**Question**

**1. In using the intersection functions, are the following two statements equivalent? If not, explain how. Be sure to think about BOTH the spatial data structures AND the attribute data. Would your answer be different if we were using different types of data?**

*sf::st\_intersection(d.stations, del.counties)*

*sf::st\_intersection(del.counties, d.stations)*

st\_intersection returns a geometry representing the intersection of a set of two geometries. That is, those parts of geometry A and geometry B that are shared between the two geometries. When the position of geometry A and geometry B is changed each other, the following differences may exist.

1. The class of returned object.

The returned object has the same **class** as that of the first argument (x) with the non-empty geometries resulting from applying the operation to all geometry pairs in x and y. The sf class is divided as follows:

- sfg: Simple feature geometry

- sfc: Simple feature columns which combining sfg objects into a single object as a list (A list of sfg object).

- sf: Combination of sfc and non-geometric attributes

- non-geometric attributes: A data frame that collects attribute values (e.g., name, use, area, price, number of populations, temperature, humidity, etc.) for each simple feature geometry.

2. processing (returning) time

Difference between two seems to be in processing (returning) time. In the case presented in our lab, returning time of sf::st\_intersection(d.stations, del.counties) is less than that of sf::st\_intersection(del.counties, d.stations). However, this is a relatively small dataset of 3 counties (del.counties) and 122 stations (d.stations). If the same st\_intersection function is returned using the ‘tornados’ data mentioned on page 150 of our textbook, the returning time is significantly different. It is speculated that the st\_intersection function returns the intersection after positioning the geometry of the first dataset, and then matching the geometry of the second dataset with the geometry of the first dataset, positioned. For this reason, If the dataset with point geometry is in the first place, the processing (returning) time is relatively short, but if the dataset with polygon geometry is in the first place, it takes a lot of processing (returning) time.

3. The order of returned dataset variables and objects

The minor difference is when the two datasets are connected to each other, the second dataset is connected behind the first dataset. However, the order of each object(column) seems to follow the order of the second dataset.

**2. What did you find challenging in this lab? What was new?**

There are various coding approaches in the problem-solving process using R. It seems that simple and clear coding can reduce errors and enable faster analysis than long coding. However, for me, there was a tendency for the coding to be long to check whether the coded had been correctly written without errors in the middle process. In addition, it took a relatively long time because I tried to find the corresponding function by rechecking the coding I wrote several times to reduce the lengthy coding by even one line during the lab. These were challenging for me.

The new thing I learned was that I was surprised that there are so many different packages and functions to use. I would like to thank the many people who voluntarily worked to maximize the usability of R, which every imaginable use case is included.

**3. What types of activities would you like to see in labs this semester?**

When I try to code what I have learned and studied in class, and the expected answer comes out, it gives me a feeling of indescribable pleasure. I think the lab is a very good opportunity to try out what I have learned through problems that make me think a lot. I have been very interested in change detection in a specific area from a long time ago. We were experiencing a little bit of the process of acquiring meaningful information using a raster file captured by satellite, which we recently discussed in class. It has been a very interesting topic. I honestly don't know clearly, but I think it is necessary to acquire relevant knowledge through field research and generalize/standardize the pixel values ​​of the raster file in order to become meaningful information. It may be important to simply get the answer I want through coding, but it would be nice if it could be a lab where I could draw an overall picture for solving problems, like the topic we were dealing in a recent class regarding the change of pixel value of raster files.