The Exercise:

Company A Technical Exercise

Data Analysis exercise

Company A is looking for a data analyst who can retrieve data from our database and work with the raw data to gain meaningful insights that they can then share with the team.

To this end, we've provided you with a subset of data from our call center, contained in the company_call_records.csv file. This data represents about 30,000 calls that have gone through our call center (called Cloud 9) in a 2 week period as we engaged with our customers on everything from how to make mobile money payments to how the customer can become eligible for one of our many ReadyPay upgrades.

Your task in this exercise is to gain an understanding of the call records and answer the questions in the "Questions for Analysis" section below using the provided data set. Clean it, chop it, run stats on it, visualize it! There is a lot to be learned.

Data Background:

Company_A ReadyPay customers have all purchased one or more of our home solar kits and enjoy customer support through the Company_A toll free line, which connects them to our 100+ person call center in Kampala, offering call support in over 10 languages! Within the call center, our Call Center Representatives (CSRs) serve on one of three possible teams: sales, support, and success.

Sales CSRs take calls from customers who are in remote villages, usually standing with a sales associate, and ready to purchase a kit from the sales associate. As a result, we see many *incoming* calls from members of our sales team lending their phones to customers who have traveled without a charged phone. Before any customer can take a Company_A product, they must go through vetting with a CSR to ensure they are a good candidate for solar. If they are approved, the CSR will work with the sales representative to associate the kit to the customer's new account in our internal tracking software - thus we have a new customer!

Our Success CSRs focus on customer outreach to ensure a smooth customer experience and to encourage steady repayment. These CSRs often make *outgoing* calls like the 10 day call, whereby we attempt to speak to all customers after having the kit for 10 days to answer any questions that might have arisen. These CSRs also target calls for overdue customers i.e. customers who have taken a certain period of time without making any payment towards their loan (**Overdue Account Calls**) and for customers who are about to complete payments for their loans (**Completion Calls**).

Finally, our Support team takes incoming calls from customers experiencing technical challenges or needing support more generally (how to make payments, for example). They work closely with our Service Centers, spread across Uganda, that handle all hardware repairs in the field.

The "Company_A_call_records.csv" file contains a subset of call records, taken during a two week period from the Company_A call center, that you will use to answer the questions below. The data fields are:

Column	Description
call_id	Unique ID for the call
destination_person_id	The unique ID of the customer if the call is outgoing and of the CSR if the call is incoming
source_person_id	The unique ID of the customer if the call is incoming and of the CSR if the call is outgoing
account_age	Time between when the customer's account was created and when the call was made (in days)
account_state	The customer's account status as of the time of the data pull **Complete:** The customer has successfully paid off their solar kit in full. **Cancelled:** The customer failed to pay off their kit and we assume the remainder of the loan will be written off. Kits are automatically cancelled after 180 days of nonpayment. **Suspended:** The customer has not made a payment for 90 days **In Repayment:** The customer is making payments towards their loan, but has not yet completed
occupation	The customer's self-reported primary occupation
language	The customer's primary language
call_direction	Whether the call is coming in to the call center ("Incoming") or a CSR is making a call to the customer ("Outgoing")
call_duration	Length of the call (in minutes)
call_outcome	The outcome of the call, typically indicating whether the customer picked up or did not (though other outcomes are possible). Of note, a Voluntary Return refers to a customer voluntarily returning their kit to a service center to reclaim their deposit (if eligible).
call_date_ended	Datetime (UTC) call was ended. You can calculate the call_start_date by subtracting the call_duration from this call_end_date.
call_topics	A list of tags the CSR can choose from a dropdown to inform the team what the call was related to. Multiple tags are possible

	per call. If individual topics are unclear, please email Denis to clarify. Note that dropped calls are frequent due to poor connections.
call_topic_group	A grouping to organize the call topics into logical categories

Questions for Analysis:

Part I

Often times, we have to use limited phone lines to support various customers in various languages and for the 3 call center teams (sales, support and success). If there are 10 phone lines for example, 5 can be used for incoming & 5 for outgoing calls at the same time. However, limited lines could mean that if there are many incoming calls, we may not be able to make many outgoing calls at that same time, and vice versa. Of the three teams, sales team must take all sales-related calls as they come in across the day, support calls can come in arbitrarily at any time we are open, while success calls can be prioritised for a particular time period(s). Call centre staff can be split arbitrarily e.g. in the morning hours, we may have 50% sales team, 25% support team and 25% success team. We have 3 shifts i.e morning (8-12pm), afternoon(12pm-4pm) and evening (4pm-8pm)

1. How many customers called Company_A multiple times in the 2 week period? What were we discussing with the customers who contacted us multiple times?
2. Should we be looking at a customer's occupation when we decide when to call them?
3. From region of the country do we have the greatest number of customers?
4. Which language speaking customer care personnel should we employ most?

Part II

Please define 1 other question of your choice to answer using the data set and provide your analysis. How is this analysis impactful to Company_A's call center operations?

Deliverables:

Once you've completed the task, please send me kasule.aptech@future.co.ug the code you wrote to complete the exercise as well as some sort of accompaniment: a Jupyter notebook, and PowerPoint presentation of your findings.

Feel free to clean up your code, but please do not remove visualizations or steps you took to understand the data, as that helps me follow your thought process through the analysis.

Note:

I will need your work put in a zipped folder. In that folder, I will be expecting to find a PowerPoint presentation of your work findings and also a Jupyter notebook.

Deadline for handing in the work is 1 September, 2020 midnight.