**IS 6503 Term Project Deliverable 1 Template**

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1. **Description of the business context and related data management problem(s)**

Rent-My-Son-Car is my son’s car rental company, and it rents out cars to the customers. The car rental company has multiple locations and has isolated databases which causes lot of discrepancies and inconsistencies. It is very hard for management to monitor the activities and form strategies to grow their business.

For the Term Project, I would like to create a database application to help Rent-My-Son-Car to integrate its fragmented and isolated data management systems and provide more effective data management.

1. **The entities and the attributes (with description, constraint and data types)**

**Entity**: **Rental**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Rental\_ID** | **Rental id of the customer** | Primary Key | Integer |
| **Car\_ID** | **Unique id of Car that customer rents** | Foreign Key | Integer |
| **Customer\_ID** | **Unique id of the customer** | Foreign Key | Integer |
| **Employee\_ID** | **Employee id associated with the rental** | Foreign Key | Integer |

**Entity**: **Customer**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Customer\_ID** | **Unique id of the customer** | Primary Key | Integer |
| **Customer\_Name** | **Name of the customer** | Not Null | Varchar(50) |
| **Customer\_Contact** | **Contact phone number of customer** |  | Char(10) |
| **Car\_ID** | **Unique id of Car that customer rents** | Foreign Key | Integer |
| **Rental\_ID** | **Rental id of the customer** | Foreign Key | Integer |

**Entity**: **Employee**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Employee\_ID** | **Employee id associated with the rental** | Primary Key | Integer |
| **Employee\_Name** | **Name of the employee** | Not Null | Varchar(50) |
| Rental\_ID | **Rental id of the customer** | Foreign Key | Integer |

**Entity**: **Payment**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Payment\_ID** | **Unique id of the payment made** | Primary Key | Integer |
| **Payment\_Amount** | **Amount of payment made** |  | Numeric(10,2) |
| Rental\_ID | **Rental id of the customer** | Foreign Key | Integer |

**Entity**: **Car**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Car\_ID** | **Unique id of Car that customer rents** | Primary Key, Foreign Key | Integer |
| **Car\_Description** | **Description of the car** | Not Null | Varchar(50) |
| Car\_Color | **Color of the car** |  | Varchar(15) |
| Car\_Brand | **Brand of the car** | “A” or “NONA” | Varchar(4) |
| Customer\_ID | **Unique id of the customer** | Foreign Key | Integer |

**Entity**: **Insurance Details**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Insurance\_ID** | **Unique id of the insurer** | Primary Key | Integer |
| **Insurance\_Company** | **Name of the associated Insurance company** | Not Null | Varchar(50) |
| Rental\_ID | **Rental id of the customer** | Foreign Key | Integer |
| Customer\_ID | **Unique id of the customer** | Foreign Key | Integer |

**Entity**: **Accident**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Report\_ID** | **Unique id** | Primary Key | Integer |
| **Customer\_DL** | **Driver License of the Customer** | Not Null | Varchar(20) |
| Accident\_Amount | Cost incurred for the accident |  | Numeric (10,2) |
| Rental\_ID | **Rental id of the customer** | Foreign Key | Integer |

**Entity**: **American**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Car\_ID** | **Unique id of Car that customer rents** | Primary Key, Foreign Key | Integer |
| **Car\_Aname** | **Name of the American Car** | Not Null | Varchar(50) |
| Car\_Amodel | Name of the American car model |  | Varchar(20) |

**Entity**: **Non-American**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description:** | | | |
| **Attribute** | **Description** | **Constraints** | **Data Type** |
| **Car\_ID** | **Unique id of Car that customer rents** | Primary Key, Foreign Key | Integer |
| **Car\_Nname** | **Name of the Non-American Car** | Not Null | Varchar(50) |
| Car\_Nmodel | Name of the Non-American car model |  | Varchar(20) |

1. **ERD (there should be at least 6 entities plus at least two subtypes**, the ERD can be modified in the next deliverable). Your ERD must have all primary/foreign keys, relationships, minim and constraints correctly specified. The ERDs below are just example.



1. **Business rules that define all the relationships among entities, the constraints (if any). Note that each relationship (i.e. each line in your ERD) requires 2 business rules (bi-directional), and each business rule should specify both the minimum and maximum cardinalities.** Use the template below to describe your business rules. Note that you should have at least one of each of the following relationships.

***Relationships:***

**1:1 relationship**: Store – Employee (Manager), each store must have one and only one manager (1,1), whereas each employee may serve as the manger for no store or at most 1 store (0,1) .

**M: N relationship:** Customer – Accident

**This M:N relationship is broken in 2 1:M relationships** through the associative entity Insurance Details which has a 1:M relationship with Customer and 1:M relationship with Accident.

**1:M relationship** Customer – Car

**1:M Unary relationship**: Employee: An Employee Manager may manage 0 or many employees (0, M), whereas each employee must have one and only one manager (1,1)

**Supertype**: Car with 2 **subtypes for car brand**: American or Non-American as differentiated by the **subtype discriminator** “Car Brand”

**Disjointed/Overlapping constraint**: The subtypes have a disjointed constraint since a car can be an American brand or non-American brand.

**Specialization constraint:** The subtypes have a total specialization constraint since a car can either be an American brand or non-American brand.

Among the above relationships:

**Strong Relationship(s)**: Customer – Car, Rental – Customer.

**Weak Relationship(s)**: Rental – Ancillary Coverage.

**Existence Dependency**: Rental - Accident

**Mandatory relationships** (required a NOT NULL constraint on the FK):

***Constraints***:

1. A car has to be either American or non-American.
2. One rental instance is associated with one and only one employee.
3. A Rental may or may not have ancillary coverage.

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1. **A summary of the functionality of the application (i.e. what the users can do with this application, future extension/integration with other systems etc.). These functionalities will be implemented in deliverable 2 and 3 and what you propose can be changed later.**

This new DBMS will help the rental company “Rent-My-Son-Car” to maintain a centralized database of all rentals, customers, their accident details along with the payments that they make.

This new DBMS will allow the rental company to keep track of the cars they rent and the customers they rent out to. It will allow users to search the database to derive useful business information that would enable data driven decision making in formulating future business strategies.

In the future, this database can also be connected with other fleet systems and they can expand their business and footprints in other areas as well.