Technical Screening

Introduction

Placeholder Technologies is a leading Ad-Tech company that uses Moment-based marketing to help global brands reach users when they are most receptive to seeing an ad. But after the final ad has delivered, the real job begins of explaining to the clients not just that a campaign performed a certain way, but also why we believe it performed that way.

Our internal data platform, Katana, can help uncover insights regarding how a campaigned performed based on who, what, when, and where media was delivered, but the data is only part of the solution. People are what generate real insights, and we are building a team of strategic thinkers that can interpret data and deliver actionable insights to our clients. We need superstars that can use their technical and business skills to weave a story that ties together everything from the highest of campaign objectives down to the finest delivery detail.

Instructions

Placeholder's interview process uses a technical pre-screening that is primarily intended to:

- Assess your technical skills
- Examine your problem-solving ability
- Test your business acumen

Please spend a bit of time reading through this document, gaining access to the database, and querying the data before solving the problems. We encourage you to reach out to ask us about anything that you need explained. There are terms and ideas specific to advertising that you may not be familiar with – we expect this, so there are no "dumb" questions. Take your time and think about how you can use the data to develop your solutions. You should be prepared to have a conversation about the problems but are not expected to have a "deliverable" (i.e. a formal deck is not required.)

Remember, we care about interpretation just as much as (if not more than) any numerical answer.

Step 1: Technical Setup

PostgreSQL Client Setup:

At Placeholder, Postgres is one of our favorite SQL technologies because of its flexibility and analytical capabilities, and it is where we've stored the raw data for this interview. If you've used other SQL versions before (e.g. MySQL, SqlLite, SQL Server, etc), you'll find much of the basic syntax to be the same. However, more advanced functionality will differ a bit, so be sure you're searching for Postgres syntax if you find yourself Googling how to do things.

Our favorite (free) Postgres client option is Postico, but if you already have something else installed on your computer (e.g. Sequel Pro), you are more than welcome to use it. Postico is only for Macs, so if you have a Windows machine, we recommend trying out pgAdmin. These instructions are provided if you choose to use Postico.

1) Download and install Postico

A. Go to https://eggerapps.at/postico/ and click "Download."
B. Double-click on the downloaded .zip file file–You should now see the Postico application icon (an elephant)
C. (Optional) Drag and drop the application into your Applications folder
D. Double-click on the application icon
E. NOTE: The software will continue to ask you whether you want to pay for the license. Feel free to click "No Thanks"... you'll still be allowed to use it.

2) Connect to the interview database

You should now see a connection window that looks like this: The required information is as follows (Nickname can be whatever you like):

- Host: placeholder-psql.place.holder

- Port: 5432
- User: interview
- Password: i_believe_in_science
- Database: interview

Step 2: Explore the Data

This screening uses three tables:

- **Impression**s – Provides a summary of the total number of impressions (aka individual ads delivered to a person) – served to consumers in specific locations across the US over a period of time
- **model_data** – Summarizes the output of a predictive sales model versus the observed sales
- **zip_codes** – lists the connection between retail stores and associated zip codes for ad-targeting

Log into your Postgres client and take a look around the tables. They will be used to help you answer the following questions.

Spend a bit of time looking at the data. Notice any issues/challenges with the data? Does anything surprise you? Are there biases that could result in false observations? There are no wrong answers.

Step 3: Test your data skills

Please only use SQL to query any data –you may then use Python, R, or Excel to analyze the data. Please note that we believe your analytic insights are far more important in these exercises than writing good analytic code. Your ability to analyze everything in SQL/Python/R will not be a definitive evaluation criteria, but doing so could break a tie in the event we have multiple candidates with equivalent analyses.

Please be prepared to provide your answers and any code or Excel workbooks used to generate them during the live interview.

Problem 1:

Using data from the model_data table, create any visualization you think is interesting using Python, R, or Excel. Please provide why you found the visualization interesting and what a consumer might glean from it.

Problem 2:

Use the provided datasets to create a table that shows actual sales versus impressions_count by store_id.

Problem 3:

Using the table you just created, summarize the actual sales versus the expected sales and impressions by population type.

Problem 4:

Is there anything you found that might suggest our predictions are biased or flawed? If so, please explain why you believe this.

Step 4: Transform analysis into strategy

Feel free to use any combination of SQL, Python, R or Excel to generate a recommendation for our hypothetical client, Bath and Body Works.

Business Problem

Bath and Body Works is considering a change of its digital payment vendor. BBW's current payment vendor (Partner A) accepts all major credit cards, charges a variable processing fee per credit card type, and also receives a flat monthly fee for service. BBW also utilizes PayPal to process online and mobile payments. PayPal has its own contract and will not be affected should the payment vendor change.

Currently, bathandbodyworks.com sees 5% of all traffic to site make a purchase. Of those that purchase, 30% use a Visa card, 30% use a Mastercard, 20% use an American

Express card, 5% use a Discover card, and the balance make their purchase using PayPal. Partner A charges fees of 2.25%, 2.25%, 3.2%, and 2.75% respectively. Due to the complexity of the PayPal contract, their rate is variable. The vendor also charges $500 per month.

A new vendor (Partner B) has approached BBW with the following offer: No monthly fee and a flat processing rate (2.75%) for Visa, Mastercard, and Discover card holders (they do not accept American Express). You've been placed in charge of the business decision. Please explain your analysis of the above factors and make a recommendation on whether BBW should continue business with Partner A or enter into a new agreement with Partner B. Make all the assumptions you want as long as they are reasonably explained.