Backend Technical Project: Commissions Reporting

Introduction:
This project is based on data that we have at CBRE. Because this is a practical assessment, please feel free to use any documentation or resources that you need. We anticipate that this project should take an hour or two but we have no strict time limit. The problem is intentionally open-ended because we want to see how you handle converting loose requirements into solutions. You are highly encouraged to ask questions, so please feel free to reach out to your developer contact at CBRE.

Problem Statement:
Commercial real estate brokers receive commissions on each deal they close. Commissions are typically not delivered in a single payment, but across multiple installments. Brokers would like to see a new set of reports based on commissions they have earned individually. They also would like to see how commissions are distributed across the company. In order to generate these reports we need to create a new data pipeline based on TSV exports from an accounting system.

Reports to Create:

1. What is the total dollar amount of installments that have been invoiced as of October 2017, but have not yet been paid?

2. What was the total commission dollar amount earned by each broker in 2017?

3. The sum of all installments per deal should match the sum of all commissions on that deal; are there deals where accounting errors cause this not to be the case?

4. For each month in a year, what's the total installment dollar value earned by all brokers?

Coding Instructions:

Please use Python 3.6+ for any code; you may use packages outside the standard library. Work should be your own. We should be able to run your solution code. The output of your program should produce the four reporting results in any format you choose — as long as it's human readable

Grading Criteria: There is no grading. We're aren't necessarily looking for correct answers. We're just seeing how you approach an open ended problem. There are many solutions to this!

Data Files:

commissions.tsv – A list of real estate commissions
installments.tsv – A list of all real estate installments

Data Context: The commissions.tsv lists broker commissions (commission_amount) per deal where the deal_id is the primary key for a deals table that is not included. The natural composite primary key for the commissions.tsv is (deal_id, line_item_id). The installments.tsv lists the payment plan for those commission through time where installment_date can be thought of as a due date and invoice_date is the date the invoice for payment was actually sent. The natural composite primary key for the installments.tsv is (deal_id, installment_line_item_num). Several different entities can earn a commission on a real estate deal. These are listed in commission_type: CBRE real estate brokers (COMM), CBRE service department Fees (FESH), Real Estate brokers (OBE) who work at companies outside of CBRE, and rebates back to clients (RBT).

Submission Criteria: Please submit your code in a format that you feel is appropriate. Also include a set of instructions for how to run it.