ETC 2420/5242 Lab 9 2016

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SOLUTION

Question 1

Write down the equation of the model that was used to play the game.

$$\hat{log(y_i)} = \beta_0 + \beta_1 Tues + \beta_2 Wed + ... + \beta_6 Sun +$$
$$\beta_7 time_2 + ... + \beta_{29} time_{24} +$$
$$\beta_{30} Feb + ... + \beta_{41} Dec + \beta_{41} MelbCent +$$
$$< two - way,\ three - way\ and\ four - way\ interaction\ terms > +$$
$$\beta_{4033} hightmpnot + \beta_{4034} lowtmpnot + \beta_{4035} highprcpnone$$

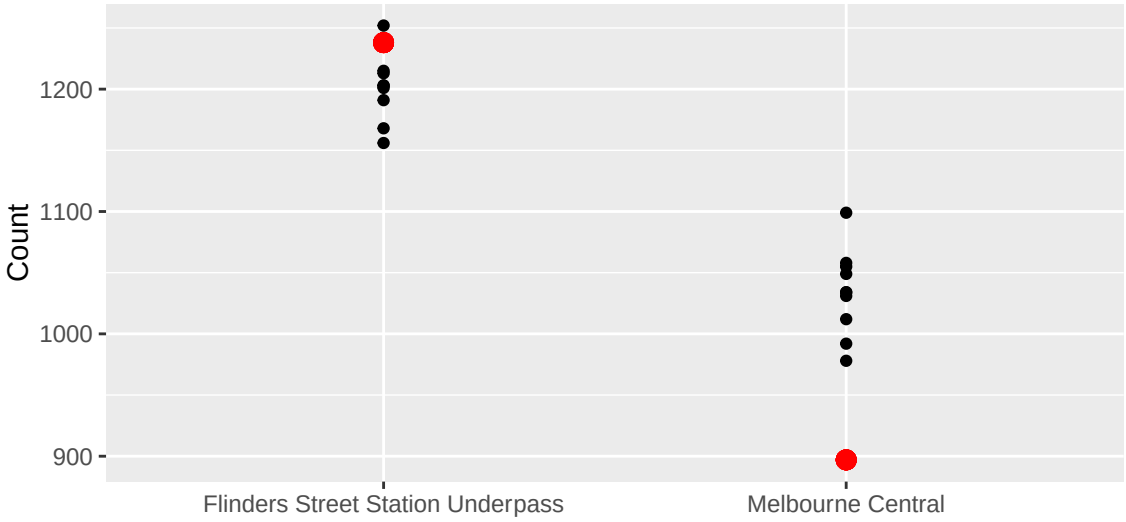
Question 2

a. Simulate 10 sets of new values using the `simulate` function.

b. Subset to examine only records for March 28, 9am. (What day of the week is this?)

```
# [1] Thurs
# Levels: Sun < Mon < Tues < Wed < Thurs < Fri < Sat
```

c. Summarise the distribution of the 10 values for the two locations, and compare with the actual count.



d. If you are open, have three attendants at Flinders and two attendants at Melbourne Central, how much would you make at most, and at least under these conditions, at each location?

```
# [[1]]
# [1] 284
#
# [[2]]
# [1] 178
```

Question 3

a. Now extend this to the full day (between 7am-10pm, closing at 10pm), keep the same number of attendants for the full day. How much in profit do you make at most, and at the lowest at each location?

```
#  [1]  256  400  288  -36    8  152  148   48   40 -136 -112 -144 -156    0
# [15]    0
#  [1] -10 186 174 174 250 250 250 250 250  66  86  54  38  14   0
# [1] 756
# [1] 2032
```

b. Suppose that the weather for the day is actually a hot day. How does this affect your profits? (Predict the counts for both locations for the hot and not hot day, and compute the difference. Subtract this number from your simulation values - because these were for a not hot day.)

```
We need to modify the compute_earnings function to take the reduction in pedestrians
based on the weather into account.
```

```
#  [1]  236  400  240  -44   -8  128  128   56   48 -140 -108 -144 -164    0
# [15]    0
#  [1] -22 154 142 134 230 250 250 250 250  58  70  58  34  18   0
# [1] 628
# [1] 1876
```

Question 4

a. Now scale your calculations up for the full month of March (assuming that you are open 7 days a week). How much do you earn at most, and at worst? At both locations, assuming the same weather conditions as in the given data.

```
# [1] 8672
# [1] 52388
```

b. During the month your coffee machine breaks, and you need to buy a new one. The new one costs $20000. Can you afford it?

```
Yes, at Melbourne Central, with the month's earnings, but not at Flinders St which didn't
make enough in the month.
```

TURN IN

- Your `.Rmd` file
- Your Word (or pdf) file that results from knitting the Rmd.
- Make sure your group members are listed as authors, one person per group will turn in the report
- DUE: Wednesday after the lab, by 7am, loaded into moodle