

DATABASE MANAGEMENT SYSTEM

Project Submission

POOLING TO PARKING

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PROBLEM STATEMENT

With families getting smaller and mushrooming total number of vehicles per head, India is now facing a new problem of – lack of sufficient parking space. Nowadays, even people having low incomes are able to own cars due to which on any given working days nearly 40% of roads in India are just used for parking purpose, exacerbating the situation even more woefully as cities in India are already highly congested. The main aim of this project is to curb with this growing menace.

On unfolding the situation more lucidly we saw that pooling of vehicles as well as centralizing the parking system of the country could serve as a very easy-to-use aid. To frame the entire system of pooling and parking we hereby provide the whole database structure.

The entire category of clients consisting of parkers, poolers and pooling service providers have been kept in one single entity called USERS. All required information of clients such as user_id, name, contact_no, adhar_id, gender, email_id, dl_no, vehicle_avail and share_allowed. Residential address of the user has been recorded in an entity (which is dependent on user's entity) called R_ADDRESS containing street_no, landmark, city, state and house_no. The VEHICLES owned by users have been represented as an entity containing attributes – vehicle_id, vehicle_type, vehicle_no and vehicle_model. Each vehicle must be owned by a user and there is a possibility that a user can own multiple vehicles. To invoke the pooling system more precisely no restriction has been imposed on the relationships among users, there is just a ternary relationship called pool where user itself is playing two roles as a REQUESTER and PROVIDER and third connected entity is RIDE_INFO giving information such as ride_id, reqstr_id, providr_id start_point, destination_point, req_time and current_status. Multiple

requesters can request a single provider and each combination must have only one ride information. **Since it's very important to take care of the** preferences of users in order to find the required match entity called PREFERECNCES containing gender, smoke, loud_music, open_shield and pref_vehicle as an attributes has been included. The person who owns vehicle parks in an area contained in an entity called SPACE having attributes space_id, parkspace_id, 4wheel_occupancy, 2wheel-occupancy, plot_size, and spot_avail. A space can be accommodated by multiple users but a user can park in only one space. The space required here is owned by an entity called PARKING_SPACE_PROVIDER giving all his personal information such as parkspace_id, name, address, contact_no, email_id, aadhar_card and a proof of holding the property say registration_id. Every space must be owned by a space provider whereas a space provider can own multiple spaces. The same space is operated by an OPERATOR whose attributes would be his name, contact_no, aadhar_card and address. Every space need not to have an operator. To provide a descriptive address of space an entity called PLOT_DETAILS has been introduced whose attributes are plot_reg_id, city, state, plot_no, street and zipcode. There would always be an area where the given space would exist. Whenever the user seeks a request for parking from then till actually using the provided space the entire information is being stored in the entity PARKING_DETAILS where we store req_id, in_time, out_time, and spot_no.

With this proposed model we have tried to invoke all kinds of cases from which a user has to go through keeping the prime objective of reducing the number of vehicles on the road.

ENTITY-RELATIONSHIP DIAGRAM

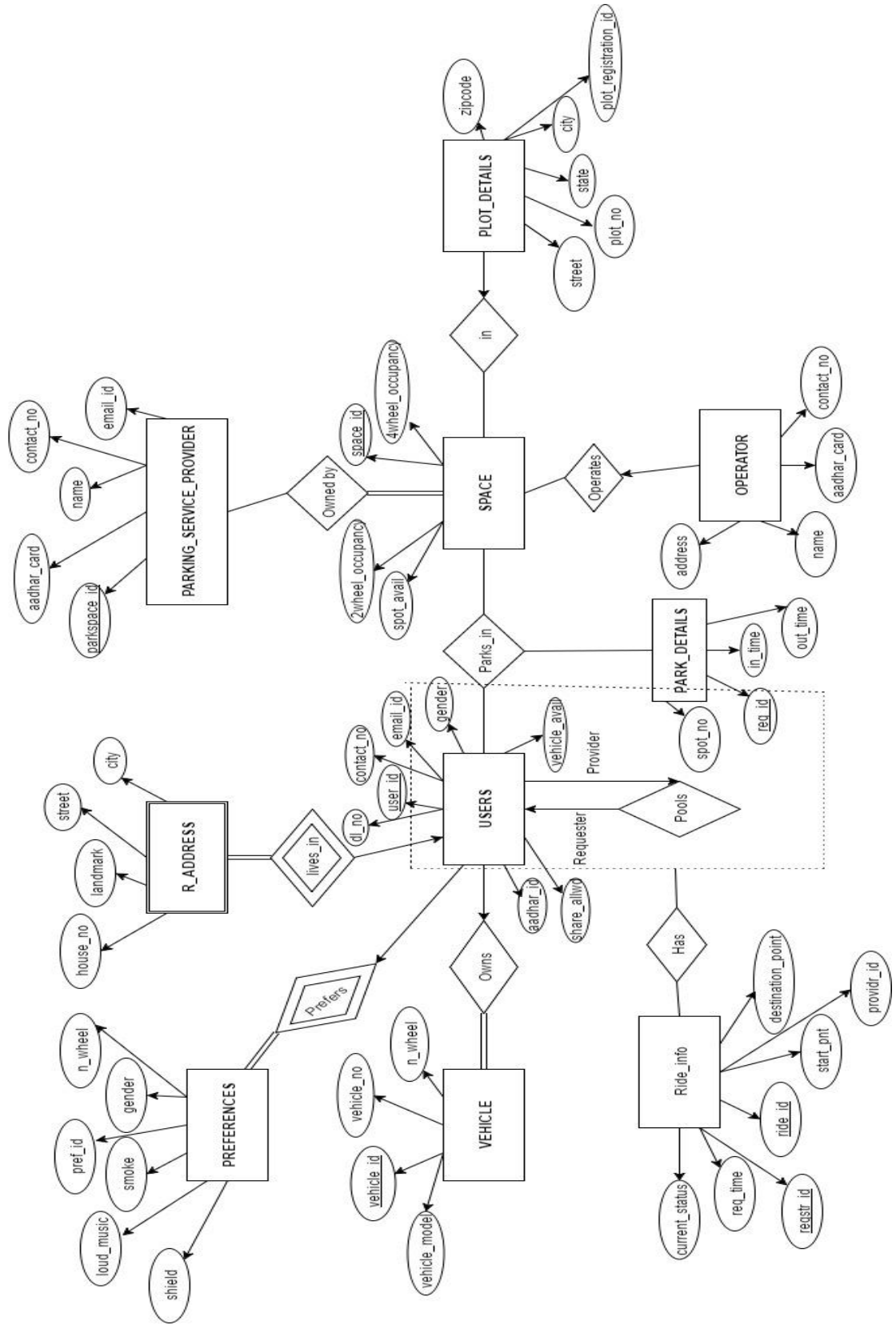
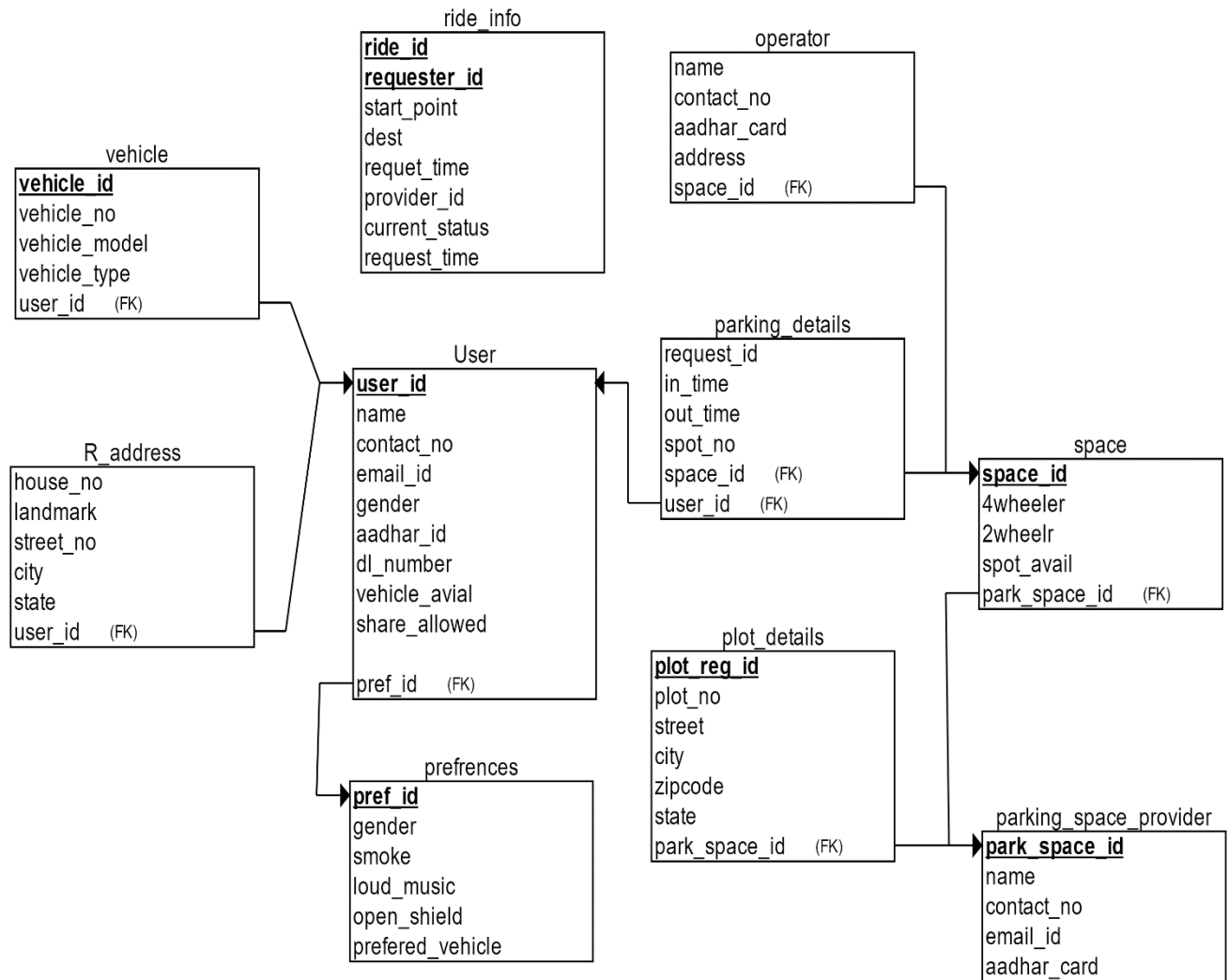


TABLE SCHEMA



Functional Dependencies

Following are the functional dependencies derived from the relational table schema. The below defined Functional dependencies will further be used for making database.

User:

User_Id \longrightarrow Name, Gender, Contact_No, DL_Number, Share_allowed, Email_Id, Vehicle_avil, Share_allowed, Aadhar_id, Preference_Id

Aadhar_Id \longrightarrow User_id, Email_Id, Name, Gender, Contact_No, DL_Number, Vehicle_Avil, Share_allowed, Preference_Id

Contact_No \longrightarrow Name, Gender, DL_Number, Share_allowed, Email_Id, User_id, Vehicle_avil, Aadhar_Id, Preference_Id

Vehicle:

Vehicle_Model \longrightarrow Vehicle_Type

Vehicle_Number \longrightarrow Vehicle_Id, Vehicle_Type, Vehicle_Model, User_id

Vehicle_Id \longrightarrow Vehicle_Number, Vehicle_Type, Vehicle_Model, User_Id,

R_Address:

Aadhar_Id \longrightarrow House_No, Street_No, City, State, Landmark

Preferences:

Preference_Id → Gender, Smoker, Loud_Music, Open_shield,
Pref_vehicle

Ride_Info:

Ride_Id ,Requester_Id → Start_pnt, Destination, Req_time,
Current_Status,Provider_Id

Preferences:

Preference_Id → Gender, Smoker, Loud_Music, Open_shield,
Pref_vehicle

Space:

Space_Id → 4Wheel_occupancy, 2Wheel_occupancy, spot_avail,
Parkspace_Id

Plot_Details:

ZipCode → City, State

Plot_registration_id → Plot_No, Street, City, ZipCode, State,
Parkspace_Id

Parking_Space_Provider:

Aadhar_Id → Name, Parkspace_Id, Email_Id,
Contact_No

Parkspace_Id → Name, Aadhar_Id, Email_No, Contact_No

Operator:

Space_Id → Name, Address, Contact_No, Aadhar_Id

Aadhar_Id → Name, Address, Space_Id

Parking_details:

Req_Id → Space_Id, In_Time, Out_Time, Spot_No, User_Id
share_allowed

Normalization

User:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Vehicle:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF:

Original scheme { Vehicle_no, Vehicle_model, User_id, Vehicle_type }

Primary key \rightarrow {Vehicle_id}

Vehicle_id \rightarrow Vehicle_model

Vehicle_model \rightarrow Vehicle_type

Hence not in 3NF

So new table scheme

Scheme1 {Vehicle_no, Vehicle_model, User_id}

Scheme2 {Vehicle_model, Vehicle_type}

BCNF: There is no inter relation among the candidate keys

R_address:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Preferences:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Ride info:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

4NF:

Original

Scheme{Ride_id,Requester_id,Start_point,Destination,Request_time,Current_status,Provider_id}

Request_id,Start_point $\rightarrow\rightarrow$ (mvd) Destination

Hence they are not in 4NF

Scheme1{Ride_id, Requester_id ,Request_time ,Provider_id ,
Current_status }

Scheme2{ Request_id,Start_point, Destination }

Space:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Parking space provider:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Operator:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Parking details:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF: There is no Transitive dependency among the attributes

BCNF: There is no inter relation among the candidate keys

Plot details:

1NF: All the attributes are atomic in nature

2NF: All the attributes are dependent on primary key only

3NF:

Original

Scheme{Plot_registration_id,Plot_no,Street,City,Zipcode,State,Park_space_id}

Primary key \rightarrow {Plot_registration_id}

Plot_registration_id \rightarrow Zipcode

Zipcode \rightarrow City,state

Hence not in 3NF

Scheme1{Plot_registration_id,Plot_no,Zipcode,Park_space_id,Street}

Scheme2{Zipcode,City,state}

BCNF: There is no inter relation among the candidate keys

Relational Table Conversion

Entity/Relation	Cardinality/Normalisation	Code to convert into relational table
User	BCNF	create table user(user_id int primary key,name varchar(20), contact_no int(12),email_id varchar(30),gender varchar(10),aadhar_id int(16),dl_number varchar(20), vehicle_avail bool,share_allowed bool, pref_id int); alter table user add foreign key (pref_id) references preferences(pref_id);
Vehicle1	BCNF	create table vehicle1(vehicle_id int primary key, vehicle_no varchar(10),vehicle_model varchar(10) ,user_id int); alter table vehicle1 add foreign key (vehicle_model) references vehicle2(vehicle_model); alter table vehicle1 add foreign key (user_id) references user(user_id);
Vehicle2	BCNF	create table vehicle2(vehicle_model varchar(10) primary key,vehicle_type varchar(10));
R_address	BCNF	create table R_address(house_no int,landmark varchar(10),street_no int, city varchar(10), state varchar(20),user_id int); alter table r_address add foreign key (user_id) references user(user_id);
Preferences	BCNF	create table preferences(pref_id int,gender varchar(10),smoke bool,loud_music bool, open_shield bool,preffered_vehicle varchar(10));
Ride_info1	4NF	create table ride_info1(ride_id int, requestor_id int,provider_id int, request_time time,current_status varchar(10)); ALTER TABLE ride_info1 ADD UNIQUE KEY `my_unique_key` (`ride_id`, `requestor_id`);
Ride_info2	4NF	create table ride_info2(request_id int primary key,start_time time, destination varchar(10));
Plot_details1	BCNF	create table plot_details1(plot_reg_id varchar(10) primary key,plot_no int,street varchar(10), zipcode int,park_space_id int); alter table plot_details1 add foreign key (park_space_id) references parking_space_provider(park_space_id); alter table plot_details1 add foreign key (zipcode) references plot_details2(zipcode);
Plot_details2	BCNF	create table plot_details2(zipcode int primary key,city

		varchar(20),state varchar(20));
Parking_details	BCNF	create table parking_details(request_id int primary key, int_time time,out_time time, spot_no int,space_id int, user_id int); alter table parking_details add foreign key (user_id) references user(user_id);
Parking_space_provider	BCNF	create table parking_space_provider(park_space_id int,name varchar(20),contact_no int(12), email_id varchar(20),aadhar_id int(15)); alter table parking_space_provider add primary key (park_space_id);
Space	BCNF	create table space(space_id int primary key, 4wheeler int,2wheeler int, spot_avail bool,park_space_id int); alter table space add foreign key (park_space_id) references parking_space_provider(park_space_id);
Operator	BCNF	create table operator(name varchar(20), contact_no int(12),aadhar_id int(16), address varchar(40),space_id int); alter table operator add foreign key (space_id) references space(space_id);
Owns	Many(Vehicles) to One(User)	alter table vehicle1 add foreign key (user_id) references user(user_id);
Prefers	Many(User) to One(Preferences)	alter table user add foreign key (pref_id) references preferences(pref_id);
Lives_in	Many(User) to one(R_address)	alter table r_address add foreign key (user_id) references user(user_id);
Park_in	Many(User) to many(space)	create table parking_details(request_id int primary key, int_time time,out_time time, spot_no int,space_id int, user_id int);
Operates	One(space) to One(Operator)	alter table operator add foreign key (space_id) references space(space_id);
In	One(space) to One(Plot_detail)	alter table plot_details1 add foreign key (park_space_id) references parking_space_provider(park_space_id);
Owned_by	Many(space) to One(Parking_service_provider)	alter table parking_space_provider add primary key (park_space_id);

Has	Many(requester) to many(provider)	<pre> create table ride_info1(ride_id int,requestor_id int, provider_id int,request_time time, current_status varchar(10)); ALTER TABLE ride_info1 ADD UNIQUE KEY `my_unique_key` (`ride_id`,`requestor_id`); </pre>
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Sample Table Outputs

User:

	user_id	name	contact_no	email_id	gender	aadhar_id	dl_number	vehide_avail	share_allowed	pref_id
	1	Aman	7723929211	aman@oamil.com	male	123456789867	NULL	0	0	2
	2	Bobbv	1234567891	bobbv@gmail.com	male	987654321123	NULL	0	0	2
	3	Chaman	1982764912	chaman@gmail.com	male	1328746918	NULL	0	0	3
	4	Deepak	21124124122	Deepak@outlook.com	male	2346217364	DL1124	1	0	5
	5	Eric	26364873	Eric@onome.ora	male	73146932176	DL263	1	1	8
	6	Favaz	273636	Favaz@yahoo.com	male	2372462786	NULL	0	0	15
	7	Govind	36298198	Govinda@aalare.com	male	328719	DL13	1	0	31
	8	Harsh	3728947	harsh@dobhihaaat.com	male	37264289	NULL	0	0	9
	9	Isha	4129861936	isha@gmail.com	female	2478462	DL987	1	1	17
	10	Jack	234789423	jack@mars.com	male	1739849	DL141	1	0	12
	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Vehicle:

	vehide_id	vehicle_no	vehide_model	user_id
	1	Jk8727	hvundai	4
	2	JK8726	fortuner	4
	3	br3355	i20	5
	4	mt2344	passion plus	9
	5	mf4245	solendor	9
	6	pl235	arand	7
	7	dl1839	i20	7
	8	fi12398	arand	10
	9	fi202	fortuner	5
	NULL	NULL	NULL	NULL

R Address:

	house_no	landmark	street_no	city	state	user_id
	12	NIT Patna	5	patna	bihar	1
	2	DLF mall	7	delhi	delhi	2
	4	Ram mandir	9	avodhva	UP	3
	10	NIIT	12	neemrana	raiaasthan	4
	8	ooodle	16	bandlore	karnataka	5
	20	DUL ihil	6	sri nagar	J&K	6
	10	NIIT	12	neemrana	raiaasthan	7
	25	akshardham	18	delhi	delhi	8
	12	NIT Patna	5	patna	bihar	9
	26	ooodle	15	bandlore	karnataka	10

Preferences:

	pref_id	gender	smoke	loud_music	open_shield	preffered_vehicle
	1	0	0	0	0	0
	2	0	0	0	0	1
	3	0	0	0	1	0
	4	0	0	0	1	1
	5	0	0	1	0	0
	6	0	0	1	0	1
	7	0	0	1	1	0
	8	0	0	1	1	1
	9	0	1	0	0	0
	10	0	1	0	0	1
	11	0	1	0	1	0
	12	0	1	0	1	1
	13	0	1	1	0	0
	14	0	1	1	0	1

Ride info:

Table 1:

	ride_id	requestor_id	provider_id	request_time	current_status
	1	2	7	09:10:00	yes
	2	1	7	10:10:00	no
	3	4	7	05:10:00	yes
	2	3	7	16:10:00	no
	5	5	7	17:10:00	yes
	6	6	10	19:10:00	yes
	7	8	10	12:10:00	no

Table 2:

	request_id	start_time	destination
	1	10:00:00	iffco
	2	10:30:00	iisc
	3	09:10:00	niit
	4	11:00:00	nit
	5	02:00:00	aandhima
	6	02:50:00	nit
	8	03:00:00	iisc
	NULL	NULL	NULL

Space:

	space_id	4wheeler	2wheeler	spot_avail	park_space_id
	1	10	12	0	1
	2	13	7	1	2
	3	19	23	0	1
	4	12	12	0	3
	5	13	16	1	4
	6	14	23	1	5
	7	17	23	0	6
	8	32	4	0	7
	9	0	1	0	8
	10	1	0	1	9
	11	2	0	1	10
	NULL	NULL	NULL	NULL	NULL

Parking_space_provider:

	park_space_id	name	contact_no	email_id	aadhar_id
	1	mainu	34852975	mainu@laila.com	6589752357290
	2	amit	68952790	amit@kumar.com	97459208230805
	3	robin	67625343	robin@lobo.com	26559835980
	4	raian	736259237	raian@raiu.com	527268952148
	5	raiu	48797509445	raiu@raian.com	6589348749
	6	preetv	7856825942	preetv@zalim.com	7488937690
	7	manoi	65837246	manoi@aalsi.com	625368568
	8	rohit	674365629	rohit@ikdf.com	72697532023
	9	reshma	6389725729	reshma@poot.com	6348062002390
	10	priva	56237689589	priva@tvuo.com	672859825787
	NULL	NULL	NULL	NULL	NULL

Operator:

	name	contact_no	aadhar_id	address	space_id
	dankai	31879346	13907567	abc oef hahd	1
	pvush	31874346	11907567	abc dlskdfef hahd	2
	praneet	318719346	313907567	sdfsabc oef hahd	3
	sanoamesh	231879346	113907567	askdoef hahd	4
	shivam	131879346	113907567	akhd oef hahd	5
	shourva	131879346	139027567	weufhahd	6
	shivangi	879346	907567	ziizoef hahd	7
	isha	3179346	13907567	kidwoef hahd	8
	hitesh	131879346	113907567	aKJSJDH ksidhK	9
	ANIRBAN	31179346	913907567	WEST BENGAL	10
	NULL	NULL	NULL	NULL	NULL

Parking_deatails:

	request_id	int_time	out_time	spot_no	space_id	user_id
	1	10:00:00	17:00:00	4	1	2
	2	11:00:00	13:00:00	2	2	3
	3	12:00:00	12:30:00	6	1	3
	4	13:00:00	14:50:00	2	2	5
	5	14:00:00	17:20:00	7	5	7
	6	15:00:00	17:00:00	12	5	9
	7	12:30:00	13:20:00	19	2	7
	8	09:10:00	19:00:00	2	2	4
	9	08:00:00	11:00:00	1	7	6
	10	15:00:00	14:00:00	7	8	1
	NULL	NULL	NULL	NULL	NULL	NULL

Plot_details:

Table 1:

	plot_reg_id	plot_no	street	zipcode	park_space_id
	U10111	2	ram mara	845401	7
	U10112	12	ma road	110092	9
	U10113	23	iffco	110092	8
	U10114	7	oanthima	301705	1
	U10115	1	iit	845401	2
	U10116	9	nit	11632	4
	U10117	10	niit	301705	3
	U10118	6	iisc	845401	5
	U10119	8	iit	11632	6
	U10120	24	nift	110092	10
	NULL	NULL	NULL	NULL	NULL

Table 2:

	zipcode	city	state
	11632	banoalore	karnataka
	110092	delhi	delhi
	165732	oatna	bihar
	301705	neemrana	raiaasthan
	845401	avodhva	UP
	NULL	NULL	NULL