Lecture 1:

Algorithms:
- Well defined computational procedure
- Takes set of values as input and produces set of values as output
- Tool to solve well defined computational problem

Different applications of algorithms:
- Medical Sequencing
- Packaging
- Internet
- Financial Analysis
- Ad placements
- Google search
- Recommendation for shows on streaming platforms
- Crypto Currency

Why Data structures?
- Way to store and organize data
- Facilitate access and modification data
- Different data structures have strengths and weaknesses
- Better suited for a specific algorithm than others

Complexity Problems

Data sets can e very large
Operations may take a lot of time or memory
Efficient implementations can make a big difference
Examples?

Million Song Dataset

http://labrosa.ee.columbia.edu/millionsong/

Data set of songs: Title,artist, recording years, etc.

How would you figure out

which artist has recorded most songs

which song has been covered the most times

what are the most common words in a title

What will you learn in this course?

- How to think about data and operations for data
- How to design data structures for efficient use
- How to determine the efficiency of algorithms for typical operations on data
- Advanced programming techniques(etc. recursion)
- How to implement a larger software project with a professional IDE