SJSU Parking Database Management

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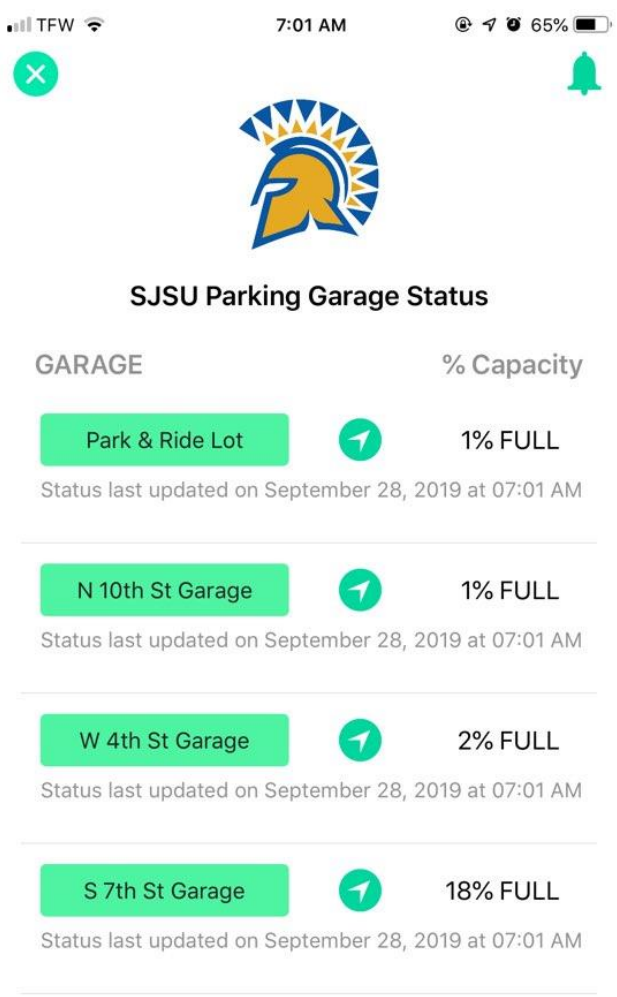
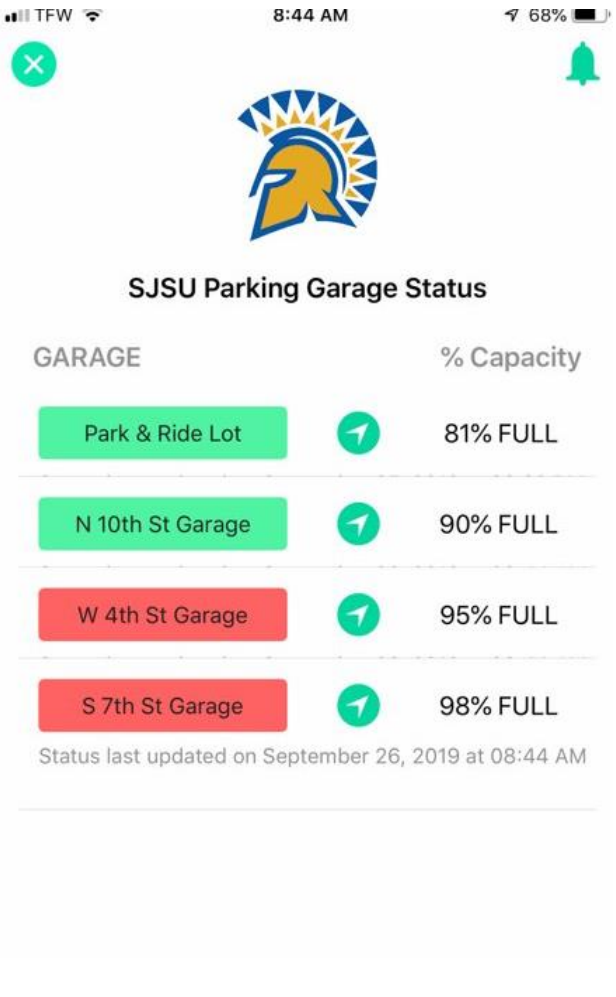
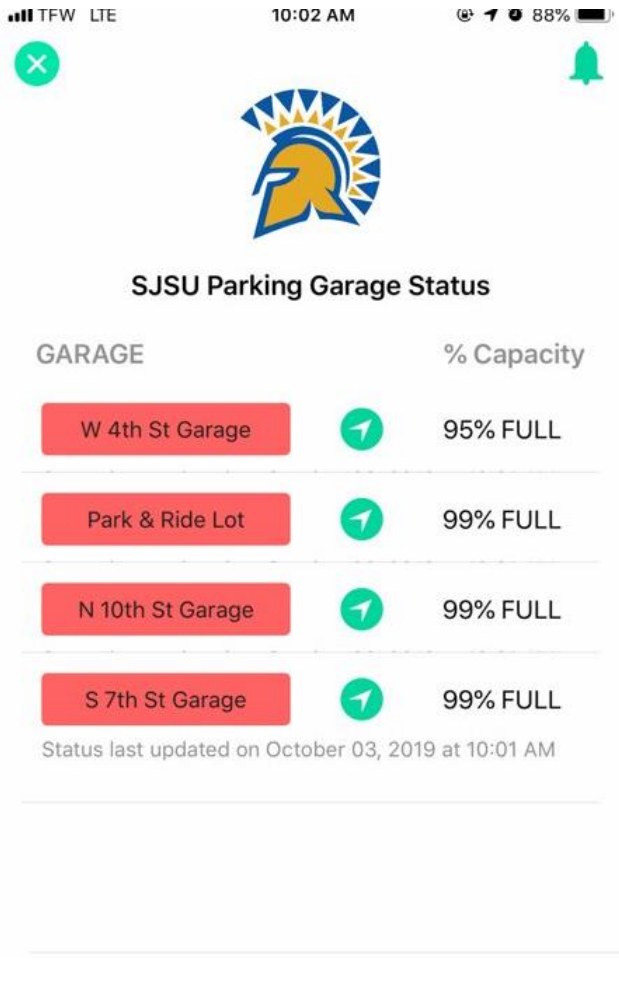
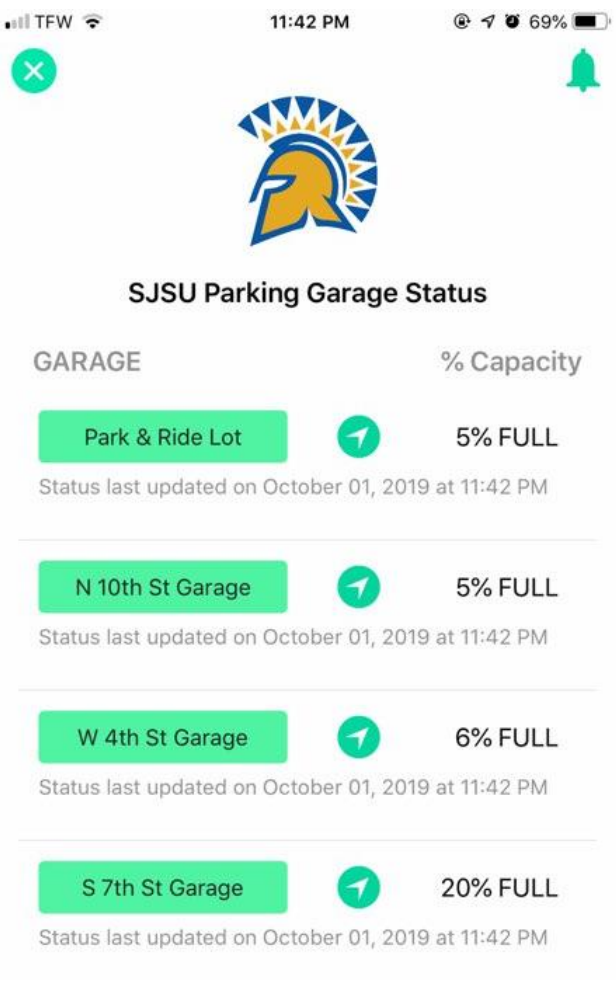
San José State UNIVERSITY

Reference- ParkStash App for Real Time Data









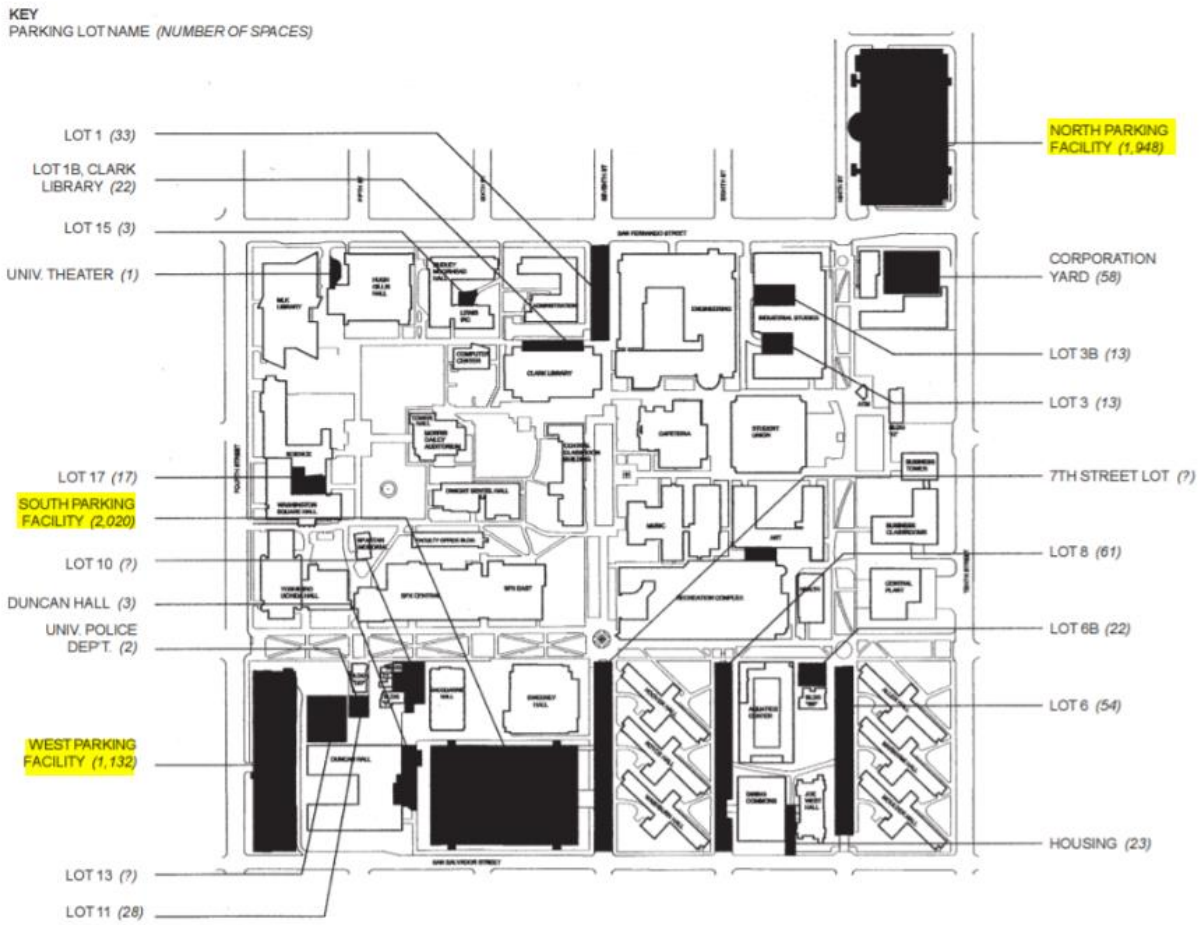
Contents

Introduction

INTERVIEWED SJSU PARKING SERVICES MANAGERS

RESEARCHED

SJSU's Parking System



- SJSU parking spaces: 6,600
- Campus population: over 36,000 students & 4,300 employees

Major Challenges

Lack of parking space for students

Preference of certain parking lots over others

Low turnover of cars in lots

Business Plan

Improve parking system efficiency by:

Identifying the consumer base

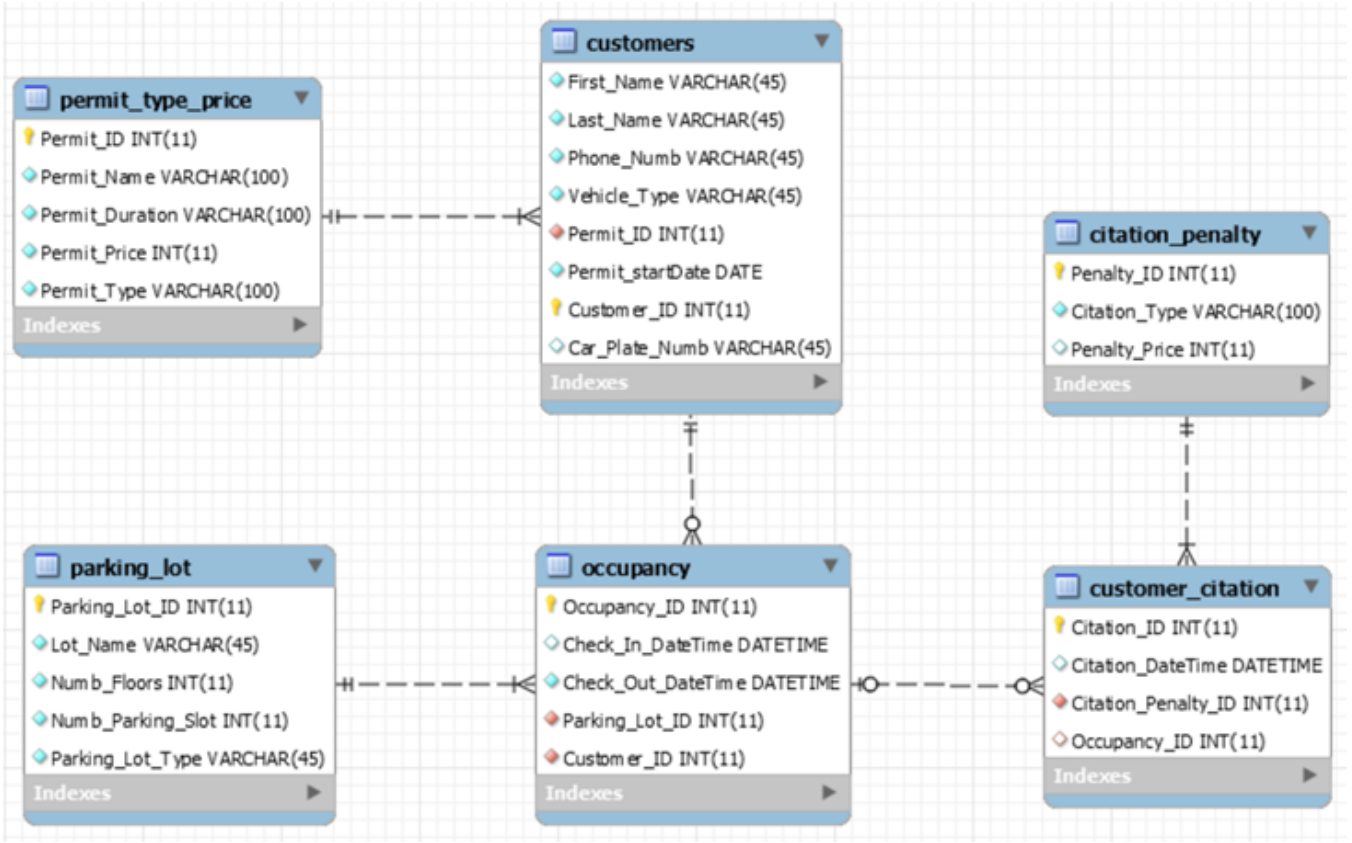
Classifying the number of permit holders in each category

Exploring the most preferred parking lots by different permit holders

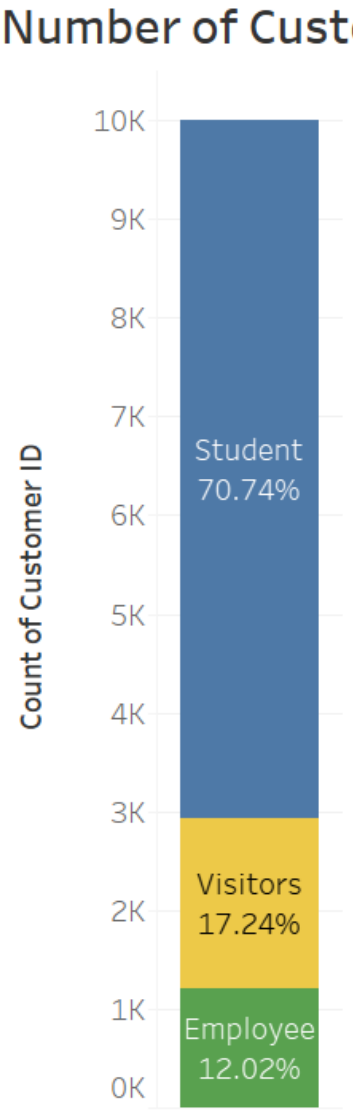
Detecting overstaying vehicles by permit holders

Finding the most frequently issued citations

Parking Database ER Diagram



Query 1) How many permits are issued for students, visitors and employees each?

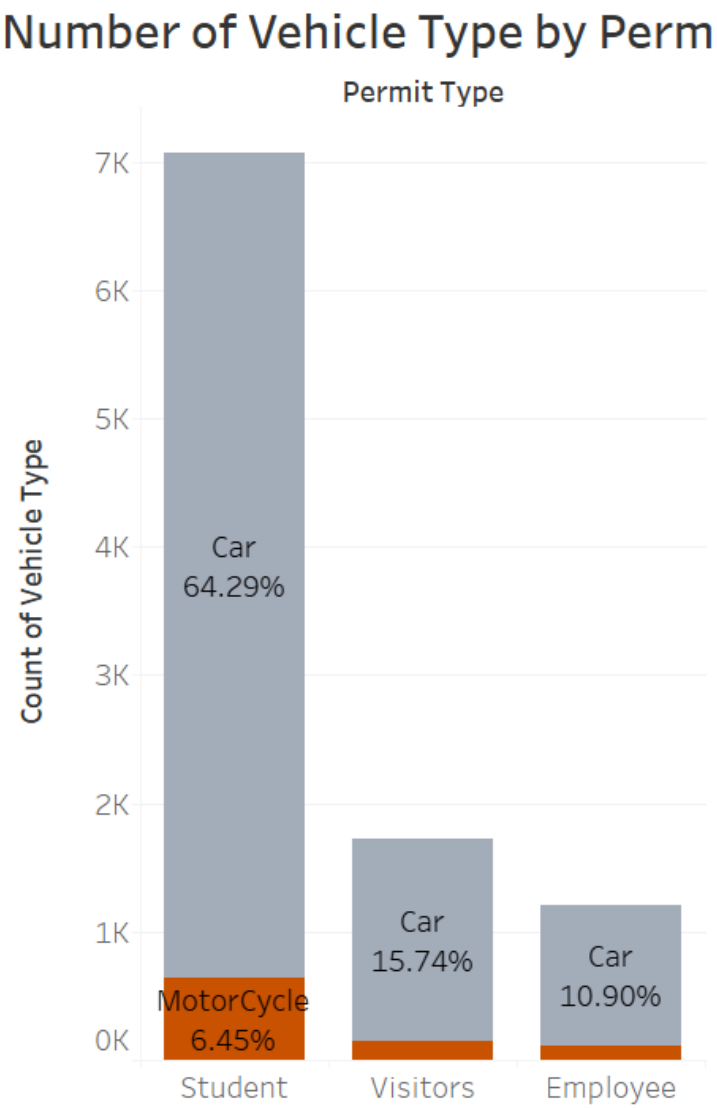



```sql
select permit_type, count(customer_id) as Count_by_permit_type
from customers
join permit_type_price
using (permit_id)
group by 1
```

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

permit_type	Count_by_permit_type
Student	7074
Visitors	1724
Employee	1202

Query 2) What are the different vehicle types used by permit holders?



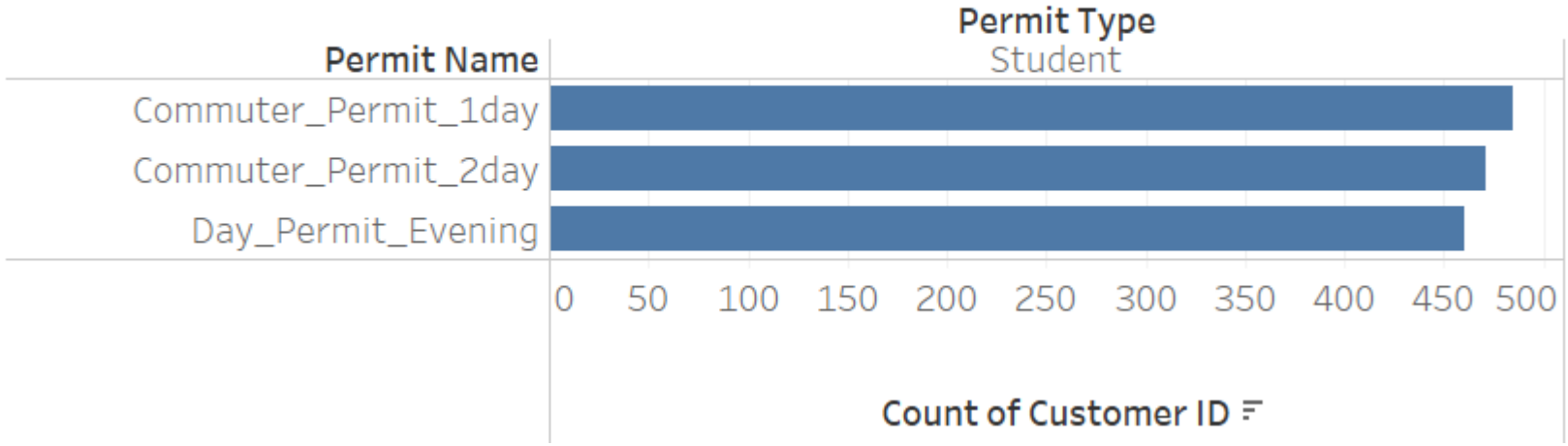

```
1 •  SELECT permit_type, vehicle_type, count(vehicle_type)
2    from customers
3    join permit_type_price
4    using (permit_id)
5    group by 1,2
```

esult Grid | Filter Rows: | Export: | Wrap Cell Conten

permit_type	vehicle_type	count(permit_type)
Student	Car	6429
Student	MotorCycle	645
Visitors	Car	1574
Visitors	MotorCycle	150
Employee	Car	1090
Employee	MotorCycle	112

Query 3) What are the names and the number of top 3 permits sold by students?

Top 3 Permits Sold by Students

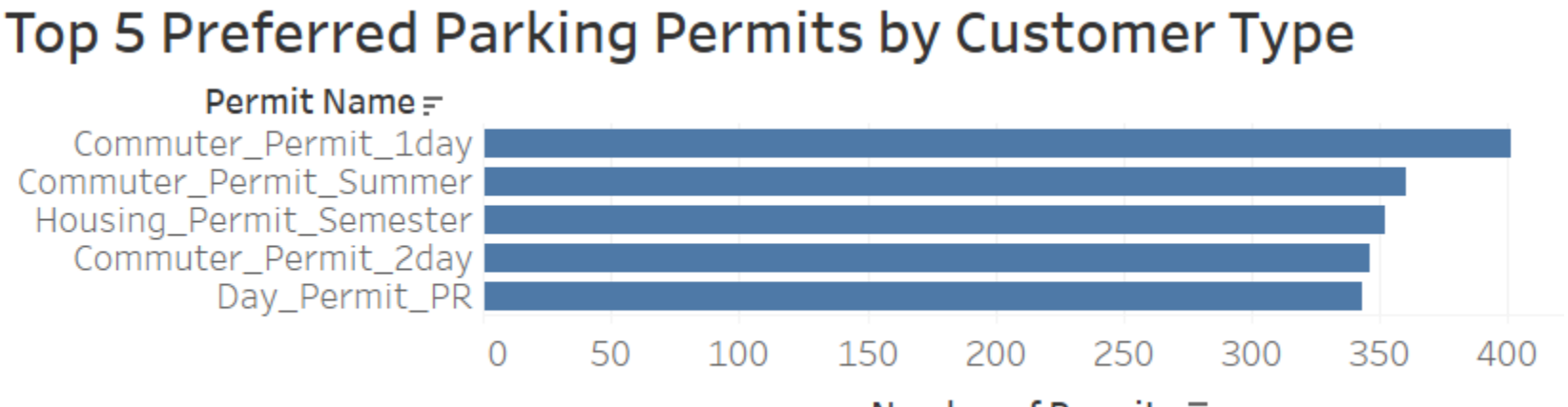



```
1  SELECT permit_type, permit_name, count(customer_id) as Count_by_permit_type
2  from customers
3  join permit_type_price
4  using (permit_id)
5  where permit_type = "Student"
6  group by 2
7  order by 3 desc
8  limit 3
```

sult Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

permit_type	permit_name	Count_by_permit_type
Student	Commuter_Permit_1day	485
Student	Commuter_Permit_2day	471
Student	Day_Permit_Evening	460

Query 4) Show top 5 permit name and # of vehicles checked in/out on 2019/11/05 by students.

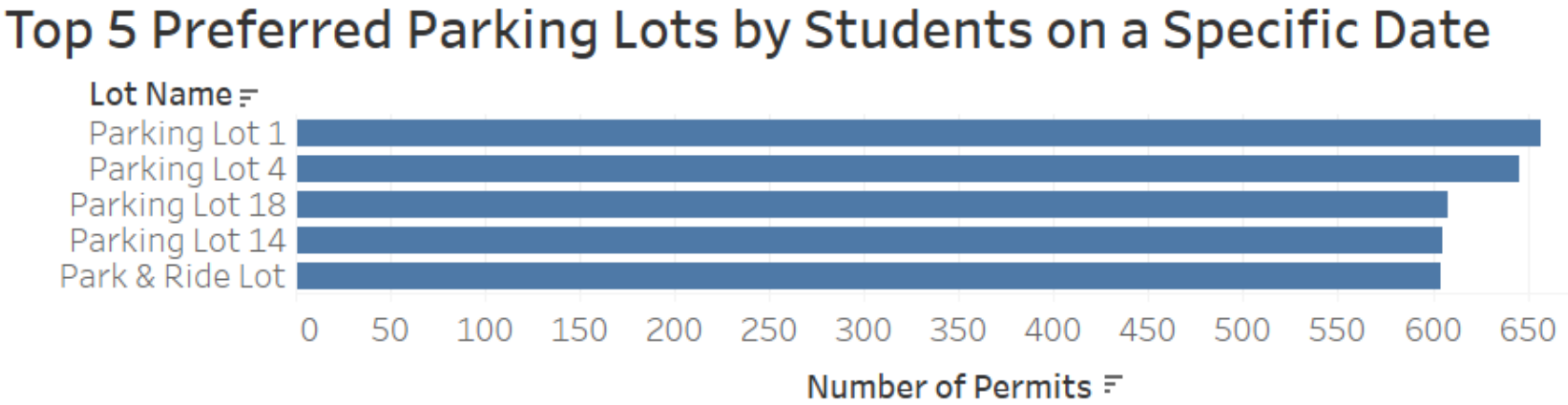



```
1   Select permit_name, permit_type, count(*)
2   as "# of Vehicles Chcked in & Out on 2019/11/05"
3   From occupancy join customers using (customer_id)
4   Join permit_type_price using (permit_id)
5   Where date(check_in_datetime) = "2019-11-05"
6   And date(check_out_datetime) = "2019-11-05"
7   And permit_type = "Student"
8   Group by permit_name
9   Order by 3 desc
10  limit 5
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

permit_name	permit_type	# of Vehicles Chcked in & Out on 2019/11/05
Commuter_Permit_1day	Student	401
Commuter_Permit_Summer	Student	360
Housing_Permit_Semester	Student	352
Commuter_Permit_2day	Student	346
Day_Permit_PR	Student	343

Query 5) What is the preferred parking lots by students on a specific date?

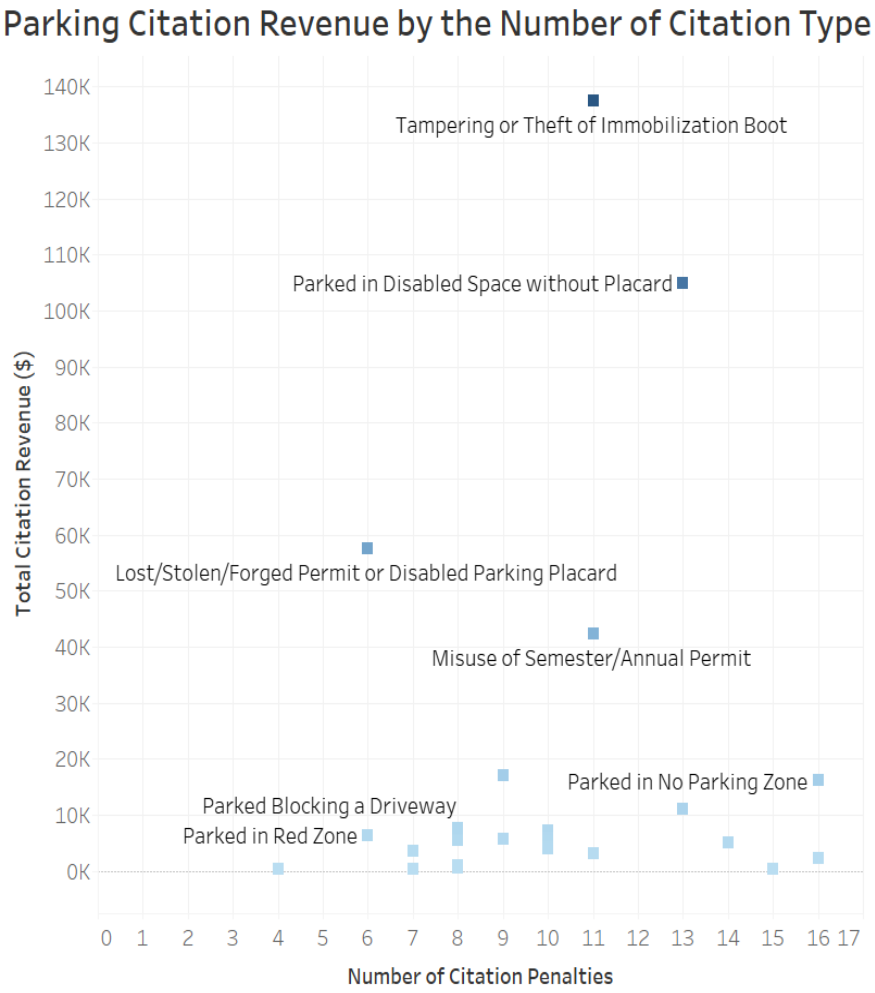



```sql
select lot_name as preferred_parking_lot, permit_type,
count(permit_id) as permit_count
from parking_lot
join occupancy using (parking_lot_id)
join customers using (customer_id)
join permit_type_price using (permit_id)
where date(check_in_datetime) = "2019-11-05"
and permit_type = "Student"
group by 1,2
order by 3 desc
limit 5
```

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

preferred_parking_lot	permit_type	permit_count
Parking Lot 1	Student	657
Parking Lot 4	Student	646
Parking Lot 18	Student	608
Parking Lot 14	Student	605
Park & Ride Lot	Student	604

Query 6) What is the revenue generated by each citation type?




```sql
select cp.citation_type,
count(cc.Citation_Penalty_ID) as "# of Citations", cp.penalty_price,
count(cc.Citation_Penalty_ID)*cp.penalty_price as "Total Citation Revenue"
from customer_citation cc
join citation_penalty cp on cc.Citation_Penalty_ID = cp.Penalty_ID
group by cc.Citation_Penalty_ID
order by 4 desc
```

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

citation_type	# of Citations	penalty_price	Total Citation Revenue
Tampering or Theft of Immobilization Boot	11	500	5500
Parked in Disabled Space without Placard	13	351	4563
Lost/Stolen/Forged Permit or Disabled Parking Pl...	6	400	2400
Misuse of Semester/Annual Permit	11	175	1925
Parked in No Parking Zone	16	53	848
Altered Permit	9	90	810
Boot Removal Fee	13	50	650
False Vehicle Alarm	14	45	630
Storing a Vehicle on Campus Over 72 Hours	10	45	450
No Valid Permit	10	45	450
Not Parked in a Marked Stall	10	45	450
Parked in a Bus Loading Zone	10	45	450
Parked in a Passenger Loading/Unloading Zone	10	45	450
Parked Over the Time Limit	11	40	440
Parked Blocking a Driveway	8	53	424
Parked in Special Purpose Zone	9	45	405
Parked Overnight without Resident or Overnigh...	16	23	368
Parked in 2 or More Spaces	8	45	360
Expired Hourly Permit	15	23	345
Parked in Red Zone	6	53	318
Other Parking Violation	7	45	315
Failure to Properly Display a Valid Permit	8	23	184
Parked On Wrong Day with Permit	8	23	184
Failure to Properly Display a DMV Placard	7	23	161
Not Parked within Stall Lines	4	23	92

Conclusion

Starting with identifying entities, relationships and designing an ER diagram, we forward engineered to create this smaller replica of SJSU parking database. We downloaded the required fictitious data from mockaroo.com.

Analyzed the data and explored the consumer base. We looked at the counts of different types of permits issued, vehicle types of permit holders etc.

Identified violation of parking hours by different permit holders

Analyzed the revenue from different citations.

Future Scope:

Work on	Work on SJSU real time parking datasets
Perform and analyze	Perform and analyze the machine learning algorithms for the real dataset and work towards a smart parking system.
Explore	Explore alternative modes of commute for effective parking management system using real time dataset


THANK
YOU!
FOR
PARKING
WITH US