GENERAL ASSEMBLY

INTERVIEW PREP

Matt Brems

Data Science Immersive, GA DC

OPENING: WHY?

- Interviews are notoriously unreliable and do not significantly predict success in the workplace.

- Interviews are time intensive:
  - they require preparation on the part of the employer,
  - they take time to discuss and evaluate afterward,
  - they take time away from a data scientist's workday or you're being interviewed by someone who isn't a data scientist.

- So, why do we interview?

REASONS FOR INTERVIEWING

REASONS FOR INTERVIEWING

- Here are some of the reasons for interviewing:
  - Assess knowledge (and lack of it!) in a prospective employee.
    - "Does this candidate know what we need them to know?"

REASONS FOR INTERVIEWING

- Here are some of the reasons for interviewing:
  - Assess knowledge (and lack of it!) in a prospective employee.
    - "Does this candidate know what we need them to know?"
  - Assess aptitude of a prospective employee.
    - "Is this candidate capable of learning needed material?"

REASONS FOR INTERVIEWING

- Here are some of the reasons for interviewing:
  - Assess knowledge (and lack of it!) in a prospective employee.
    - "Does this candidate know what we need them to know?"
  - Assess aptitude of a prospective employee.
    - "Is this candidate capable of learning needed material?"
  - Assess attitude of a prospective employee.
    - "Is this candidate willing to work hard?"

REASONS FOR INTERVIEWING

- Here are some of the reasons for interviewing:
  - Assess knowledge (and lack of it!) in a prospective employee.
    - "Does this candidate know what we need them to know?"
  - Assess aptitude of a prospective employee.
    - "Is this candidate capable of learning needed material?"
  - Assess attitude of a prospective employee.
    - "Is this candidate willing to work hard?"
  - Assess "fit" for company.
    - "Will I enjoy working with this candidate, or will this be a struggle?"

STRUCTURE OF INTERVIEWS

STRUCTURE OF INTERVIEWS

- Unfortunately, interviewing processes at different companies can be wildly different.
  - Study the material. Don't study for the test.
  - That doesn't mean you should be unaware of what information you've given – but your focus should be on you as a data scientist.

- Types of interviews: technical, behavioral, mix.

- Potential audiences: data scientists, HR, subject matter experts, mix.

- Some will ask "case studies." (McKinsey, Morgan Stanley.)

INTERVIEW PREP

COMMON TYPES OF INTERVIEW QUESTIONS

TYPES OF INTERVIEW QUESTIONS

- Behavioral Questions
- Subject Matter Questions
- Coding Questions
- Case Studies
- Classic Logic Puzzles*
- Insight Questions*
- Lateral Thinking Puzzles*
- Tests of Divergent Thinking*
- Fermi Questions*
- Algorithm Questions*

- * Starred results are drawn from “Are You Smart Enough to Work at Google?” by William Poundstone.

BEHAVIORAL QUESTIONS

- Behavioral questions are among the most frequently encountered interview questions.
  - “Tell me a little bit about yourself.”^
  - “If I were to call your boss right now and ask what your three biggest weaknesses are, what would he/she tell me?”^
  - “Tell me about a time when you made a mistake in the workplace.” ^
  - “Tell me about a time when you had to do something that wasn’t in your job description.” ^

- ^ Questions I’ve personally been asked in interviews.

SUBJECT MATTER QUESTIONS

- Subject matter questions vary depending on the role for which you are applying, but it is important to be able to provide some answer and defend it.
  - "Who is your favorite economist, and why?"^
  - "What are the assumptions in a linear regression model?"^
  - "How would you evaluate the performance of a classification model?"^
  - "Suppose you wanted to build a classification model, but you have a very small percentage of 'positive' outcomes. What are your concerns?"^
  - "Suppose you have an arbitrary function $f(x)$. You know there is exactly one place where $f(x) = 0$. How would you go about finding x?"

- ^ Questions I've personally been asked in interviews.

CODING QUESTIONS

- Coding questions are often used to evaluate your ability to code and have a specific objective.
  - "Print out each integer from 1 to 100, but if that number is divisible by 3, print 'Fizz,' if that number is divisible by 5, print 'Buzz,' and if that number is divisible by 3 and 5, print 'Fizzbuzz.""^
  - "The smallest number divisible by 1 through 10 is 2520. Find the smallest number divisible by 1 through 20."^
  - "Suppose I broke a stick in two places chosen at random. What is the probability that the three pieces can make a triangle?"*

- Unless it is already understood, be sure to clarify if they are looking for a particular language or if pseudocode is acceptable.
- ^ Questions I've personally been asked in interviews.

CASE STUDIES

- Case studies are designed for you to walk through a problem and articulate your thought process.

- You are generally provided basic details, the business problem, and some data.
  - "You can place ads in emails or in banners on Web sites. What information do you want?"^
  - "Here is some information. Which should we do?"^
  - "Here is some new information. Reevaluate your work."^
  - "Given everything you know, at what point is it more advantageous to do only email ads or only banner ads?"^

- ^ Questions I've personally been asked in interviews.

CLASSIC LOGIC PUZZLES

- Classic logic puzzles are designed to test your ability to take all information and solve a problem.
- “Two MIT grads meet, having not seen each other for 20 years.
  - A: How’ve you been?
  - B: Great! I’m married with three daughters.
  - A: How old are they?”
  - B: The product of their ages is 72 and the sum of the ages is the same as the number on that building over there.
  - A: I still don’t know.
  - B: My oldest just started to play the piano.
  - A: Really? My oldest is the same age!
- How old are the daughters?”*

INSIGHT QUESTIONS

- These questions don't follow step-by-step deduction; they generally rely on a moment of insight.

- "You've got a chessboard with 2 diagonally opposite corners chipped off – so it's 62 squares instead of 64. You're given 31 dominoes, each exactly the size to occupy 2 adjacent squares. Arrange the dominoes to cover the chessboard."*

- Poundstone's recommendation: The best way to deal with these is to be aware of the commonly used ones.

LATERAL THINKING PUZZLES

- Some interviewers may ask you some… absurd questions.
- “There are three women in bathing suits. Two are sad, and one is happy. The sad women are smiling. The happy woman is crying. Explain.”*
- These puzzles are usually short and seem like there isn’t enough to answer. This should tip you off.

TESTS OF DIVERGENT THINKING

- These are open-ended questions to encourage brainstorming. There isn't a particular "right answer," but your goal is to come up with a workable solution and improve it.

- "How would you compare two search engines?"*

FERMI QUESTIONS

- A popular type of interview question asks you to estimate some unknown and ridiculous quantity.
  - Enrico Fermi (physicist) used these in teaching.

- "How many tennis balls can you fit in this room?"*

FERMI QUESTIONS – HELPFUL DATA

- This is a good set of figures to know when interviewing.
  - Population of the world: 7 billion
  - U.S. population: 300 million
  - World GDP: $60 trillion
  - U.S. GDP: $14 trillion
  - Federal minimum wage: $7.25

- It is also good to know the following things about the company:
  - Stock Market Value
  - Annual Revenue
  - Annual Profit
  - Price of a single share of stock
  - Population of metropolitan area of company's location.

ALGORITHM QUESTIONS

- Similar to the tests of divergent thinking, the goal here is to describe an algorithm for performing a task.

- "You have a closet full of shirts, and it's very hard to find the one you want. How would you organize the shirts for easy retrieval?"*

YOUR TURN

YOUR TURN

- In three sentences, explain what a database is to your eight-year-old nephew.

YOUR TURN

- You have a coin that is not necessarily unbiased. How could you flip the coin in a fair manner?

YOUR TURN

- You get on a ski lift at the bottom of the mountain and take it all the way to the top. What fraction of the lift's chairs do you pass?

YOUR TURN

- Estimate the number of shampoo bottles produced across the world in one year.

YOUR TURN

- You have 25 horses. You do not have a timer and you can only run five horses at one time. How many races do you need to run to identify the fastest three horses?

YOUR TURN

- Estimate the number of lines of code you've written in your life.

DISCLAIMER

- Many questions as well as much of the material in this PowerPoint were drawn from William Poundstone's book "Are You Smart Enough to Work at Google?"