**Introduction**

Vanguard Client Experience (CX) strives to create a world-class investment experience for our clients. One area of focus is on the development of more client-centered digital processes.  The CX team uses client *journeys* to understand the many ways clients choose to interact with Vanguard. Based on those journeys, *labs* are then established to uncover opportunities to improve the client experience.

**Case Study**

You are a newly hired journey analyst for one of the CX labs. Your job is to prepare a read out on a digital experiment that was run before you were hired. The experiment was designed as an A/B test with a measurement period of 3/15/2017 – 4/30/2017. Research conducted by the lab revealed a hypothesis: a more modern UI and in-context prompts would make clients feel more comfortable with the process. The team further believed that clients would complete the new process at a higher rate. In the experiment, the control group was exposed to the current state experience while the test group saw a newly redesigned experience with improved UI, navigation, and in-line help. Both the test and control experiences have the same number of process steps (start page, steps 1-3, and then a confirm page, which indicates completion of the process).

There are three data sets for this case study (metadata is provided on page 2):
1) Data set 1 (df_final_demo) contains client demographic information
2) Data set 2 (df_final_web_data) contains web hit level web activity (split into 2 parts: pt_1 and pt_2)
3) Data set 3 (df_final_experiment_clients) contains a list of clients and indicates whether they were a part of the experiment

**Objectives**

As an analyst for the lab, your team has tasked you with understanding and explaining the performance of the experiment. Prior to implementing the experiment, your lab team had developed a list of questions it hoped to answer.

- *How do clients interact with the process differently?*
- *Who currently engages Vanguard via this process?*
- *For the experimental new process, how can its success be measured?*
- *How did the new process perform?*

As the new analyst joining the team, you are responsible for the statistical inferences uncovered from the experiment. As such, you also have some questions that you may want to answer. When performing analysis of the experiment, be sure to only consider data during the measurement period.

- *How effective was the experiment design?*
- *Was the experiment run long enough?*
- *How can the performance of the process be evaluated?*
- *What other data may be required and/or helpful to the analysis?*

**You should plan to prepare your insights as you would for a 30-45 minute presentation. Please include in your final submission a presentation on the experiment as well as all of the code used in your analysis. Feel free to**

**use the advanced analysis tool/language of your choice (Python, R, SAS, Matlab, etc.). Our team predominantly uses Python and SQL today.**

**Metadata**

*Note: the data provided for this case study is fictitious and is only meant for the purposes of evaluating a candidate's skill set.*

| Data field | Description |
|---|---|
| client_id | Unique identifier of a client |
| variation | Indicates whether the client was a part of the experiment |
| visitor_id | Unique identifier of a client and device combination, determined by cookies, non-persistent cookies, IP address, and user agent |
| visit_id | Unique identifier for a web visit/session (a visit is defined as a sequence of consecutive page views without a 30-minute break, or continuous activity for 30 minutes) |
| process_step | The step in the digital process |
| date_time | Date and time of page hit |
| clnt_tenure_yr | The tenure of the client in years |
| clnt_tenure_mnth | The tenure of the client in months |
| clnt_age | The age of the client |
| gendr | The gender of the client |
| num_accts | The number of accounts the client has |
| bal | The total balance of all accounts for the client |
| calls_6_mnth | The number of times the client called within the last 6 months |
| logons_6_mnth | The number of times the client logged on the website within the last 6 months |