

# Internship Preparation Program: Session 2

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# Overview

- Coding
- Machine Learning
- Databases/SQL
- Statistics/Probability
- Behavioral
- Brain Teaser

# Coding

- Roles: software engineer, applied scientist, quantitative researcher.
- Tips:
  - Think out loud about how you are approaching the problem.
  - Ask clarifying questions to the interviewer.
  - Map the question to similar problems you have done in the past.
- Resources:
  - [LeetCode](#)
  - [Cracking the Coding Interview](#)
  - [UC Berkeley Data Structures & Algorithms](#)
- Example questions:
  - Provide code to check whether two strings are anagrams of one another.
  - Provide code to find the longest path between two nodes in a binary tree.
  - In what scenarios would you use an  $O(n^2)$  algorithm instead of an  $O(n)$ ?

# Machine Learning

- Roles: data scientist, research scientist, applied scientist, quantitative researcher.
- Tips:
  - You don't have to know everything, but you do have to confidently know something.
  - Everyone knows the method names; stand out by being precise about the computation (data representation, run times) or the surrounding context (data collection, privacy, safety, fairness).
- Resources:
  - Fundamentals: [Elements of Statistical Learning](#).
  - Deep Generative Models: [CSE 599 Autumn 2020](#).
  - Interviewing: [ml-interviews repo](#).
- Example questions:
  - How can we predict the click through rate (CTR) of an advertisement?
  - How would you explain the bias-variance tradeoff to a complete beginner?
  - What is the purpose of a residual connection in deep neural networks?

# Databases/SQL

- Roles: data scientist, data engineer.
- Resources:
  - [HackerRank.](#)
  - [LeetCode \(Databases\).](#)
  - [Cracking the Coding Interview.](#)

# Statistics/Probability

- Roles: data scientist, quantitative researcher.
- Tips:
  - Ask for clarification.
  - Think out loud.
  - Walk the interviewer through your solution.
  - Check with the interviewer after each step and keep an eye on feedback.
- Resources:
  - [Casella & Berger.](#)
  - [Heard on the Street.](#)
  - [A Practical Guide to Quantitative Finance Interviews.](#)
  - [StatQuest.](#)
- Example questions
  - Regression with collinearity.
  - The expected number of tosses to get two consecutive 6.

# Behavioral

- All roles.
- Tips:
  - Practice common behavioral questions.
  - Maintain a pool of stories.
  - Reflect the required skills in your answers (e.g., Amazon Leadership Principles).
  - Use concrete examples.
- Example questions:
  - Describe a challenge and how you conquered it.
  - Describe a time you disagree with others.
  - Describe a time you need to meet a hard deadline and how you achieved it.

# Brain Teaser

- Roles: quantitative researcher
- Tips:
  - Practice regularly.
  - Be creative.
  - Check with the interviewer after each step and keep an eye on feedback.
- Resources:
  - [Heard on the Street.](#)
  - [A Practical Guide to Quantitative Finance Interviews.](#)
- Example questions:
  - At a party, everybody shakes hands with everybody else. If there are 66 handshakes, how many people are at the party?
  - You have a string-like inhomogeneous fuse that burns in exactly 1 minute. You have a match, and no watch. How do you measure exactly 30 seconds?



# Mock Interviews

