**Exercise: Go from mockup to build in Matplotlib**

We’ll take a look at Question 1 from the VAST Challenge 2017 MC1. The dataset is available on this page, as well as additional description of Question 1: http://vacommunity.org/tiki-index.php?page=VAST+Challenge+2017+MC1&ok=y

Make a series of six different graphics in Matplotlib that explore patterns of activity in the park:

1. Plot a histogram of car types at entrance 1.
2. Plot histograms of car types at all entrances.
3. Plot the count of daily visits grouped by day for the whole dataset.
   1. Hint: The groupby() method of pandas works like this:  
      g = df.groupby(pd.DatetimeIndex(pd.to\_datetime(df["Timestamp"])).date)  
      then you can plot the counts by using g.count()
4. Same as plot (3), but plot a separate line for each car type.
   1. Hint 1: It will help to loop over the car-types, and do a group by within each car-type.  
      for car\_type in df["car-type"].unique():  
       g = df[df["car-type"] == car\_type].groupby(pd.DatetimeIndex(df[df["car-type"] == car\_type]["Timestamp"]).date)
   2. Hint 2: Make sure to add a legend!
5. Repeat plot 3, but group by the hour.
6. Repeat plot 4, grouping by the day of week, and show a stacked bar chart for each car type.
   1. Hint 1: pd.DatetimeIndex has the attribute .dayofweek.
   2. Hint 2: You can loop over the car types again, and to stack the bars, use plt.bar() with argument bottom=prev (where prev is the height of the bars from before). It may help to start with prev = np.zeros(7) outside of the loop, and add to it at the end of each loop (prev += g.count().Timestamp.values)

Did you learn anything interesting about the activity patterns in the park? Upload your six plots and a sentence about what you observe.

Here is some starter code to load the dataset into Pandas:

import pandas as pd

import matplotlib.pyplot as plt

import numpy as np

%matplotlib inline

df = pd.read\_csv("data/Lekagul-Sensor-Data.csv")

If you’re still not sure how to get started, here is the first of the graphics:

plt.hist(pd.to\_numeric(df[df["gate-name"] == "entrance1"]["car-type"]),bins=np.arange(6)+0.5)

plt.xlabel("Car type")

plt.ylabel("Count")

plt.title("Count of car types at entrance1")



You final graphic should look something like:

