Interdisciplinary CS: Introduction

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Syllabus

- www.cs.fit.edu/~pkc/classes/interCS/

- "Discipline/problem-centric"

- Sample problems in each discipline

- Algorithm solutions to each problem

Sample Disciplines & Problems

- Sociology
  - small world (how many friends are there between Obama and you?)
  - connectors in social networks
- Geography
  - localization (where are you?)
  - turn-by-turn navigation (how do you get there?)
- Marketing
  - advertisement in search (google)
  - recommendation systems (netflix, amazon)

Sample Disciplines & Problems

- Finance
  - credit card fraud detection (is that you trying to spend $1000 at Best Buy in Alaska?)
- Law
  - scheduling attorneys to judges (time, workload, specialty, personality, ... constraints)
- Biology
  - DNA sequence alignment (are you a close relative of your cat? is the suspect the criminal?)

General Steps

- Problem Understanding
  - Understand what is desired
- Problem Formulation
  - Convert the problem into a more formal/computer-oriented description (input/output)
  - Abstraction is usually needed
- Algorithm
  - Algorithmic solution to the formulated problem
  - Analysis of tradeoffs among solutions
- Implementation
  - Data structures, programming languages

Assigned Reading

- "The Law of the Few" handout from
  - Malcolm Gladwell
  - *The Tipping Point—How Little Things Can Make a Big Difference*
  - Little Brown,1994.