As we outlined in the previous section, a lot of data science work can be classified as translation: taking a question and translating it into mathematical or statistical tests or taking statistical results and translating them into something everyone can understand.

Below we have a series of questions for you to translate into a technical plan. For each question, describe how you would make it testable and translate it from a general question into something statistically rigorous. Write your answers down in a shareable document and submit the link below.

1. You work at an e-commerce company that sells three goods: widgets, doodads, and fizzbangs. The head of advertising asks you which they should feature in their new advertising campaign. You have data on individual visitors' sessions ([activity on a website](https://en.wikipedia.org/wiki/Session_%28web_analytics%29), [pageviews](https://en.wikipedia.org/wiki/Page_view), and purchases), as well as whether or not those users [converted](https://en.wikipedia.org/wiki/Conversion_marketing) from an advertisement for that session. You also have the cost and price information for the goods.

Technical plan: Consider the levels on interest in each product – Index the attributes for Activity, Pageviews & Purchases of the products that could create a more simplistic way to understand each products demand. Next, we should consider the percentage of Ad-generated purchases vs. regular purchases. This can identify products might benefit from more marketing and can jump in sales more significantly. Also, we should factor in its profit margin (price/cost) to determine which products would return more for the company. All of these factors could be added into a formula which can help guide the analyst to the answer.

1. You work at a web design company that offers to build websites for clients. Signups have slowed, and you are tasked with finding out why. The [onboarding funnel](https://en.wikipedia.org/wiki/Funnel_analysis) has three steps: email and password signup, plan choice, and payment. On a user level you have information on what steps they have completed as well as timestamps for all of those events for the past 3 years. You also have information on [marketing spend](https://en.wikipedia.org/wiki/Marketing_spending) on a weekly level.

Technical plan: Examine the timestamps from the past 3 years to see if there has been a significant difference in time spend on each step over time. Match this with a timeline of policy changes/plan choices/prices over this time to see if there is something in this process that might be turning some potential clients away. Also examine the marketing spend over this time. Onboarding might not be as significant to client signups as spending dollars on marketing.

1. You work at a hotel website and currently the website ranks search results by price. For simplicity's sake, let's say it's a website for one city with 100 hotels. You are tasked with proposing a better ranking system. You have session information, price information for the hotels, and whether each hotel is currently available.

Technical plan: Looking at the session information might give us some important clues to what certain customers are looking for. For example, we would be able to produce a list of the most clicked hotels or the most booked hotels which could be the basis of a new ranking system of popularity on the site. However, that ranking might be biased toward the older price-based ranking and might not tell us something different. I would recommend gathering more data on what hotel attributes that customers look for to create a better ranking. Ask the customer what is most important to them when choosing a hotel and factoring these into an index would be a good start. (ie Star ranking, amenities, location, etc.)

1. You work at a social network, and the management is worried about [churn](https://en.wikipedia.org/wiki/Churn_rate) (users stopping using the product). You are tasked with finding out if their churn is atypical. You have three years of data for users with an entry for every time they've logged in, including the timestamp and length of session.

Technical plan: Create a model of the customer cycle with the social network looking at the average amount of log ins, session lengths and time between log ins. Determine what is the historical churn for the 3 years of data and then test this against some of the newest customers to see if there is a significant difference.