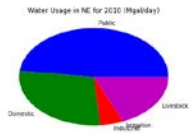


College of Engineering

CSE 231

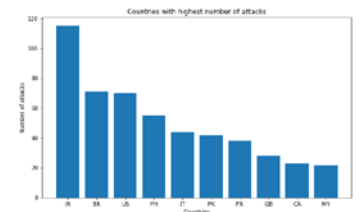
The goal of CSE 231 is that when students are presented with a problem they will say “I can write a program to solve that!” The theme is to take real data and analyze it. The course is the first course for CS majors so the focus is CS fundamentals, but students from a broad swath of majors across campus have found it useful so there are many more non-majors than majors. The course uses Python, and assumes no prior programming. Below is a sampling of the weekly programming projects from Fall 2017 (incorporating the list, set, and dictionary Python data structures).

Project 6 (week 8) Using U.S. Geological Survey data (usgs.gov) students analyzed water usage of five types: public, domestic, industrial, irrigation, and livestock. Generating data such as this, as well as making a pie chart.

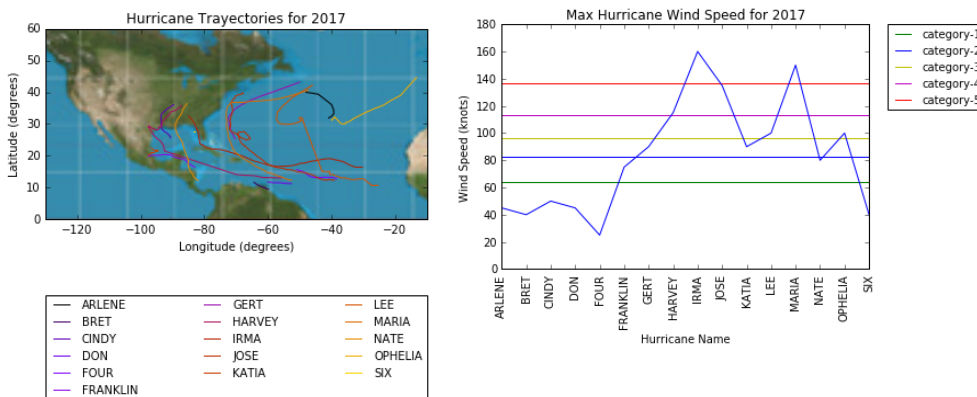


County	Population	Total (Mgal/day)	Per Person (Mgal/person)
Alcona County	10,942	6.29	0.0006
Alger County	9,601	5.59	0.0006
Allegan County	111,408	23.59	0.0002
Alpena County	29,598	120.32	0.0041

Project 7 (week 9) Daily we collected IP addresses from attacks on the CSE computer systems (using the most-significant numbers, a.k.a. Class C for privacy). We then asked the question: “What countries did the most attacks come from?” To answer that students had to merge information from three files: the attack IP addresses, a mapping of IP addresses to country codes, and a mapping of country codes to full country names, e.g. UK for United Kingdom). They then sorted by attack counts and plotted the top ten:

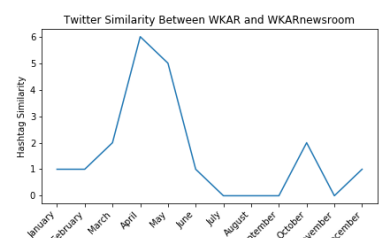


Project 8 (week 10) Using data from the National Hurricane Center (nhc.noaa.gov) students extracted trajectories and maximum wind speed by hurricane and plotted them.



Project 9 (week 11) Using Twitter data (twitter.com) of tweets using a selection of MSU related hashtags from MSU users, students wrote a program to address the following questions related to this data set:

- “What are the most common hashtags used by users *collectively*?”
- “What are the most common hashtags used by users as *individuals*?”
- “How does hashtag *similarity* between two users vary over time?”



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