**Pillow Developer Challenge:**

* Solutions are preferred in Ruby or Python (not required)
* Feel free to email Dan ([dan@pillowhomes.com](mailto:dan@airenvy.com)) with any questions
* We’ll review your finished solution together
* We expect the challenge to take up to 4 hours
* Have fun!

At Pillow, it’s important for us to understand the financials of the short term rental market. When evaluating new customers, we need to understand how to price them, how often they’ll book, and how much they’ll earn. In this challenge, you’ll create a web api that can provide this information for new properties in our system. To accomplish this, you’ll build an algorithm which leverages a data set that contains short-term rental listings in San Francisco and their booking & pricing history from 6/18/2013 - 6/18/2014.

**Deliverable:**

* 3 web API endpoints that accept a POST of JSON data
  + /price
    - Inputs: zipcode and bedroom count.
      * eg: {zipcode: 120, bedroom\_count: 2}
    - Outputs: Integer price in dollars
      * eg: {price: 150}
  + /booking\_rate
    - Inputs: zipcode and bedroom count
      * eg: {zipcode: 120, bedroom\_count: 2}
    - Outputs: Booking rate from 0 to 1
      * eg: {booking\_rate: 0.95}
  + /earnings
    - Inputs: Start date, end date, zipcode, and bedroom count
      * eg: {start\_date: ‘2015-01-01’, end\_date: ‘2015-07-01’, zipcode: 120, bedroom\_count: 2}
    - Outputs: Expected amount in dollars the property will earn in that time range
      * eg: {earnings: 1500}

**Details:**

* For the purposes of this exercise, we’re assuming that the algorithm will estimate the same price and booking rate for every day, for a given property.
* To create the price estimates, our data scientist has determined that a single variable linear regression on average property price vs. bedroom count works well, per zipcode.
  + Think of linear regression as a black box that accepts an array of bedroom counts and an an array of average prices, then outputs two values (slope and intercept) that you will use in a formula to determine a price for a given bedroom count per zipcode.
  + For Ruby, you can use a LinearRegression class attached, for Python try scikit (<http://scikit-learn.org/stable/modules/generated/sklearn.linear_model.LinearRegression.html>). Linear regression will give you a slope and intercept for each zipcode. For a given zipcode, price = slope \* bedrooms + intercept. You should have a different slope and intercept *for each zipcode.*
* To create the booking rate estimates, our data scientist has determined averaging the booking rate for a zipcode works well, independent of bedroom count.
  + Ignore days marked “unavailable” when calculating a property’s booking rate
* If the service can’t provide a reasonable estimation for the given inputs, respond with a 404
* Hint: You don’t want to do the work on every api call, imagine this system scaling for a larger number of properties

**Data set details:**

* property\_id: unique id of a property under management
* zipcode: zip code of property under management
* bedrooms: number of bedrooms property has
* accommodates: number of people a property accommodates
* date columns:
  + unavailable - property is not available for booking on that date (owner is not accepting bookings for that day)
  + reserved - property was booked by a guest on that date (price is hidden)
  + integer value - property was available for price shown, but not booked

**Submission:**

* Please submit a zip file containing all code used.