1. Welcome to the Nanodegree
   1. Welcome to the MLND Program
      1. Welcome to MLND
      2. Announcement
      3. Program Readiness
      4. What is Machine Learning
      5. Machine Learning vs. Traditional Coding
      6. Quiz: Applications of Machine Learning
      7. Connections to the GA Tech
      8. Program Outline
   2. What is Machine Learning
      1. Introduction to Machine Learning
      2. Decision Trees
      3. Decision Trees Quiz
      4. Decision Trees Answer
      5. Naïve Bayes
      6. Naïve Bayes Quiz
      7. Naïve Bayes Answer
      8. Gradient Descent
      9. Linear Regression Quiz
      10. Linear Regression Answer
      11. Logistic Regression Quiz
      12. Logistic Regression Answer
      13. Support Vector Machines
      14. Support Vector Machines Quiz
      15. Support Vector Machines Answer
      16. Neural Networks
      17. Kernel Method
      18. Kernel Method Quiz
      19. Kernel Method Answer
      20. Recap and Challenge
      21. K-means Clustering
      22. Hierarchical Clustering
      23. Practice Project: Detect Spam
          1. https://github.com/udacity/machine-learning/blob/master/projects/practice\_projects/naive\_bayes\_tutorial/Naive\_Bayes\_tutorial.ipynb
      24. Summary
   3. MLND Program Orientation
      1. Before the Program Orientation
      2. Introduction
      3. Projects and Progress
      4. Connecting with your community

## Connecting with Your Community

Your Nanodegree community will play a huge role in supporting you when you get stuck and in helping you deepen your learning. Getting to know your fellow students will also make your experience a lot more fun!

**To ask and answer questions, and to contribute to discussions, head to your**[**program forum**](http://discussions.udacity.com/categories)**. You can get there by clicking the Discussion link in the classroom and in the Resources tab in your Udacity Home.** You can search to see if someone has already asked a question related to yours, or you can make a new post if no one has. Chances are, someone else is wondering about the same thing you are, so don’t be shy!

In addition, students may connect with one another through [**Slack**](https://slack.com/), a team-oriented chat program. You can join the MLND Slack student community by following [**this link**](http://br-slack.udacity.com/) and registering your email. There are many content-related channels where you can speak with students about a particular concept. In addition, you can talk with **MLND graduates and alumni** to get a live perspective on the program in the #mlnd channel! You can find the student-run community wiki [**here**](https://github.com/machinelearningnanodegree/MLND/wiki).

* + 1. Support from the Udacity Team

## Support from the Udacity Team

The Udacity team is here to help you reach your Nanodegree program goals! You can interact with us in the following ways:

* **Forums**: Along with your student community, the Udacity team maintains a strong presence in the forum to help make sure your questions get answered and to connect you with other useful resources.
* **Project Reviews**: During the project submission process, your submissions will be reviewed by a qualified member of our support team, who will provide comments and helpful feedback on where your submission is strongest, and where your submission needs improvement. The reviews team will support your submissions all the way up to meeting specifications!
* **By email**: You can always contact the Machine Learning team with support-related questions using [**machine-support@udacity.com**](mailto:machine-support@udacity.com). Please make sure that you have exhausted all other options before doing so!

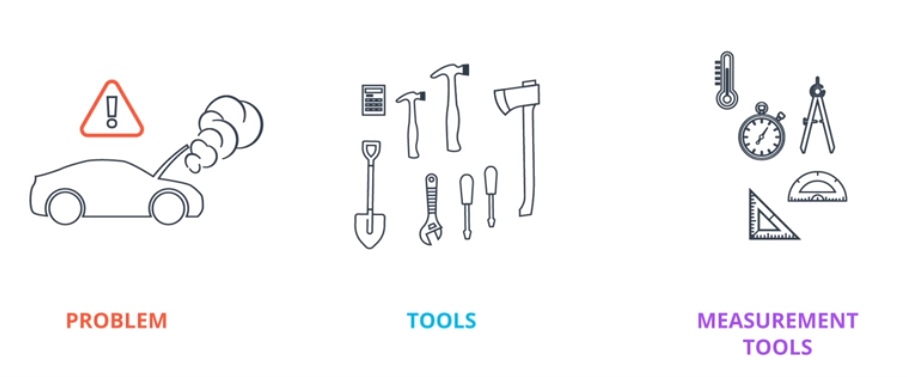
Find out more about the support we offer using the **Resources** tab in your Udacity Nanodegree Home.

* + 1. How does Project Submission Work?
    2. Integrity and Mindset
    3. Final Tips
    4. Wrapping up the Program Orientation

1. Evaluation and Validation
   1. Training Models
      1. Intro

How well is my model doing? Learn metrics to tell us if it is good or not. The second question is: How do we improve the model based on these metrics?

* + 1. Outline

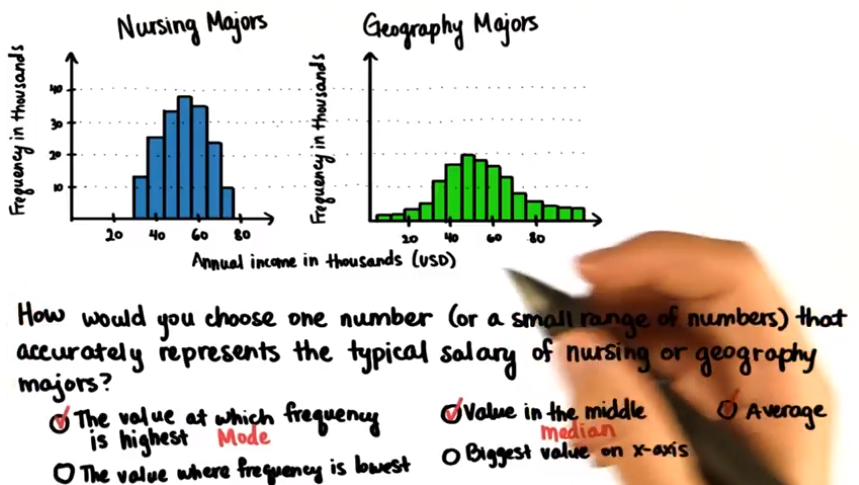


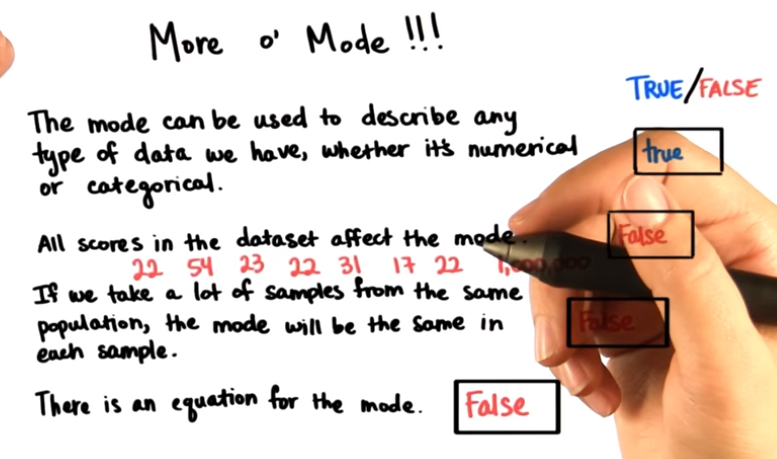
* + 1. Stats Refresher

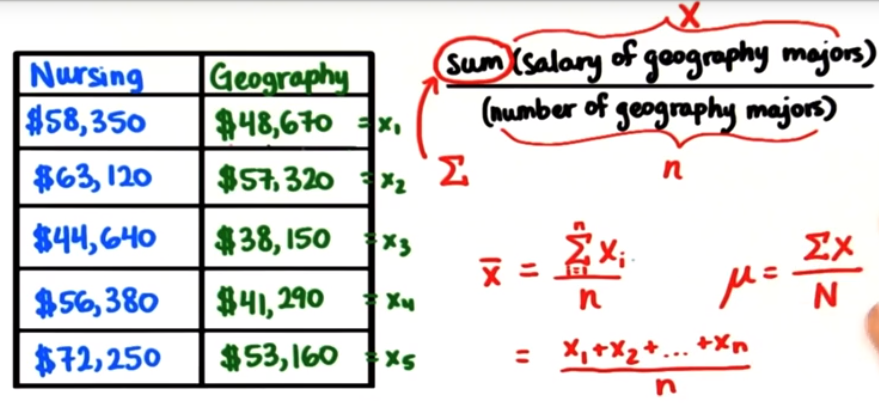
# Statistics Refresher

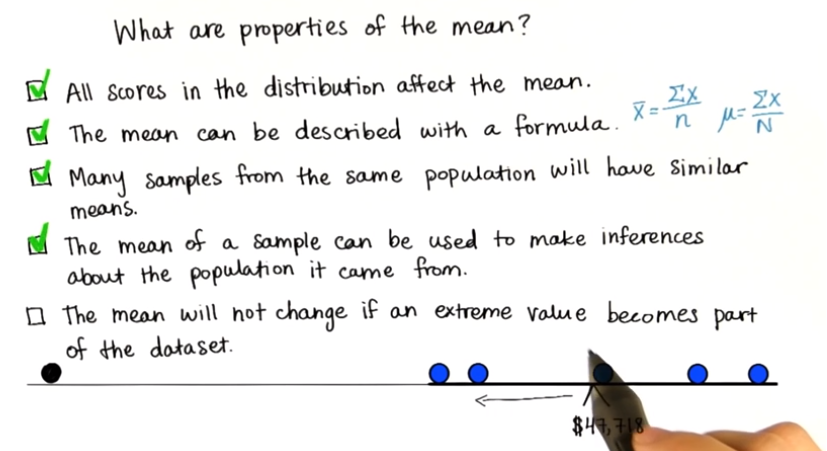
In this class, we'll assume familiarity with concepts in statistics such as mean, median, variance, etc. If it's been a while since you learned these and you feel that you need a refresher, here are some videos and quizzes in the **Extracurricular Section** which we encourage you to check out.

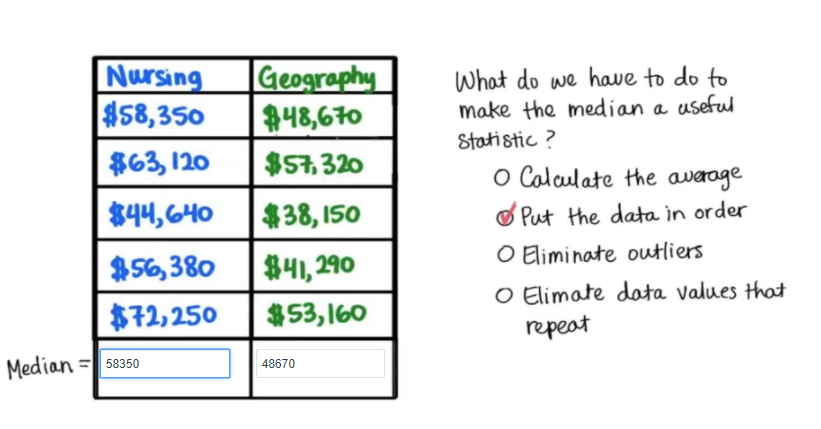
* [**Measures of Central Tendency**](https://classroom.udacity.com/nanodegrees/nd009-br/parts/d2fec38c-e52a-4370-a633-963baf638733/modules/6bebd83e-e02e-44dd-97ec-34e1129d32db/lessons/5422370497/concepts/1f585461-1429-401d-bc2a-238567a3e255): Mean, Median, Mode.
* [**Variability of Data**](https://classroom.udacity.com/nanodegrees/nd009-br/parts/d2fec38c-e52a-4370-a633-963baf638733/modules/6bebd83e-e02e-44dd-97ec-34e1129d32db/lessons/5452179865/concepts/edebdc1f-699d-46f7-a7f9-3a396c9ece9a): Inter Quartile Range, Outliers, Standard Deviation, Bessel's Correction.

****

****

****

****

****

* + 1. Numpy and Pandas

# Numpy, Pandas, and scikit-learn Refresher

Over the next few sections, you'll learn the basics in **Numpy**, **Pandas**, and **scikit-learn**, in order to train and test your machine learning models. However, if you feel that you need a more thorough introduction, here are some videos and quizzes in the **Extracurricular Section** of the course that we encourage you to check out the following content in elective part.

* [**Numpy and Pandas Tutorial**](https://classroom.udacity.com/nanodegrees/nd009-br/parts/d2fec38c-e52a-4370-a633-963baf638733/modules/6bebd83e-e02e-44dd-97ec-34e1129d32db/lessons/5454078888/concepts/54758106780923)
* [**Scikit Learn Tutorial**](https://classroom.udacity.com/nanodegrees/nd009-br/parts/d2fec38c-e52a-4370-a633-963baf638733/modules/6bebd83e-e02e-44dd-97ec-34e1129d32db/lessons/5430830847/concepts/6a282140-f39d-4b43-8c91-539571a30fad)
  + 1. Tuning Parameters Automatically

**How to train, test, evaluate and validate models in order to make the best decisions with our data.**

* + 1. Data Refresher

# Data Refresher

If you have previously played with data, and have an intuition about it, you can click on next. However, if you'd like to get some practice into what types of data there are, and get a hands-on exercise working on real data, here are some links in the **Extracurricular Section** that we encourage you to look at.

* [**Nature of Data**](https://classroom.udacity.com/nanodegrees/nd009-br/parts/d2fec38c-e52a-4370-a633-963baf638733/modules/6bebd83e-e02e-44dd-97ec-34e1129d32db/lessons/8034555385/concepts/6785689350923): Types of data (numerical, categorical, time series, etc.)
* Data types 1 – Numeric Data
  + Discrete or continuous
* Data types 2 – Categorical Data
  + Represents characteristics, can take on numerical values, but they don’t have mathematical meaning (1 – male, 2 – female)
  + Ordinal data (very low, low, average, high, very high)
* Data types 3 – Time Series Data
* Treatment of categorial data
* Encoding using sklearn
* Quiz: One-Hot Encoding
* Time series data leakage
* A hands-on example
* [**Datasets and Questions**](https://classroom.udacity.com/nanodegrees/nd009-br/parts/d2fec38c-e52a-4370-a633-963baf638733/modules/6bebd83e-e02e-44dd-97ec-34e1129d32db/lessons/2291728537/concepts/28772285450923): A thorough exercise on Enron Data where you can apply the previously learned concepts.
  + 1. Loading data into Pandas
    2. Numpy Arrays
    3. Training models in sklearn
    4. Tuning parameters manually
  1. Testing Models
  2. Evaluation Metrics
  3. Detecting Errors
  4. Putting it all together
  5. Predicting Boston Housing Prices

1. Supervised Learning
2. Unsupervised Learning
3. Machine Learning Capstone