# **Hotel Overbooking – Flatiron Course**

## Objectives for this course

* Define a real world problem to solve with Python
* Understand the Bernoulli experiment
* Learn about a binomial distribution and apply it to the problem
* Use the above information to help determine the optimal number of rooms to overbook

The travel and hospitality industries have become reliant on technology to help them make and keep their operations profitable. For hotel owners and managers one thing they work towards, everyday, is to fill as many rooms as possible while getting the best price. In this course, we will explore one method to help maximize profitability by optimizing the booking of rooms in a hotel using Python.

# **THE PROBLEM**

You are the owner of a hotel with 100 rooms, and you would like to maximize your revenue for these rooms. In order to determine the maximum revenue, you first need to establish what information you know about your hotel. You take a look at the books and discovered the following information:

* You have 100 rooms in the hotel that can be sold.
* Each room costs $220 USD per night
* On an average night, you know that 8% of your hotel guests who book a room don’t show up.
* If overbooked, we have to place customers at another hotel, which costs us $400 USD.

Using all of this information, we need to determine how many rooms we should overbook in order to maximize expected revenue.

## Develop a game plan

In order to successfully solve this problem, there are a few things we’ll need to learn about. First of all, we’ll need to understand what it means numerically that “on average, 8% of our hotel guests don’t show up”.

It turns out that you can model this with a **binomial distribution**. To understand **the binomial distribution**, an important concept in probability theory which lies at the foundation of data science, you first need to learn a little bit more about the Bernoulli experiment\*.