1) (20 pts) For this problem, we will look at data about Intel stock (Intel-1998 dataset from the website). The data covers stock market trading for the Intel corporation in 1998. Each row is a day, with the following columns: Date, Trading Day (integer day number, including skips), Open (price at market open), High (highest price of day), Low (lowest price of day), Close (price at market close), Volume (shares traded), and Adj. Close (adjusted closing price, meaning accounting for stock splits, which are not a problem in this data).
Make the specified graphs in either R or Tableau:

R was used for the graphs in this probelm

a**. Graph the closing price vs. the date with an ordinary line graph. If you use Tableau, you need to right-click on the Date and choose Exact Date from the dropdown menu so that it uses the full date with "day".**

A graph was created using the ggplot geom_line function.

The above visualization was made in R. The Intel data contained the date as a factor. To make the visualization clearer, the date data type was changed to a date. The size and color of the line graph where changed to better visualize the change in stock prices over time. The dates shown are the start of each quarter in 2019.

b. Graph the Volume vs. the exact Date as in the last part with a bar graph.

Intel Stock Volume Vs Closing Date Per Quarter
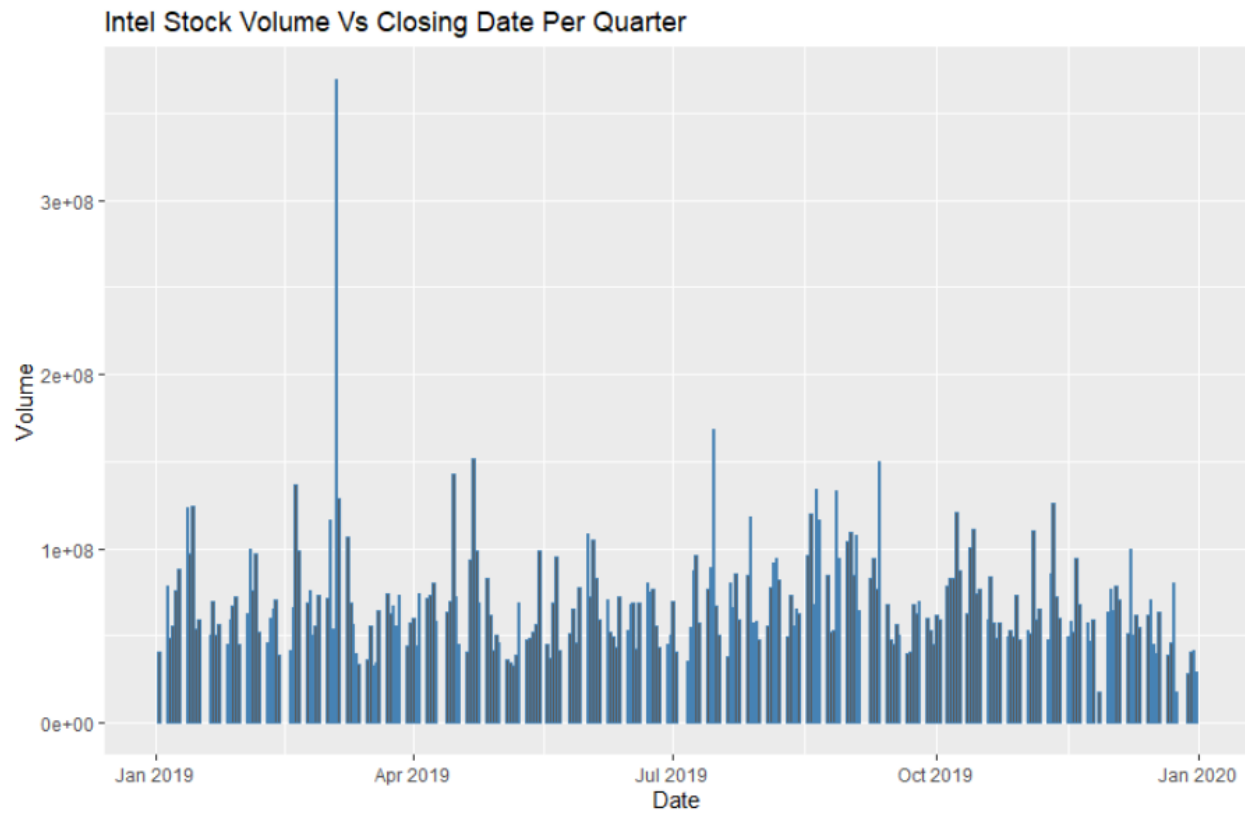
R was used to make the above visualization. The exact dates were used to form the bar graphs. The dates may have made the visualization a little more difficult to understand what is happening with the stock volume for each date. It appears the volume increased in May of 2019 but remained steady throughout the rest of the year.

c. *Create a scatterplot that graphs the Volume on the x-axis and the daily price range on the y-axis. You will need to create an additional column that contains the "range" of the prices for the day as the difference between the fields High and Low.*
Range = High – Low

Intel Stock Volume vs Daily Stock Range
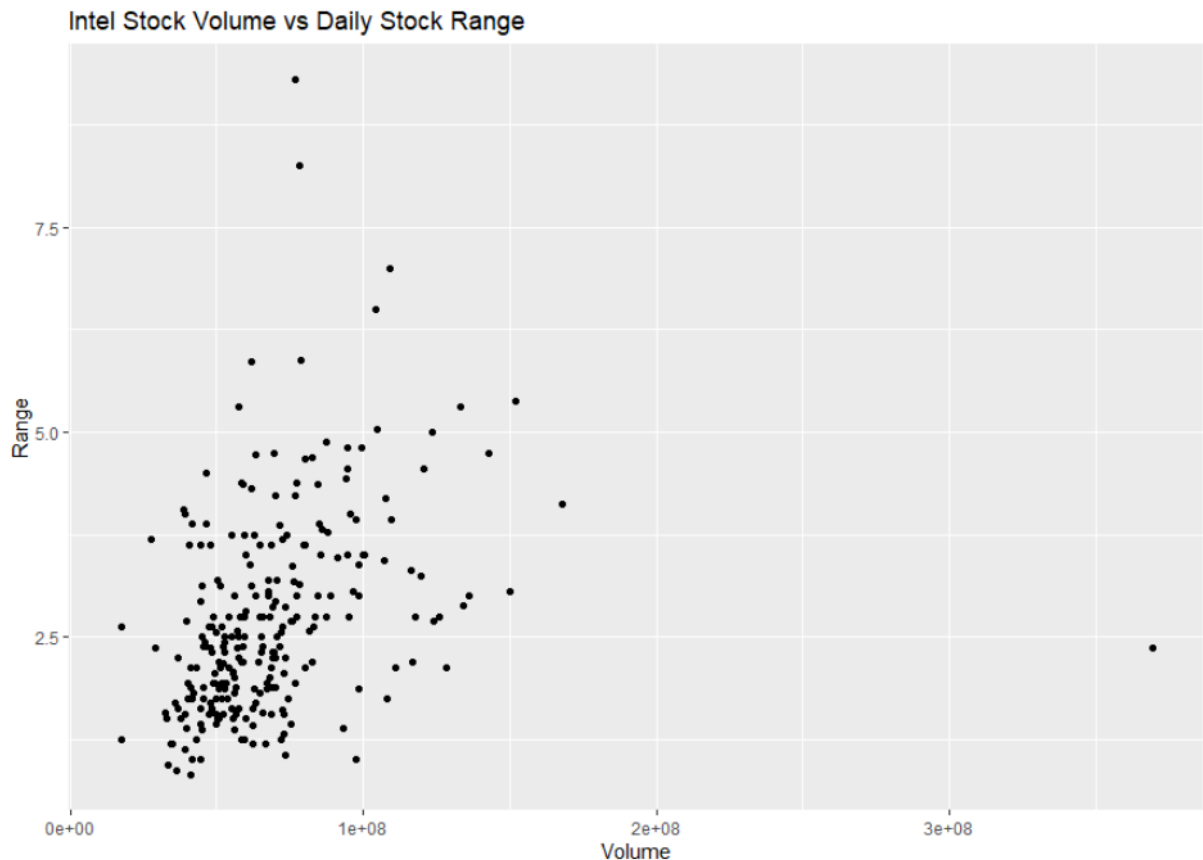
The above visualization was created in R. A variable containing the range of daily high and low stock prices was created. The visualization shows the volume of stock sales and the range of the high and low stock prices. There appear to be a few outliers in the data, which may need to be removed to create a better visualization.

2) (20 pts) Use Tableau for this question. Open the GM cars dataset included with this assignment (gmcar_price.txt). Each row represents a different car that was sold and includes information about features like the mileage and the price of sale. Hint: use the "Show Me" menu.
   a. A treemap based on Price with a main subdivision for the Make of the car and a minor subdivision based on the Model. Because each row of the data file represents a single car but each box in the treemap represents all the cars with a given make and model, pay very close attention to what kind of aggregation is being used.
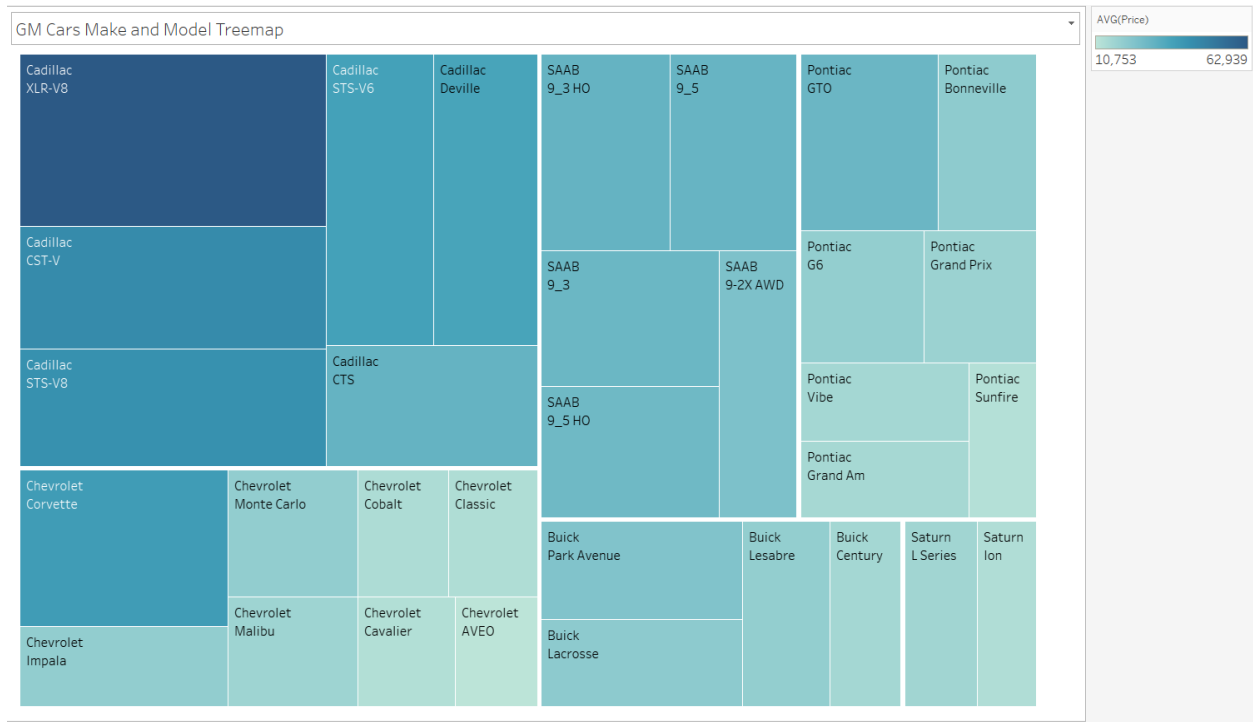
The above visualization shows a treemap based on the average price of the make and model of GM cars. The segments of the treemap are broken up into segments and the darker colors represents cars with a greater overall average cost.

b. A packed bubble chart of the same type.

GM Cars Make and Model Average Price

The above visualization shows different manufacturers car makes and models by color. The larger circles appear to be car manufacturers make and models that have a higher average price.
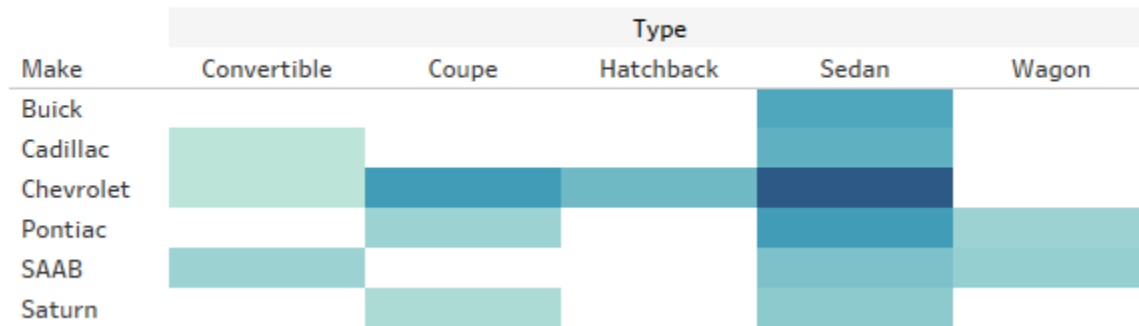
***c. Write a short paragraph discussing the differences between the two plots.
Describe for each something that displayed more clearly than with the other.***

The above treemap shows similar car make and models grouped together in the same section. The darker colors in the treemap represent vehicles that have a higher average cost. It appears to be easier to view the differences in cost between different car models belonging to the same company. The Bubble chart displays the car companies by color and the size or area of the circles represents the difference in cost for different car makes and models. The different colors in the bubble chart make it easier to see the different car manufacturers. It appears that the bubble chart displays the different car manufacturers more clearly.

d. Create a contingency plot (Tableau calls it a heat map under Show Me)

showing with color the number of cars (Number of Records) of each Type sold by each Make. Explain at least one observation about that data that this chart makes it easy to see.

GM Cars Sold by Make and Type (HeatMap)

|	Type				
Make	Convertible	Coupe	Hatchback	Sedan	Wagon
Buick					
Cadillac					
Chevrolet					
Pontiac					
SAAB					
Saturn					

The above visualization makes it to easier to see that sedans are sold most frequently by each car manufacturer. It is also easier to see that Chevrolet, Buick, and Pontiac sell more sedans than other vehicle types.

3) (20 pts) This problem works with a dataset containing the population of Montana and of each of the 7 Native American reservations within it (reservation70-00.xlsx). There is a measurement for each decade between 1970 and 2000. Create graphs to show the following information, using appropriate graph types. Make sure that the graphs are properly labeled and that the axis scales properly reflect the type of data represented.

a. One chart that graphs the population growth over the years for the individual reservations.
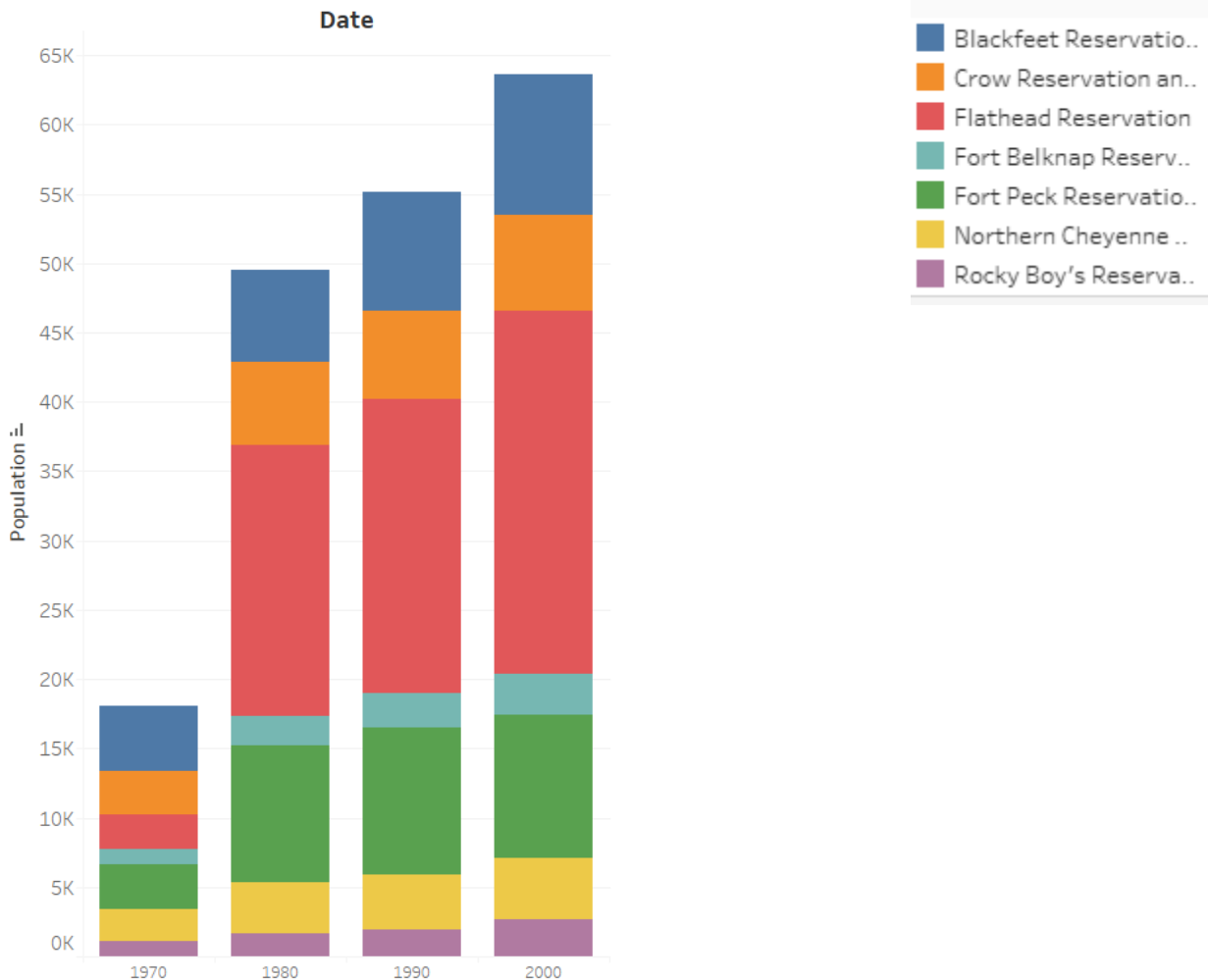
Population on Native American Reservations (1970-2000)
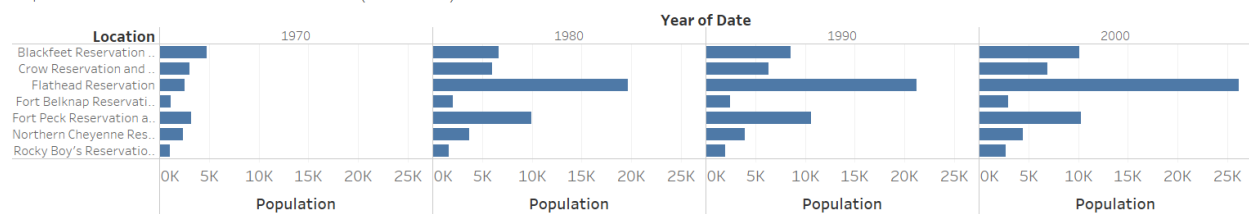
The above visualization shows a horizontal bar graph of the different Native American reservations populations in each decade. The visualization makes it easy to see the change in population after 1970.

b. One that graphs the total reservation population for each year, subdivided among the different reservations. The difference between this and (a) is that in (b) we are not looking only at each population individually but at the growth of the total population of all of them together, then subdivided by the reservations.

Population on Native American Reservations (1970-2000)

Date

Location
- Blackfeet Reservatio..
- Crow Reservation an..
- Flathead Reservation
- Fort Belknap Reserv..
- Fort Peck Reservatio..
- Northern Cheyenne ..
- Rocky Boy's Reserva..

4) For this question, answer only with text. You may include an illustration if you would like, but you do not need to visualize data for this question.

a. Explain what we mean by 'pre-attentive' attributes. Are these as effectively recognized by human perception when they are used in combinations?

Pre-attentive attributes are those that make things easy to see in a visualization. In other words, pre attentive attributes are visual properties that are noticed without having to think about it. These attributes are effectively recognized by human perception when because the attribute has a high salience and are easily recognized by the human eye. When they are used in combination such as color and length, and spatial position they are effectively recognized by human perception.

b. Use Weber's Law to explain why it is important to include 0 in the numerical axis of a bar chart.

Weber's law explains the noticeable difference between two stimuli that is proportional to the magnitude of the stimuli. Weber's law helps to show how different things need to be before the differences are observable by human perception. It is important to include 0 in the numerical axis of a bar chart because human perceive things by percentage increase. Having 0 on the axis of the bar chart allows the graph to have a common baseline and provides clarity to the data being presented.

5) This graph of cell phone pricing plans is not very easy to use. Use R for this question and recreate this graph in two different ways of your choice. For each one, explain what you are trying to help the user see.

Cell Phone Data Price (GB) Per Cell Phone Carrier
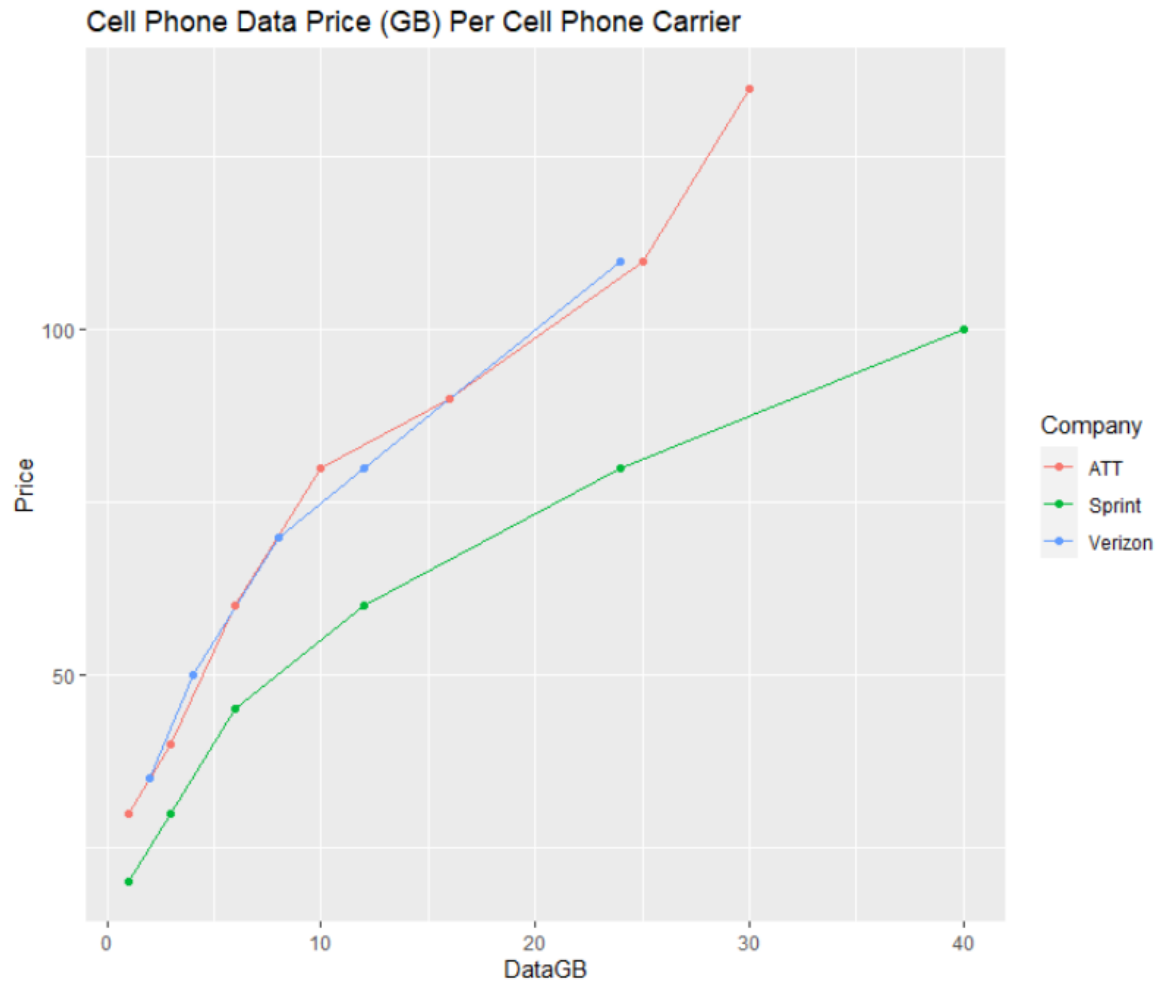
The above plot shows the price per cell phone data plan offered by each phone company. This visualization shows that the prices per data plan differ amongst the different companies. From the visualization we can see that Sprint has the lowest cost per data plan, while ATT has the highest cost plan.

Cell Phone Data Plans Per Cell Phone Carrier
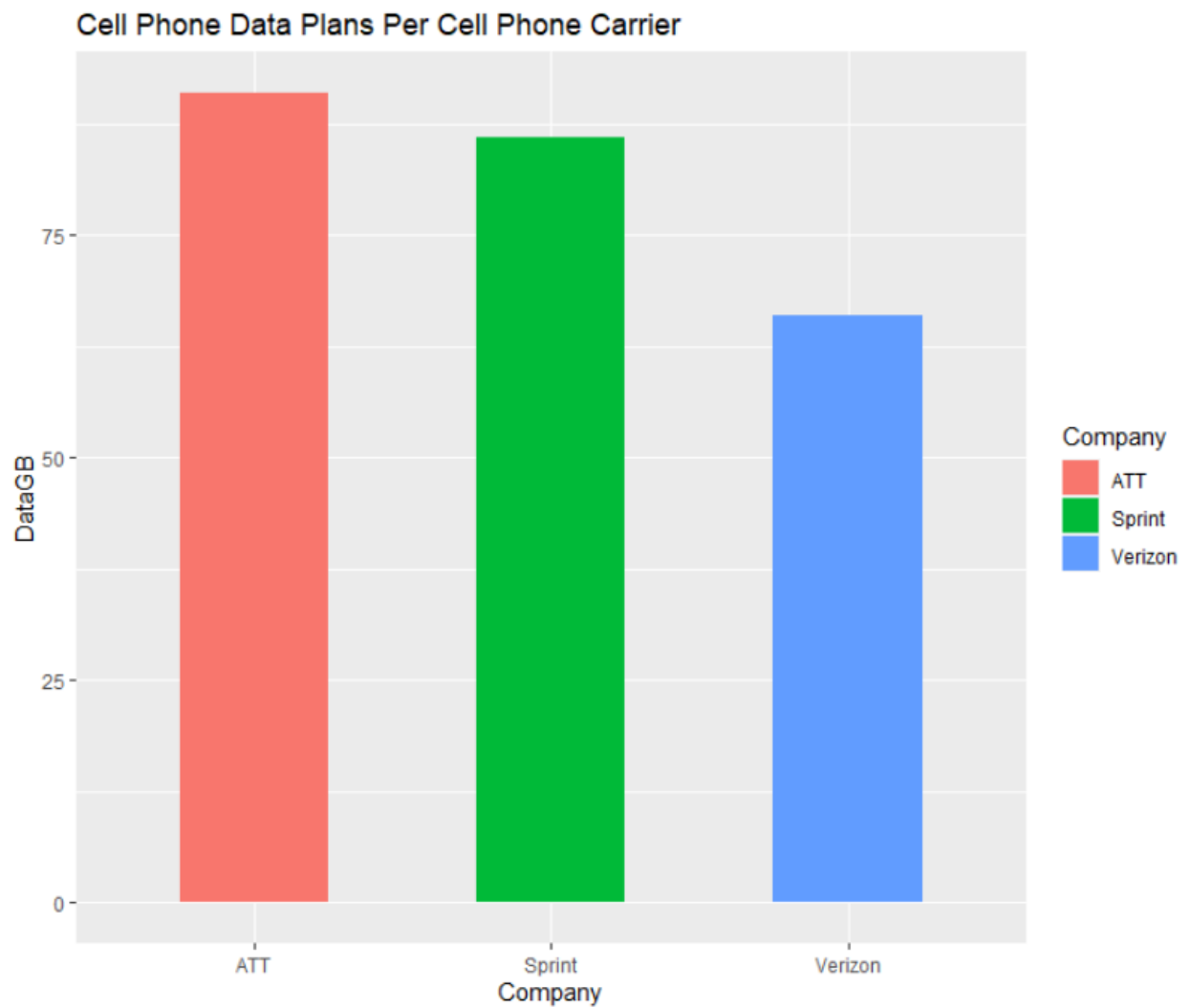
The above visualization shows each cell phone carrier and the maximum data plan offered by the carrier. Each bar represents a different cell phone carrier. From the above visualization we can see that ATT offers the highest available data plan and Verizon offers the lowest amount of data in a plan to customers.