WORK ANY PRODUCTION STAGE FOR A PARTICULAR VEH_TYPE

DEPARTMENT	
DEPT_ID (PK)	DEPT_DESC
CAR_DEPT	Builds cars
TRUCK_DEPT	Builds trucks
LIMO_DEPT	Builds limos
RV_DEPT	Builds RVs

PART_TYPE	
PART_TYPE_ID (PK)	PART_TYPE_DESC
TIRES	Tires for all vehicles
ENGINES	Engines for all vehicles
AXELS	Axels for all vehicles
SEATS	Seats for all vehicles

REQUIRE (Bridge)	
VEH_TYPE_ID (PK/FK)	PART_TYPE_ID (PK/FK)
CAR	TIRES
CAR	ENGINES
TRUCK	TIRES
TRUCK	ENGINES

PRODUCTION_STAGE	
PROD_STG_ID (PK)	PROD_STG_DESC
FRAME	Frame assembly
ENGINE	Engine assembly
INTERIOR	Interior assembly
EXTERIOR	Exterior assembly

PART_ORDER	
PART_ORD_ID (PK)	PART_ORD_DATE
PO-001	2/14/14
PO-002	2/15/14
PO-003	1/20/14

SUPPLIER	
SUPP_ID (PK)	SUPP_NAME
S25	Engines R Us
S26	American Engines
S27	Axels, Inc.
S35	Michelin, Inc.
S38	NW Axels, Co.

PARTS_ORDER_LINE				
PART_ORD_ID (PK/FK)	PARTS_ORD_LINE_ID (PK)	PART_TYPE_ID (FK)	PART_ORD_LINE_QTY	PART_ORD_LINE_PRICE
PO-001	1	ENGINES	1	2000.00
PO-001	2	AXELS	2	505.35
PO-002	1	ENGINES	1	2000.00
PO-002	2	TIRES	4	200.00

PART					
PART_ID (PK)	PART_DESC	PART_IN_STOCK	VEH_NUM (FK)	SUPP_ID (FK)	PART_TYPE_ID (FK)
P505	Fast engine	311	VH200	S25	ENGINES
P613	Snow tires	234	VH300	S35	TIRES
P713	Large axel	1814	VH300	S27	AXELS
P726	Small axel	210	VH400	S27	AXELS

Team Contributions

Russell Cortez	Creator of 1 st draft ERD, wrote entity relationship narrative for 1 st draft, reviewed Analysis, reviewed and suggested changes on 2 nd draft ERD, reviewed and suggested changes to final draft of ERD and made suggestions for data tables
Adam Garfinkel	Reviewed Analysis, 1 st draft ERD, 2 nd draft ERD, co-reviser of Data Dictionary based on 2 nd draft ERD
Melissa Lafranchise	Team coordinator, creator of schedule, creator of Analysis, reviewed 1 st draft ERD and Data Dictionary and suggested changes, co-creator of 2 nd draft ERD, revised ER narrative for 2 nd draft, creator of preliminary data tables, revised ERD, ER narratives and data tables for final
Weston Rowan	Creator of 1 st draft Data Dictionary, reviewed Analysis and 1 st and 2 nd drafts ERD, co-reviser of Data Dictionary based on 2 nd draft ERD, revised Data Dictionary based on final draft; reviewed final draft of ERD
Jennifer Vasquez	Reviewed Analysis and suggested changes, reviewed 1 st draft ERD, reworked 1 st draft ERD layout, co-creator of 2 nd draft ERD