Hotel.R

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```
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# 25 points


# There are a number of options in R and Python,
# you need to be able to generate the random distributions (rbinom in R, or numpy.random.binomial in Py

library(data.table)
```

```
## Warning: package 'data.table' was built under R version 3.5.3
```

```
set.seed(1234)

rent <- 150
cost <- 30
overbookCost <- 200
minRoom <- 100
maxRoom <- 108
capacity <- 100
noShow <- 0.95 #5%

# Find 10 random values from a sample of 100 with probability of 0.95.
rbinom(n = 10, size = 100, prob = 0.95)
```

```
##  [1] 98 94 95 94 93 94 99 97 94 95
```

```
simulation <- data.table(Reservations = rbinom(n = 1000, size = 110, prob = 0.95))
simulation$Booked <- ifelse(simulation$Reservations < 100, simulation$Reservations, 100)
simulation$Overbooked <- ifelse(simulation$Reservations > 100, simulation$Reservations - 100, 0)
simulation$Revenue <- rent * simulation$Booked
simulation$Cost <- cost * simulation$Booked
simulation$OverbookedCost <- overbookCost * simulation$Overbooked
simulation$Profit <- (simulation$Revenue - simulation$Cost - simulation$OverbookedCost)
simulation
```

```
##       Reservations Booked Overbooked Revenue Cost OverbookedCost Profit
##    1:          103    100          3   15000 3000            600  11400
##    2:          104    100          4   15000 3000            800  11200
##    3:          106    100          6   15000 3000           1200  10800
##    4:          101    100          1   15000 3000            200  11800
##    5:          106    100          6   15000 3000           1200  10800
##   ---
##  996:          105    100          5   15000 3000           1000  11000
##  997:          105    100          5   15000 3000           1000  11000
##  998:          107    100          7   15000 3000           1400  10600
##  999:          100    100          0   15000 3000              0  12000
## 1000:           99     99          0   14850 2970              0  11880
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.5.3
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:data.table':
##
##     between, first, last
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
simulation %>%
  group_by(Reservations) %>%
  summarise(count = n(), average = mean(Profit))
```

```
## # A tibble: 15 x 3
##    Reservations count average
##           <int> <int>   <dbl>
##  1           96     2   11520
##  2           97     2   11640
##  3           98     5   11760
##  4           99    24   11880
##  5          100    28   12000
##  6          101    61   11800
##  7          102    72   11600
##  8          103   121   11400
##  9          104   166   11200
## 10          105   168   11000
## 11          106   169   10800
## 12          107   104   10600
## 13          108    57   10400
## 14          109    13   10200
## 15          110     8   10000
```