

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

