

# My Favorite Programming Assignments

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# Direction to Anywhere

- A simple first week program calculates the compass direction from one place on the globe to another

$$\text{direction} = \text{atan2}(\sin(\text{longitude} - \text{startLong}) * \cos(\text{latitude}), \cos(\text{startLat}) * \sin(\text{latitude}) - \sin(\text{startLat}) * \cos(\text{latitude}) * \cos(\text{longitude} - \text{startLong}))$$

requires: Math equations

# Reading Level

- Roughly approximate reading difficulty by measuring the
  - number of letters / word
  - number of words / sentence
- requires: reading text files

# Medium Data

- The federal government agencies have a mandate to make their information available
- **data.gov** has lots of useful (*and otherwise*) data
- Frequently I edit the data to remove some (but not all) of the irrelevant information

# Average Date of Last Frost

- You can get customized data files from the National Climatic Data Center
- Students write a program to calculate the last day before July 1 that has a temperature before freezing
- They then must average the last day for each year
- Requires: reading text files

# Drunk Drivers

- The National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) has a census of all fatal accidents
- The students write a program to display the percentage of fatal accidents that involve a drunk driver for each hour
- requires: reading text files and one dimensional arrays