

### Examine the Data

1. Find the total number of tickets for the year.

Total number of tickets are 5431918

2. Find out the number of unique states from where the cars that got parking tickets came.

64 unique states are present where cars got the parking tickets after replacing 99 by 'NY'.

Registration State	count
NY	4273951
NJ	475825
PA	140286
CT	70403
FL	69468
IN	45525
MA	38941
VA	34367
MD	30213
NC	27152
TX	18827
IL	18666
GA	17537
99	16055
AZ	12379
OH	12281
CA	12153
ME	10806
SC	10395
MN	10083

### Aggregation tasks

1. How often does each violation code occur? Display the frequency of the top five violation codes.

Frequency of top 5 violation codes is shown below:

Violation Code	Frequency
21	768087
36	662765
38	542079
14	476664
20	319646

2.How often does each 'vehicle body type' get a parking ticket? How about the 'vehicle make'?

#### Frequency for 'Vehicle Body Type'

Vehicle Body Type	count
SUBN	1883954
4DSD	1547312
VAN	724029
DELV	358984
SDN	194197
PICK	135772
2DSD	135707
REFG	59641
TRAC	40030
TAXI	32608
UTIL	31135
BUS	24749
4 DR	24153
CONV	22064
nan	20201
WAGO	17465
4D	16647
TRLR	14281
MCY	12838
TK	11386

only showing top 20 rows

#### Frequency for 'Vehicle Make Type'

Vehicle Make	count
FORD	636844
TOYOT	605291
HONDA	538884
NISSA	462017
CHEVR	356032
FRUEH	230787
ME/BE	197568
DODGE	187729
BMW	186700
JEEP	175815
HYUND	148657
INTER	128737
GMC	127581
LEXUS	122078
ACURA	100637
INFIN	88572
CHRY	85573
VOLKS	85051
SUBAR	71791
AUDI	68854

3.1 Violation Precinct' (This is the precinct of the zone where the violation occurred). Using this, can you draw any insights for parking violations in any specific areas of the city?

Top 5 violation precincts are mentioned below.

Violation Precinct  count	
	19 274445
	14 203553
	1 174702
	18 169131
	114 147444

3.2 'Issuer Precinct' (This is the precinct that issued the ticket.)

Top 5 Issuer precincts are mentioned below

Issuer Precinct  count	
	19  266961
	14  200495
	1  168740
	18  162994
	114  144054

4.Find the violation code frequencies for three precincts that have issued the most number of tickets. Do these precinct zones have an exceptionally high frequency of certain violation codes? Are these codes common across precincts?

Top 3 issuer precincts are 19,14 and 1.(0 is an erroneous entry so ignoring it)

Top 5 Violation Codes frequencies for issuer precinct 19

Violation Code Frequency	
	46  48445
	38  36386
	37  36056
	14  29797
	21  28415

Top 5 Violation Codes frequencies for issuer precinct 14

Violation Code	Frequency
14	45036
69	30464
31	22555
47	18364
42	10027

Top 5 Violation Codes frequencies for issuer precinct 1

Violation Code	Frequency
14	38354
16	19081
20	15408
46	12745
38	8535

Some conclusions drawn from above results

1. 14 violation code is common for all three issuer precincts.
2. For issuer precinct 19, 46 violation code has exceptionally high frequency of 48445.
3. For issuer precinct 14 and 1, 14 violation code has exceptionally high frequency of ~3800 - 45000

5. Find out the properties of parking violations across different times of the day:

No null values present in Violation Time column

Dividing data frame into 6 time intervals namely 12AM-3AM, 4AM-7AM, 8AM-11AM, 12PM-3PM, 4PM-7PM, 8PM-11PM

Finding top 3 violation codes for all 6 time buckets 12AM-3AM, 4AM-7AM, 8AM-11AM, 12PM-3PM, 4PM-7PM, 8PM-11PM

Top 3 Violation Codes frequencies for 12AM-3AM

Violation Code	Frequency
21	34703
40	23628
14	14168

Top 3 Violation Codes frequencies for 4AM-7AM

Violation Code	Frequency
14	74114
40	60652
21	57897

Top 3 Violation Codes frequencies for 8AM-11AM

Violation Code	Frequency
21	1182689
36	751422
38	346518

Top 3 Violation Codes frequencies for 12PM-3PM

Violation Code	Frequency
36	286284
38	240721
37	167025

Top 3 Violation Codes frequencies for 4PM-7PM

Violation Code	Frequency
38	203232
37	145784
14	144749

Top 3 Violation Codes frequencies for 8PM-11PM

Violation Code	Frequency
7	26293
40	22337
14	21045

Three most commonly occurring as found above are 21,36 and 38 (Answer to 1 question)

Violation Code	Common Time of Day
21	8AM-11AM
36	8AM-11AM
38	8AM-11AM

6. Let's try and find some seasonality in this data:

First, divide the year into a certain number of seasons, and find the frequencies of tickets for each season.

Dividing data frame into 4 seasons namely SPRING,SUMMER,FALL,WINTER.

Frequencies of tickets for each season.

```
Season|Frequency|
+-----+-----+
|SPRING| 2873383|
|WINTER| 1704690|
|SUMMER| 852866|
| FALL| 979|
+-----+-----+
```

Top 3 Violation Codes frequencies for SPRING

```
+-----+-----+
|Violation Code|Frequency|
+-----+-----+
| 21| 402424|
| 36| 344834|
| 38| 271167|
+-----+-----+
```

Top 3 Violation Codes frequencies for WINTER

```
+-----+-----+
|Violation Code|Frequency|
+-----+-----+
| 21| 238183|
| 36| 221268|
| 38| 187386|
+-----+-----+
```

Top 3 Violation Codes frequencies for FALL

```
+-----+-----+
|Violation Code|Frequency|
+-----+-----+
| 46| 231|
| 21| 128|
| 40| 116|
+-----+-----+
```

Top 3 Violation Codes frequencies for SUMMER

```
+-----+-----+
|Violation Code|Frequency|
+-----+-----+
| 21| 127352|
| 36| 96663|
| 38| 83518|
+-----+-----+
```

7. Find the total occurrences of the three most common violation codes.

Violation Code	Frequency
21	768087
36	662765
38	542079
14	476664
20	319646

Top 3 violations codes are 21,36 and 38.

Calculating Average fine for top 3 violations codes

Violation Code	Fine (highest-density)	Fine (Other areas)	Avg Fine
21	\$65	\$45	\$55
36	\$50	\$50	\$50
38	\$65	\$35	\$50

Total amount for violation code 21.

Total_amount
42244785

Total amount for Violation Code 36

Total_amount
33138250

Total amount for Violation Code 38

Total_amount
27103950

Violation code 21 has the highest total amount i.e. \$42,244,785