A Parking Lot Audit of Columbia College Total Parking

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PROJECT GOALS

The reason for this project is assess if there is a lack of parking if so, is it we will determine if it is related to class scheduling at Columbia College.

In order to complete this assessment we will collect data on: the total number of student parking, the total number of cars during steady peak hours, and capacity percentage of available parking during the steady peak hours. With this information we will be able to assess if parking is an issue at any given time at Columbia College as well as predict at which point it will become an issue if it is not already.

ASSUMPTIONS

For this assessment we will assume the following:

1. Parking of handicapped, overflow, auto shop, and fire science will not affect the overall capacity of parking
2. All students will be parked at or within 15 minutes of class start time.
3. Peak times are: 8am, 1pm, and 6pm

SAMPLING AND DATA COLLECTION

Due to it being an observational study, we did not use an simple random sample, it became more applicable to survey the entire parking of Columbia college with the exception of:

1. Handicapped parking
2. Overflow Parking
3. Auto shop Parking
4. Fire Science Parking

All of our calculations and graphs were completed using Microsoft Excel and Holt.blue

Our sample size consisted of:

PARKING

1. Oak Pavilion: 109
2. Upper Lot: 288
3. A Lot: 69

4. B Lot: 69
5. C Lot: 48

For a total of 583 spaces

CLASS TIMES

Monday:
8am/8:15am = 20
1pm/1:15pm = 22
6pm/6:15pm = 26

Tuesday:
8am/8:15am = 24
1pm/1:15pm = 28
6pm/6:15pm = 23

Wednesday:
8am/8:15am = 24
1pm/1:15pm = 25
6pm/6:15pm = 25

Thursday:
8am/8:15am = 24
1pm/1:15pm = 28
6pm/6:15pm = 20

Friday:
8am/8:15am = 13
1pm/1:15pm = 15
6pm/6:15pm = 7

Saturday:
8am/8:15am = 9
1pm/1:15pm = 11
6pm/6:15pm = 0

Sunday:
8am/8:15am = 4
1pm/1:15pm = 4
6pm/6:15pm = 0

We collected these numbers by rolling through the parking lots in a vehicle while the passenger used a pitch counter to count the total number of available spots. At the start of each of the peak times. Each time took approximately 15 minutes to complete.

The total data collection resulted in the following points (number of classes, total number of cars)

11/9 (Wed): (25,294) (26,410) (26,192)

11/10 (Thur): (24,290) (29,348) (21,188)

11/15 (Tue): (25,303) (29,367) (24,200)

11/16 (Wed): (25,252) (26,367) (26,206)

11/17 (Thur): (24,292) (29,342) (21,193)

11/18 (Fri): (14,104) (15,108) (7,47)

RESULTS

We took the total amount of cars in the parking lot and divided the total by the number of available spaces total. By doing this, we are able to see by percentage how full the parking lot is. By looking at this data, we are able to see that the parking lot never reaches its full capacity.

Tuesday: 51.9%, 62.9%, 34.3%

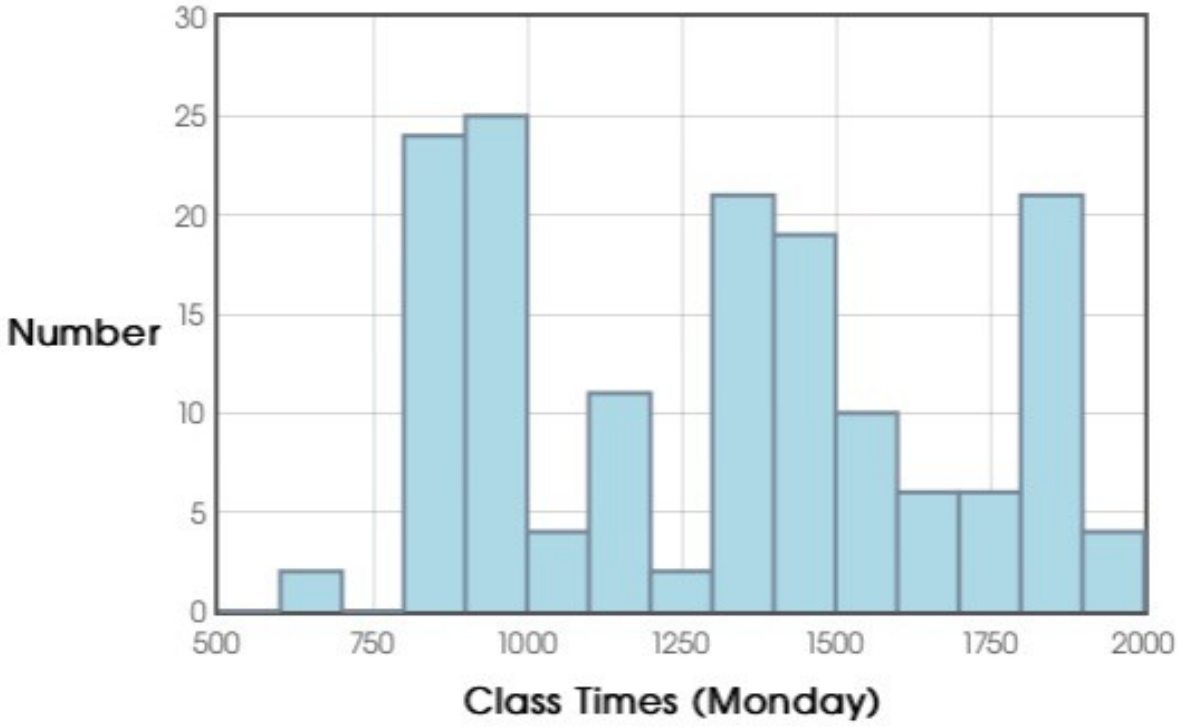
Wednesday: 43.2%, 82.9%, 35.3%

Thursday: 50%, 58.7%, 33.1%

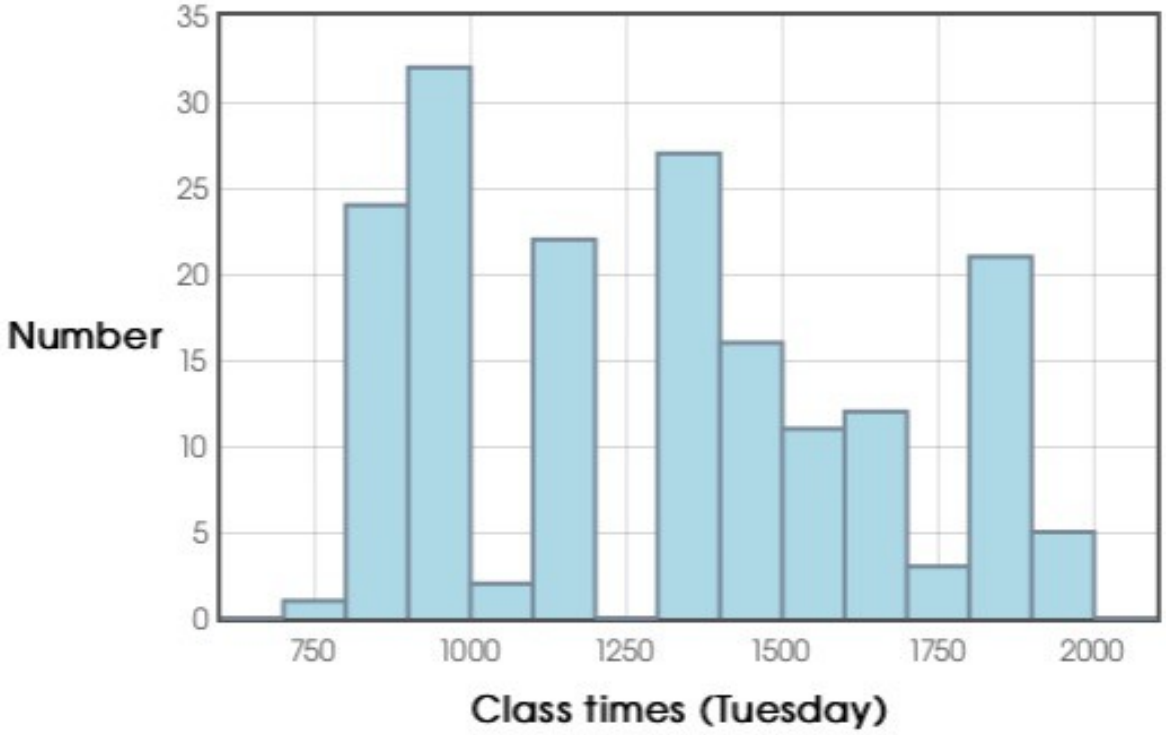
Friday: 17.8%, 18.5%, 8.1%

We can see there is a disparity between the numbers of parking spaces between class times even though the total number of classes is nearly the same between times for each day. This is also reflected in our histograms for each of the days.

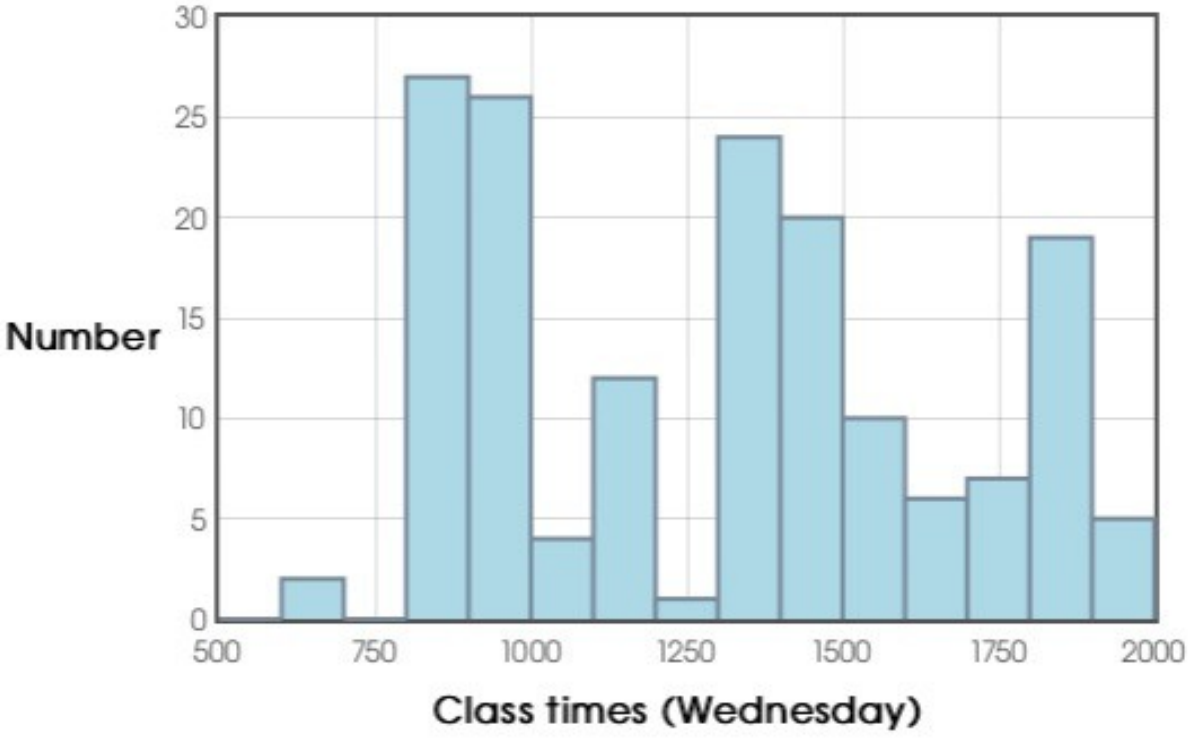
Monday:



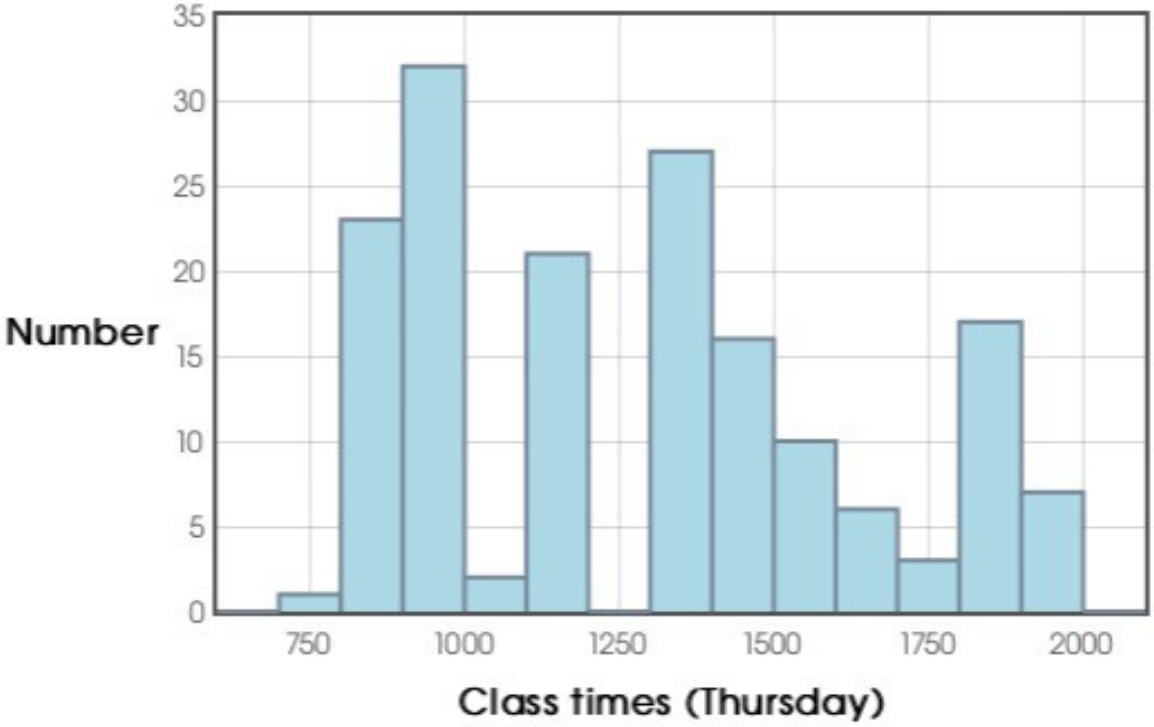
Tuesday:



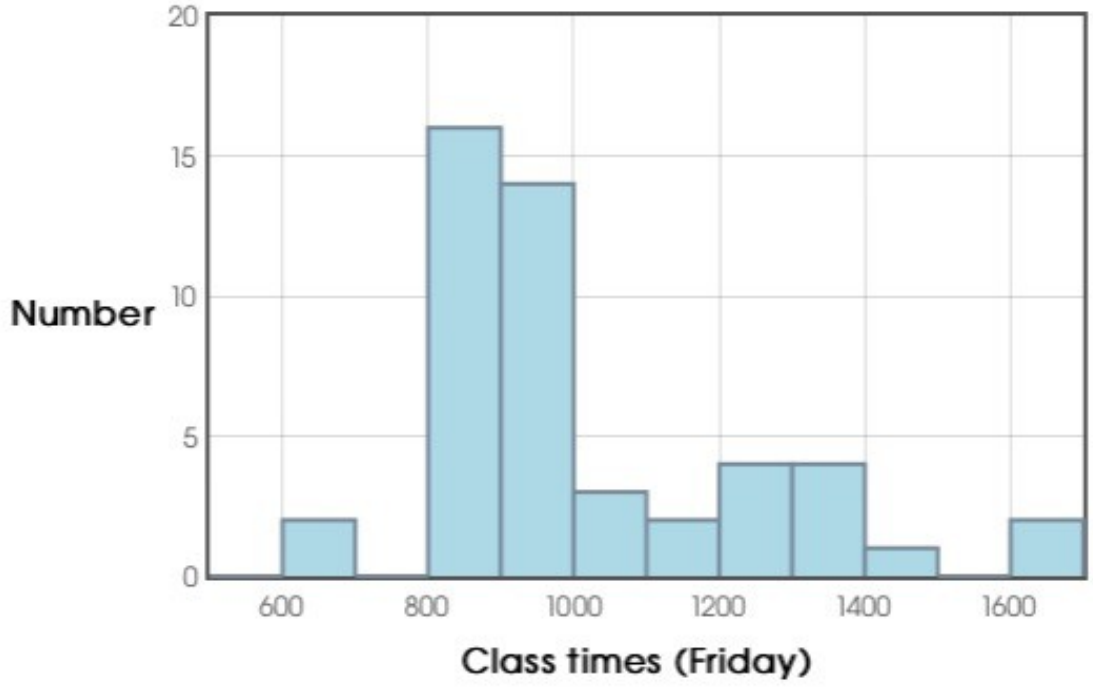
Wednesday:



Thursday:

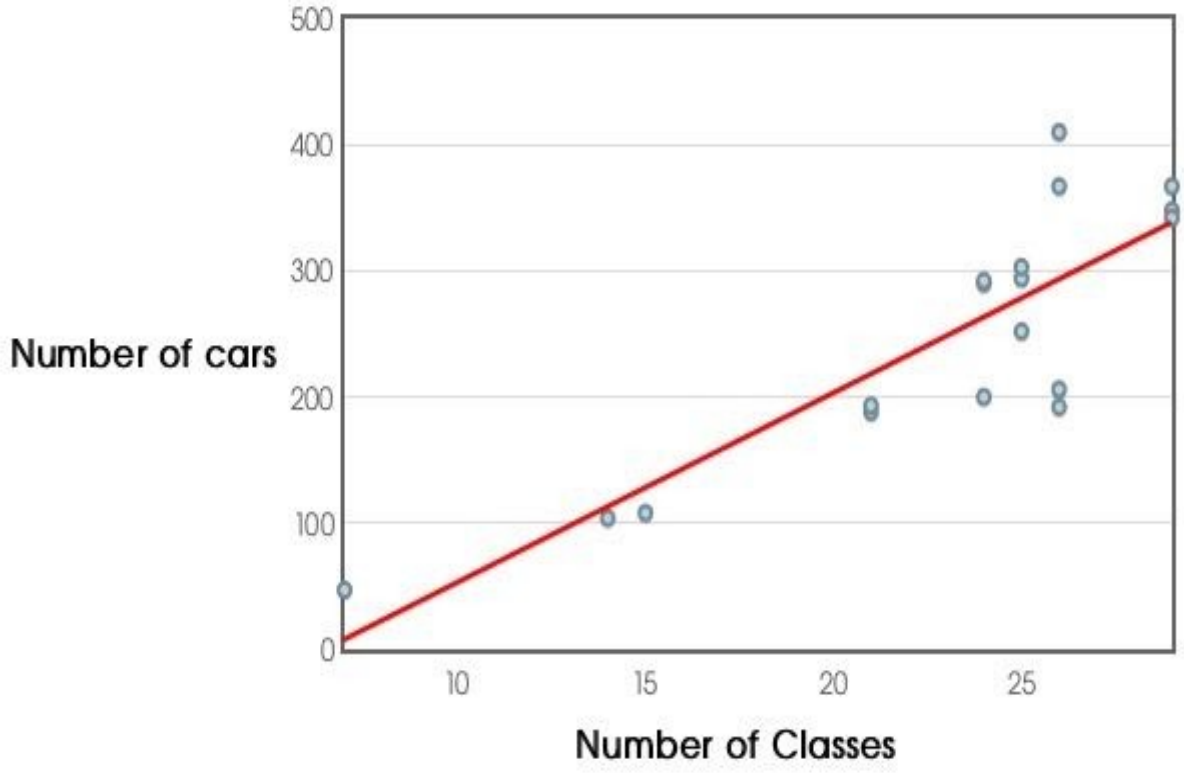


Friday:



We chose to exclude Saturday and Sunday due to the classes hitting nearly every peak time overall and the classes were either fire science or forestry classes (excluded from parking).

By inputting all of our date into Holt.Blue to create a regression inference line we can calculate that the estimate of the line will have a slope of b=15.028 with positive correlation of 0.852 that is explained by an r^2 of 0.726. With this we can say with a 95% confidence that if you increase the total number of classes at any given time by one you will see an increase of 11 to 20 additional cars.



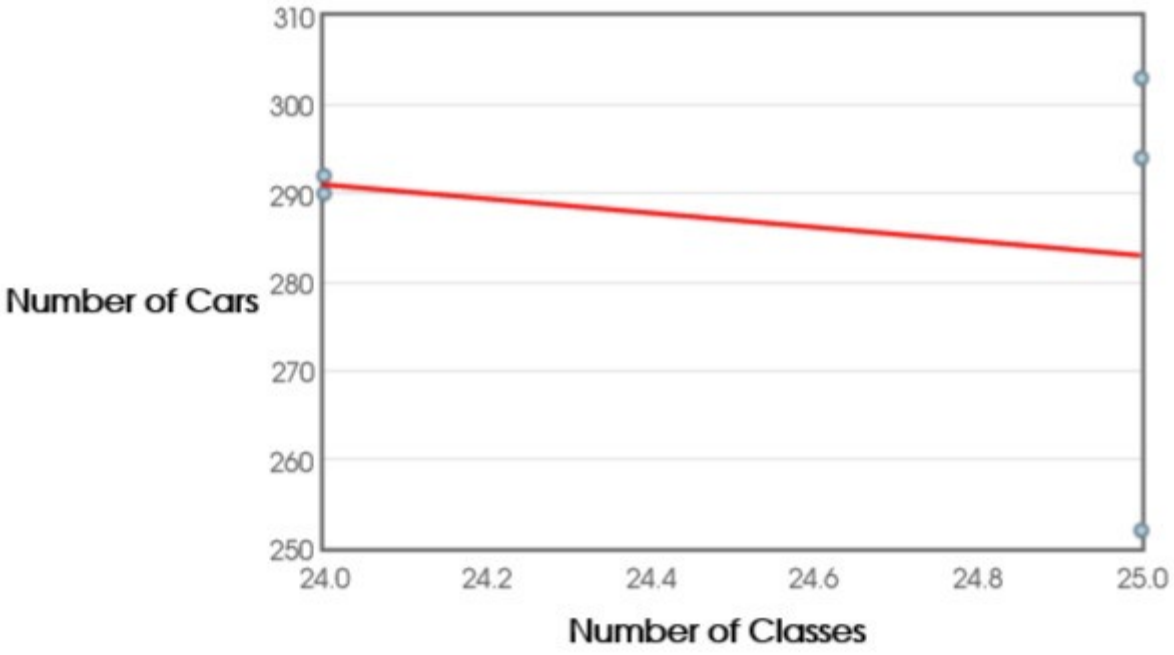
The issue with this is that it does not positively reflect the day to day nature of classes which when calculate in Holt.Blue we can see without the potential outlier of Friday, which creates an extreme skew to the left, we can see that there is actually little to no correlation between the class times/class density, and total number of cars.

8am/8:15am:
Regression Line:

Cars = -8*Class+483

Correlation: r = -0.222

R-squared: r^2 = 0.049



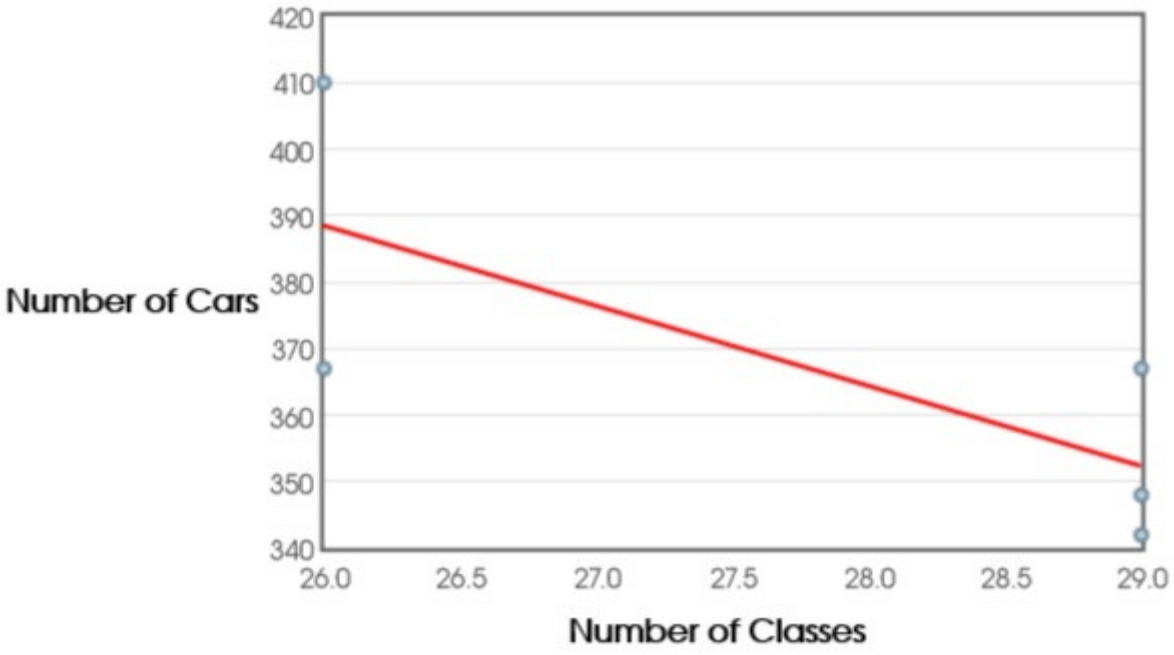
1pm/1:15pm:

Regression Line:

Cars = -12.056*Class+701.9

Correlation: r = -0.744

R-squared: r^2 = 0.554



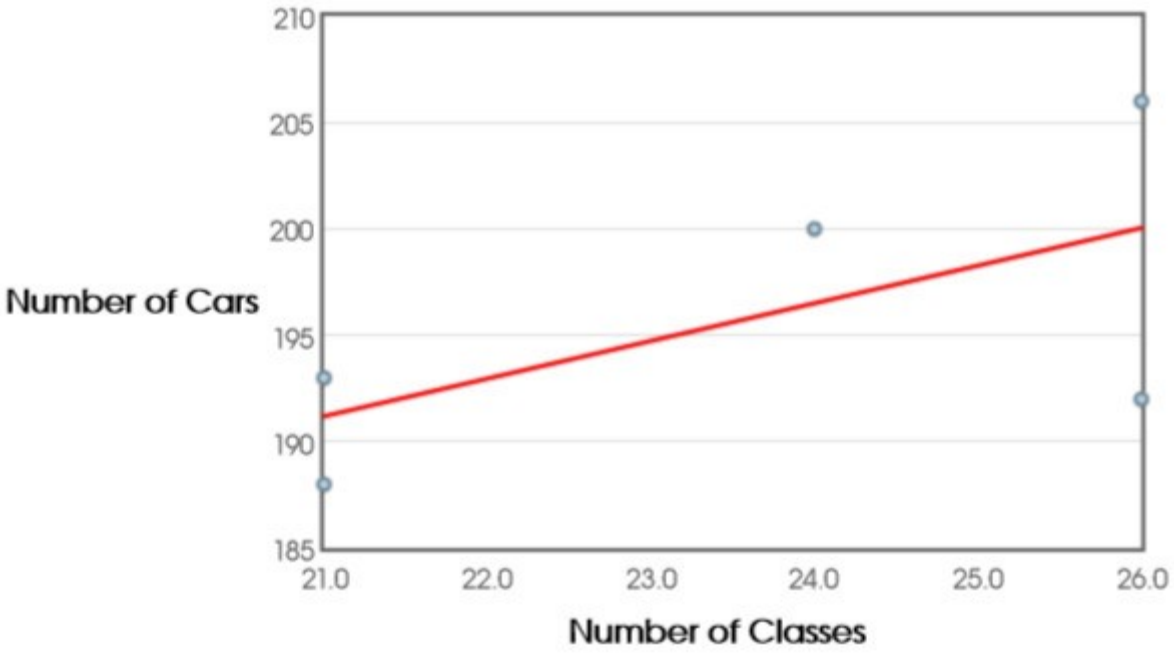
6pm/6:15pm:

Regression Line:

Cars = 1.77*Class+154.032

Correlation: r = 0.621

R-squared: r^2 = 0.385



CONCLUSION

According to the percentages for each peak time during each day, the parking lot capacity is never fully reached. However, according to our correlation graphs and our overall regression inference, if Columbia College wanted to add more classes during any of these peak times, overall they should expect anywhere from 10 to roughly 20 additional cars per class. But, without showing a definitive correlation outside of the overall coverage, the data is inconclusive.

UNKNOWN VARIABLES

- Types of classes offered during peak times (may affect class selection)
- Class cancellations (professors sick)
- Lack of information previous to W date
- Student drops later in the semester / during assessment
- Study habits / Facility usage.