

Physical Schema

A physical schema is a representation of a data design as implemented, or intended to be implemented, in a database management system. Before implementing the real database by using MySQL RDBMS, we will implement the specifications for each table. Specifications includes the name, variable which is the abbreviation of the name, data type, size, whether the key is primary key or foreign key, and whether the key is the index or not. In this paper, we also discuss about the integrity of each key, mainly about entity and referential integrity.

1. Camping Car

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Camping Car ID	CIN	VARCHAR	17	<input checked="" type="checkbox"/>	
2	Issue date	ISSUE_DT	DATE	3	<input checked="" type="checkbox"/>	
3	Car type	CAR_TP	VARCHAR	25		
4	Manufacture date	MANU_DT	DATE	3		
5	Distance Driven	DRI_DIS	INTEGER	4		
6	Facilities	CAMP_FAC	VARCHAR	50		
7	Passenger	CAMP_CAP	INTEGER	4		
8	Availability	CAMP_FL	TINYINT	1		
9	Required License	LCNS_RQ	VARCHAR	10		
10	Branch ID	BIN	VARCHAR	18		<input checked="" type="checkbox"/>

Table 1 - CAMP_CAR

Table 1 shows the camping car table. This table exists to manage the information about camping cars. It has the set of CIN (Camping Car ID) and ISSUE_DT (Issue Date) as a primary key. We assigned this set of the key as a primary key because of the regulation of car number pad assignment. Purpose of this regulation is to avoid the misuse of number pad in driving stolen car. Therefore, to identify the camping car, or just a car, we need to search it with car number and its issued date. The BIN (Branch ID) key in this table is the foreign key that references the Branch ID from the branch table. In the aspect of entity integrity, the set of CIN (Camping Car ID) and ISSUE_DT (Issue Date) should be unique and not null. In the aspect of referential integrity, BIN (Branch ID), which references Branch ID from branch table, should be casually updated if the referenced key is updated. Also, if the referenced key is deleted, the we denote that the camping car is turned in to the head branch. Therefore, we will set the BIN (Branch ID) into head branch if the referenced key is deleted.

2. Customer

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	License number	LCNS_NO	VARCHAR	12	<input checked="" type="checkbox"/>	
2	First name	FNAME	VARCHAR	50		
3	Middle name	MNAME	VARCHAR	50		
4	Last name	LNAME	VARCHAR	50		
5	Phone	CUS_PHN	VARCHAR	11		

6	Email	CUS_EML	VARCHAR	50		
7	Address	CUS_ADDR	VARCHAR	50		
8	Age	CUS_AGE	INTEGER	4		
9	Login ID	LOGIN_ID	VARCHAR	13		<input checked="" type="checkbox"/>

Table 2 - CUSTOMER

Table 2 shows the customer table. This table stores the information about customers. It has the LCNS_NO (License Number) as a primary key, and LOGIN_ID (Login ID) as a foreign key that references the Login ID in customer credential table. In the aspect of the entity integrity, LCNS_NO (License Number) should be unique and not null. In the aspect of referential integrity, LOGIN_ID (Login ID) must be causally updated and deleted if the reference key is updated and deleted.

3. Customer Credential

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Login ID	LOGIN_ID	VARCHAR	13	<input checked="" type="checkbox"/>	
2	Password	PASSWORD	VARCHAR	13		
3	Login time	LOGIN_TIME	TIME	3		
4	Logout time	LOGOUT_TIME	TIME	3		

Table 3 - CUSTOMER_CREDENTIAL

Table 3 shows the customer credential table. Customer credential table stores the information of the logging data of customers, which includes ID, Password, and Login and Logout time. It has LOGIN_ID (Login ID) as a primary key.

4. Event

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Event ID	EIN	INTEGER AUTO INCREMENT	4	<input checked="" type="checkbox"/>	
2	Start date	EVNT_SDT	DATE	3		
3	End date	EVNT_EDT	DATE	3		
4	Description	EVNT_DES	VARCHAR	100		
5	Applied Location	APP_LOC	VARCHAR	50		

Table 4 - EVENT

Table 4 shows the event table, which contains the information of event that is held from particular start date to end date. This table has EIN (Event ID) as a primary key, and it is an auto incremented number from 1 to the end of the tuple.

5. Accident

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Accident ID	AIN	VARCHAR	10	<input checked="" type="checkbox"/>	
2	Camping Car ID	CIN	VARCHAR	17		<input checked="" type="checkbox"/>
3	Issue date	ISSUE_DT	DATE	3		<input checked="" type="checkbox"/>

4	Accident date	ACC_DT	DATE	3		
5	Description	ACC_DES	VARCHAR	50		
6	Damage	DAMAGE	FLOAT	4		

Table 5 - ACCIDENT

Table 5 shows the accident table. This table includes the information of camping car accident. It has the set of AIN (Accident ID), CIN (Camping Car ID), and ISSUE_DT (Issue Date) as a primary key. Due to the entity integrity, AIN (Accident ID) should be unique and not null. In the aspect of referential integrity, foreign keys, which are CIN (Camping Car ID) and ISSUE_DT (Issue Date), should be casually updated and deleted when the following referenced keys are updated and deleted because the accident data is dependent to the camping car, which also means that accident information cannot be exists without the camping car.

6. Review

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Review ID	REV_SQ	INTEGER AUTO INCREMENT	4	<input checked="" type="checkbox"/>	
2	Rate of the service	RATE	INTEGER	4		
3	Description	REV_DES	VARCHAR	100		
4	License number	LCNS_NO	VARCHAR	12		<input checked="" type="checkbox"/>
5	Camping Car ID	CIN	VARCHAR	17		<input checked="" type="checkbox"/>
6	Issue date	ISSUE_DT	DATE	3		<input checked="" type="checkbox"/>

Table 6 - REVIEW

Table 6 shows the review table that stores the data of reviews for each camping car. It has REV_SQ (Review Number), which is auto incremented number, as a primary key. Following table generates the relation between customer and camping car table. Therefore, it contains the LCNS_NO (License Number), CIN (Camping Car ID), ISSUE_DT (Issue Date) as foreign keys that each reference the License Number from customer table, and Camping Car ID and ISSUE_DT from camping car table. In the aspect of entity integrity, REV_SQ (Review ID) should be unique and not null. LCNS_NO (License Number) should be converted into the default value of “Unknown”, if the referenced key is deleted, because the review should be remained even though customer information is deleted. If the following key is updated. LCNS_NO (License Number) of the review table is updated casually. The set of CIN (Camping Car ID) and ISSUE_DT (Issue Date) is updated and deleted casually if the referenced keys are updated and deleted.

7. Accessory

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Accessory ID	ACSRY_NO	VARCHAR	10	<input checked="" type="checkbox"/>	
2	Status	STATUS	TINYINT	1		
3	Amount	ACSRY_AMT	INTEGER	4		
4	Type	ACSRY_TP	VARCHAR	50		

Table 7 - ACCESSORY

Table 7 shows the accessory table, which includes the information of accessories. It has primary key of ACSR_NO (Accessory ID) which follows the entity integrity. Therefore, it should be unique and not null.

8. Reservation

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Reservation ID	RID	VARCHAR	20	<input checked="" type="checkbox"/>	
2	Start date	RES_SDT	DATE	3		
3	End date	RES_EDT	DATE	3		
4	Start location	RES_SLOC	VARCHAR	50		
5	End location	RES_ELOC	VARCHAR	50		
6	Passenger	PASS_AMT	INTEGER	4		
7	Meter start	METR_STD	INTEGER	4		
8	Meter end	METR_END	INTEGER	4		
9	Rental amount	RENT_AMT	FLOAT	4		
10	Additional amount	ADD_AMT	FLOAT	4		
11	Total amount	TTL_AMT	FLOAT	4		
12	Penalty amount	PNLT_AMT	FLOAT	4		
13	Billing address	BILL_ADDR	VARCHAR	50		
14	Payment ID	PAY_ID	VARCHAR	10		<input checked="" type="checkbox"/>
15	License Number	LCNS_NO	VARCHAR	12		<input checked="" type="checkbox"/>
16	Camping Car ID	CIN	VARCHAR	17		<input checked="" type="checkbox"/>
17	Issue date	ISSUE_DT	DATE	3		<input checked="" type="checkbox"/>

Table 8 - RESERVATION

Table 8 shows the reservation table. It contains the information of reservations of the camping car. It has RID (Reservation ID) as a primary key. PAY_ID (Payment ID), LCNS_NO (License Number), CIN (Camping Car ID), and ISSUE_DT (Issue Date) are the foreign keys that reference each Payment ID from pay table, License Number from customer, and Camping Car ID and Issue Date from the camping car table. In the aspect of entity integrity, RID (Reservation ID) should be unique and not null. In the aspect of referential integrity, PAY_ID (Payment ID) should be changed into the “refund” if referenced key is deleted, because deletion on the payment table means the refund of the reservation. If referenced key is update, following foreign key should be updated casually. LCNS_NO (License Number), CIN (Camping Car ID), and ISSUE_DT (Issue Date) should be updated and deleted casually when each referenced key is updated and deleted.

9. Branch

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Branch ID	BIN	VARCHAR	18	<input checked="" type="checkbox"/>	
2	State	STATE	VARCHAR	20		
3	Street	STREET	VARCHAR	20		
4	Zip	ZIP	VARCHAR	5		
5	Email	BRN_EML	VARCHAR	50		
6	Phone	BRN_PHN	VARCHAR	11		
7	Capacity	BRN_CAP	INTEGER	4		

Table 9 - Branch

Table 9 shows the branch table, which stores the information of branch at each location that owns the camping car. This table as BIN (Branch ID) as a primary key, which fulfills the entity integrity. In short, following key is unique and not null.

10. Insurance

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Insurance ID	IIN	VARCHAR	10	<input checked="" type="checkbox"/>	
2	Type	INS_TP	VARCHAR	15		
3	Collision coverage	CLSN_COV	TINYINT	1		
4	Body coverage	BODY_COV	TINYINT	1		
5	Medical coverage	MEDI_COV	TINYINT	1		
6	Price	INS_PRC	FLOAT	4		
7	Camping car ID	CIN	VARCHAR	17		<input checked="" type="checkbox"/>
8	Issue date	ISSUE_DT	DATE	3		<input checked="" type="checkbox"/>

Table 10 - INSURANCE

Table 10 shows the insurance table that contains the data of each applied insurance to the camping car. It has IIN (Insurance ID as a primary key. CIN (Camping Car ID) and ISSUE_DT (Issue Date) are the foreign key that reference the Camping Car ID and Issue Date from the camping car table. Due to the entity integrity, IIN (Insurance ID) should be unique and not null. In the aspect of the referential integrity, CIN (Camping Car ID) and ISSUE_DT (Issue Date) should be updated and deleted casually when the referenced key is updated and deleted, because information of insurance only can exist when the camping car exists.

11. Choose

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Reservation ID	RID	VARCHAR	20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Accessory ID	ACSRY_NO	VARCHAR	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 11 - CHOOSE

Table 11 shows the choose table, which contains the relationship between reservation and accessory. This table is needed due to resolve the numerous to numerous relations between the reservation and accessory table, which causes the problem of large required data size due to the duplication of tuple. It has RID (Reservation ID) and ACSR_NO (Accessory ID) as both primary and foreign keys that each reference Reservation ID from reservation table and Accessory ID from accessory table. In the aspect of entity integrity, RID (Reservation ID) and ACSR_NO (Accessory ID) should be unique and not null. In the aspect of the referential integrity, if the referenced keys are updated or deleted, both RID (Reservation ID) and ACSR_NO (Accessory ID) should be updated and deleted casually.

12. Apply

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Reservation ID	RID	VARCHAR	20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Event ID	EIN	INTEGER	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 12 - APPLY

Table 12 shows the apply table, which contains the information of applied events to the reservations. This table is needed due to resolve the numerous to numerous relations between the reservation and event table, which caused the problem of large required data size due to the duplication of tuple. It has RID (Reservation ID) and EIN (Event ID) as both primary and foreign keys that each reference Reservation ID from reservation table and Event ID from event table. In the aspect of entity integrity, RID (Reservation ID) and EIN (Event ID) should be unique and not null. In the aspect of referential integrity, if the referenced keys are updated or deleted, both RID (Reservation ID) and EIN (Event ID) should be updated and deleted casually.

13. Payment Type

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Payment type	PAY_TP	INTEGER AUTO INCREMENT	4	<input checked="" type="checkbox"/>	
2	Payment type name	PAY_NM	VARCHAR	10		

Table 13 - PAY_TPYE

Table 13 shows the payment type table, which includes the information that is indexed with auto incremented numbers. This table is implemented due to identify the payment type whether it is paid by cash, card, or coupons. It has PAY_TP (Payment Type) as a primary key, which follows the entity integrity. Therefore, it is unique and not null.

14. Pay

Number	Name	Variable	Type	Size	Primary Key (PK)	Foreign Key (FK)
1	Payment ID	PAY_ID	VARCHAR	10	<input checked="" type="checkbox"/>	
2	Payment type	PAY_TP	INTEGER	4		<input checked="" type="checkbox"/>
3	Payment amount	PAY_AMT	FLOAT	4		
4	Payment date	PAY_DT	DATE	3		

Table 14 - PAY

Table 14 shows the pay table, which includes the information of payment. This table has PAY_ID (Payment ID) as a primary key, and PAY_TP (Payment Type) as a foreign key which references the Payment Type in payment type table. Due to the entity integrity, PAY_ID (Payment ID) should be unique and not null. In the aspect of the referential integrity, PAY_TP (Payment Type) should not be deleted until the referenced key is deleted. However, if the referenced key is updated, PAY_TP (Payment Type) should updated casually.