

# BC COMS 1016: Intro to Comp Thinking & Data Science

## Lecture 0 - Introduction

BARNARD COLLEGE OF COLUMBIA UNIVERSITY

# Computational Thinking

It represents a universally applicable attitude and skill set everyone, not just computer scientists, would be eager to learn and use.



**C**omputational thinking builds on the power and limits of computing processes, whether they are executed by a human or by a machine. Computational methods and models give us the courage to solve prob-

cisely. Stating the difficulty of a problem accounts for the underlying power of the machine—the computing device that will run the solution. We must consider the machine's instruction set, its resources, constraints, and its operating environment.

In solving a problem efficiently, we might ask whether an approximate solution is good enough, whether we can use randomization to

# What is Computational Thinking?



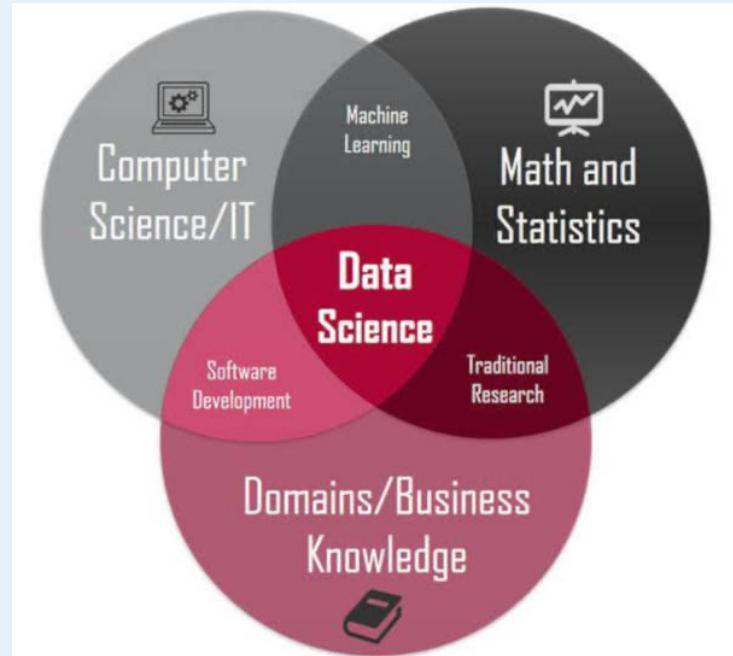
- reformulating a seemingly difficult problem into one we know how to solve by:
  - reduction, embedding, transformation, or simulation.
- thinking recursively
- TODO - ADD

<https://bc-coms-1016.github.io/readings/Wing06-Comp-thinking.pdf>



# What is Data Science?

- “*Data science is the study of extracting value from data*” – Jeannette Wing
- “Value”
  - leaves it to a domain expert, to determine what value is
- “Extracting”
  - emphasizes action on data, mining information



# Data Science in this course



- Exploration
  - Discover patterns in data
  - Articulate insights (visualizations)
- Inference
  - Make reliable conclusions about the world
  - Statistics is useful
- Prediction
  - Informed guesses about unseen data



# Course outline

- Intro to Python (week 1)
- Exploring and manipulating data (week 1 – 2)
- Probability & Sampling (week 3)
- Statistical Inference (week 3-5)
- Prediction (week 6 – 7)
  
- Detailed schedule – [link](#)



# — Logistics —



# Course staff

- TODO

# Communication



- Piazza



- Pre-recorded
  - These will go hand-in-hand with the course textbook: [inferentialthinking.com](http://inferentialthinking.com)
  - Watch before course meetings
- Live classes
  - Small lectures
  - Discussions and exercises about course material
  - Q/A
  - recorded



- Get credit by either:
  - Attending and answering question after
  - Complete it by deadline (midnight after it is hosted)
  - Drop lowest 2

# Homeworks & Projects (Evaluation)



- Homeworks:
  - 10 or 11 through out the semester
  - Complete individually
  - Drop lowest 2
  
- Projects:
  - 1 week to complete
  - Can be done in pairs

# Midterm (Evaluations)



- Take-home
- Open notes/open book
- Roughly a week to complete

# Final Project (Evaluations)



- Components:
  - Choose a dataset (from a given set)
  - Analysis proposal
    - Due Friday 12/11
  - Describe the analysis in a report
    - Due Wednesday 12/23

# Grading



Participation	10%
Weekly HW	25%
Projects	15%
Midterm	20%
Final Project	30%

# Participation



- During class meetings:
  - Topic discussion
  - Asking questions
- Asynchronous
  - Active on Piazza
  - Response questions to pre-recorded lectures

A black and white photograph of the exterior of a classical-style building, identified by the inscription "BARNARD" on the pediment. The building features several large, fluted Corinthian columns supporting an entablature. The sky is clear and blue.

# Course Policies



# Collaboration

- TODO



# Getting help

- Office Hours
  - TODO
- Barnard CS Help Room
  - TODO

# Learn by doing

