# 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

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## Different applications of algorithms:

- Medical Sequencing
- Packaging
- Internet
- Financial Analysis
- Ad placements
- Google search
- Recommendation for shows on streaming platforms
- Crypto Currency

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## 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

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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

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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