In [1]:
```
import pandas as pd
import numpy as np
import csv

import scipy.stats as scs
import statsmodels.api as sm
import statsmodels.formula.api as sms
import scipy.stats as stats

from pltfunctions import hist_kde_plots
from haversine import haversine
from math import sqrt

from sklearn.model_selection import train_test_split, cross_val_score
from sklearn.linear_model import LinearRegression
from sklearn.feature_selection import f_regression
import sklearn.metrics as metrics

import matplotlib.pyplot as plt
import seaborn as sns
```

Question 2

What times of the day and on what weekdays are traffic col common?

In [2]:
```
df = pd.read_csv(r'data\Sample2.csv')
```

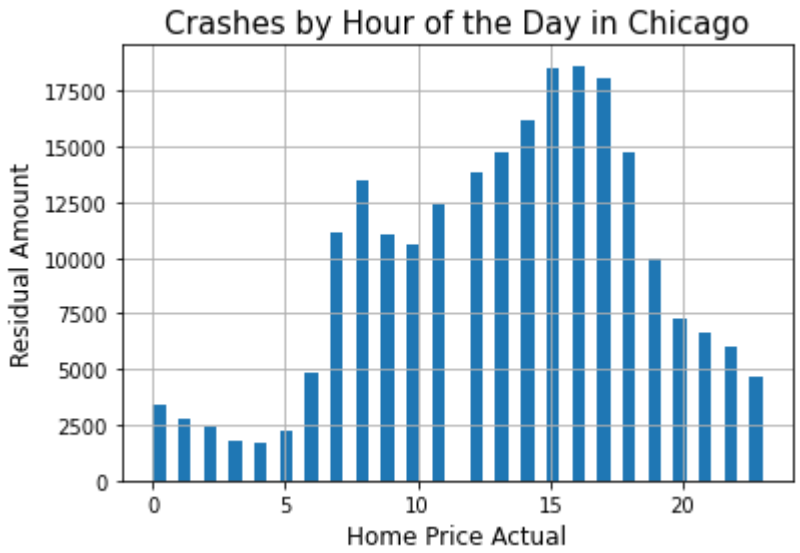
In [3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 226982 entries, 0 to 226981
Data columns (total 49 columns):
 #   Column                          Non-Null Count   Dtype  
---  ------                          --------------   -----  
 0   Unnamed: 0                      226982 non-null  int64  
 1   CRASH_DATE_x                    226982 non-null  int64  
 2   UNIT_TYPE                       226982 non-null  object 
 3   MAKE                            226982 non-null  object 
 4   MODEL                           226982 non-null  object 
 5   VEHICLE_DEFECT                  226982 non-null  object 
 6   VEHICLE_TYPE                    226982 non-null  object 
 7   VEHICLE_USE                     226982 non-null  object 
 8   MANEUVER                        226982 non-null  object 
 9   OCCUPANT_CNT                    226982 non-null  float64
 10  CRASH_DATE_y                    226982 non-null  object 
 11  POSTED_SPEED_LIMIT              226982 non-null  int64  
 12  TRAFFIC_CONTROL_DEVICE          226982 non-null  object 
 13  DEVICE_CONDITION                226982 non-null  object 
 14  WEATHER_CONDITION               226982 non-null  object 
 15  LIGHTING_CONDITION              226982 non-null  object 
 16  FIRST_CRASH_TYPE                226982 non-null  object 
 17  TRAFFICWAY_TYPE                 226982 non-null  object 
 18  ALIGNMENT                       226982 non-null  object 
 19  ROADWAY_SURFACE_COND            226982 non-null  object 
 20  ROAD_DEFECT                     226982 non-null  object 
 21  REPORT_TYPE                     226982 non-null  object 
 22  CRASH_TYPE                      226982 non-null  object 
 23  DAMAGE                          226982 non-null  object 
 24  PRIM_CONTRIBUTORY_CAUSE         226982 non-null  object 
 25  SEC_CONTRIBUTORY_CAUSE          226982 non-null  object 
 26  BEAT_OF_OCCURRENCE              226982 non-null  float64
 27  NUM_UNITS                       226982 non-null  int64  
 28  MOST_SEVERE_INJURY              226982 non-null  object 
 29  INJURIES_TOTAL                  226982 non-null  float64
 30  INJURIES_FATAL                  226982 non-null  float64
 31  INJURIES_INCAPACITATING         226982 non-null  float64
 32  INJURIES_NON_INCAPACITATING     226982 non-null  float64
 33  INJURIES_REPORTED_NOT_EVIDENT   226982 non-null  float64
 34  INJURIES_NO_INDICATION          226982 non-null  float64
 35  INJURIES_UNKNOWN                226982 non-null  float64
 36  CRASH_HOUR                      226982 non-null  int64  
 37  CRASH_DAY_OF_WEEK               226982 non-null  int64  
 38  CRASH_MONTH                     226982 non-null  int64  
 39  LATITUDE                        226982 non-null  float64
 40  LONGITUDE                       226982 non-null  float64
 41  PERSON_ID                       226982 non-null  object 
 42  PERSON_TYPE                     226982 non-null  object 
 43  CRASH_DATE                      226982 non-null  object 
 44  SEX                             226982 non-null  object 
 45  SAFETY_EQUIPMENT                226982 non-null  object 
 46  AIRBAG_DEPLOYED                 226982 non-null  object 
 47  EJECTION                        226982 non-null  object 
```

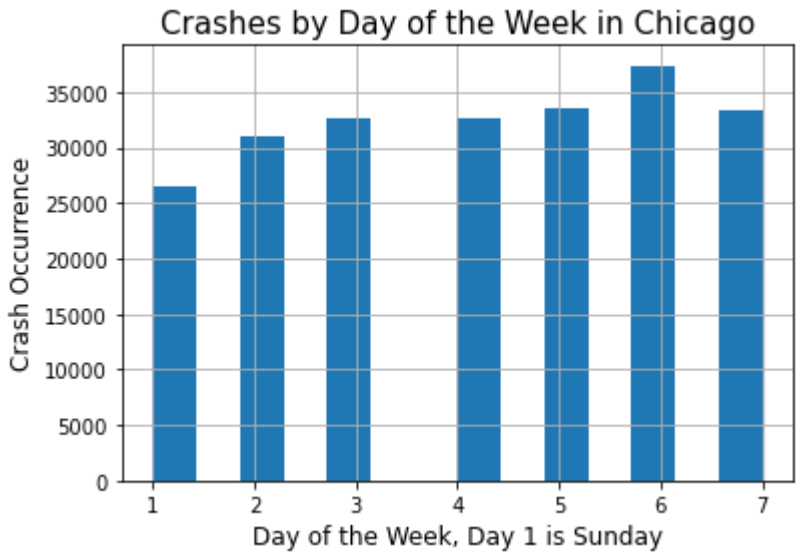
```
 48  INJURY_CLASSIFICATION          226982 non-null  object
dtypes: float64(11), int64(7), object(31)
memory usage: 84.9+ MB
```

In [14]:

```
df['CRASH_HOUR'].hist(bins=48)
plt.title("Crashes by Hour of the Day in Chicago",fontsize=15)
plt.ylabel('Crash Occurrence',fontsize=12)
plt.xlabel('Hour of the Day', fontsize=12)
plt.show()
```

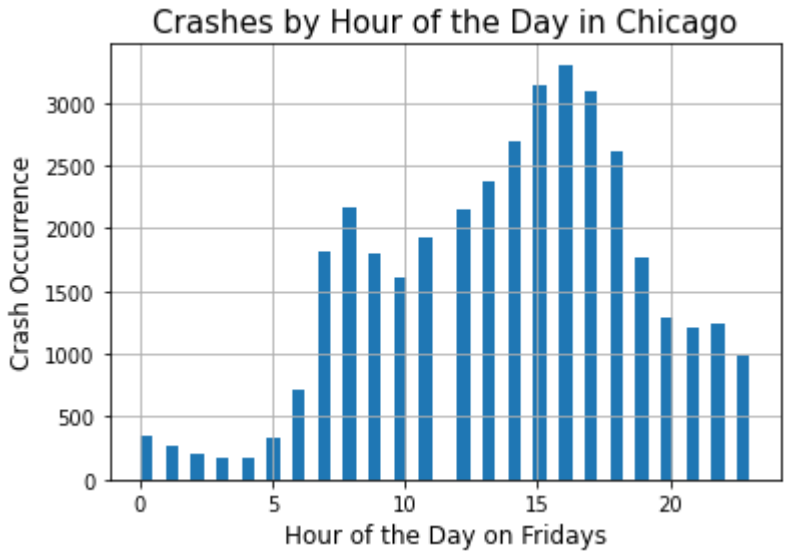


In [16]:
```
df['CRASH_DAY_OF_WEEK'].hist(bins=14)
plt.title("Crashes by Day of the Week in Chicago",fontsize=15)
plt.ylabel('Crash Occurrence',fontsize=12)
plt.xlabel('Day of the Week, Day 1 is Sunday', fontsize=12)
plt.show()
```



In [17]:
```
df1=df[df['CRASH_DAY_OF_WEEK']==6]
```

In [21]:
```
# Let's also look at just Friday, Day 6
df1['CRASH_HOUR'].hist(bins=48)
plt.title("Crashes by Hour of the Day in Chicago",fontsize=15)
plt.ylabel('Crash Occurrence',fontsize=12)
plt.xlabel('Hour of the Day on Fridays', fontsize=12)
plt.show()
```



In [22]:
```
# Similar pattern to the entire week
```

Question 2 Insights

The hours between 2 and 6 pm see elevated accident rates - this is invariab
when there are simply more vehicles on the roads and increased opportunit
there are more accidents on Fridays, the pattern for accidents by the hour is
rest of the week.

In [ ]: