

## Geog332 - Thematic Cartography Project 9 - Proportional Circle Maps

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### Proportionate Symbol Mapping

This project is designed to familiarize you with the techniques of proportional circle mapping. You will be creating **two** maps; the first will utilize map the conventional square root method for determining the sizes of circles, and the second map will use circles computed by Flannery's method. In each case you are to use sound cartographic design practices. This includes good balance, title, legend, foreground/background contrast, etc. The maps should be produced as black and white maps.

Your company, *Aggeland Cartographics, Inc.* has been contracted the ***Wine Institute – the voice for California Wine*** create maps **showing wine production in Europe for 1999**, the most recent year that you have data. California wines are world class, but you can't neglect your competition. The data you will use is provided by the Wine Institute (<http://www.wineinstitute.org/>) and you should cite this as your data source. I have placed the wine production data you will need in an Excel® file. PLEASE NOTE THE DATA ARE IN THOUSANDS OF GALLONS PER YEAR SO YOU MUST TAKE THIS INTO CONSIDERATION IN YOUR LEGEND!

The wine growers of California do not like to waste their precious profits, so to cut down on production costs, the maps will be in black and white.

### Computer Instructions

The Excel and ARCGIS files that you need for this lab are located on the server in the project09 folder. Your TA can help you find the files if you have trouble locating them. You should copy them to your local drive.

### Tips

- 1) You can save a lot of work by setting up the overall design of your map and legend (labeling) and just substituting different circles at the appropriate places. This way you will not have to make each of your two maps from scratch.
- 2) Do not forget to rescale the linework of the circle to the same point size each time you enlarge or reduce it, otherwise it will vary in proportion to the size of the circle.
- 3) Pay some consideration of how you might treat European countries that are not wine producers. You might wish to consider something to set them apart from countries that do produce wine.

### Basemap

Although ARCGIS has the ability to produce proportional circle maps, including using the Flannery method, we are going to be doing these by hand to give you experience in undertaking the classifications, scaling circles, etc. That is to say, you will be using Excel and Adobe Illustrator to make your symbols and legend.

However, you will be using ARCGIS to make the basemap. I have placed a GIS coverage of Europe (*europe.shp*) on the class drive. Your TA can help you locate it. You should use ARCMAP to produce a basemap of the area of interest.

What you will need to do is this:

- 1) Select a proper projection for the study area.
- 2) Adjust the size of Europe until you feel you have reached an appropriate size
- 3) Add a scale bar and any other elements you may think you might need when construction your map.
- 4) Once the basemap is created, save it as Adobe Illustrator file that you can modify it to create your two proportional circle maps.

## **MAP 1: Proportional Circle Map: Square Root Method**

### **Circle Diameters**

Use the conventional square root method to create proportionate circles from the wine production data. When placing the circles on the map use the **cut-out circle method**. You should start with the largest circle that corresponds to the country with the highest wine production in 1999. The size of the circle corresponding to this country should be 1.25 inches in diameter.

### **Legend**

The legend should contain at least 7 sample circles covering a range of values that you feel is appropriate. I will leave it up to you to decide what appropriate legend values are.

### **Map Design**

The map should include an appropriate legend, title, and neatline. Place your name and the name of your company outside the neatline and in the lower right corner. Indicate the circle computation technique (Square Root method or Flannery method) outside the neatline below the lower left corner. Remember it is assumed that you are to create cartographically correct and visually interesting graphics for all projects.

The general procedures for processing the data and constructing the map are outlined as follows:

1. Generally, when you begin a proportional circle map you should determine which enumeration unit has the highest density by dividing the values by their corresponding areas. This will help you decide on how large to make the circles if you want the enumeration boundaries to be visible after the circles are drawn. You would determine the maximum size circle that will fit within the densest unit and then calculate all other circles based on this diameter. However, since some European countries are quite small, it may not be possible to constrain a proportional circle to within all enumeration unit, so in this case let us simply work from largest to smallest. In real life, you will probably find out that you often face a tradeoff between the size of the largest and smallest units, and will have to solve that dilemma.

2. Indicate the circle computation technique (Square Root method) inside the neatline in the lower left corner of the map.
3. Compute the square root of the wine production in 1999 using Excel®  
**HINT** If you include your legend values as data values in the Excel file, you can compute the exact diameters for the legend symbols at the same time you computer the diameters of all the other circles.
4. Divide the largest square root value by the diameter of your largest circle.
5. Take the result of step #4 and divide it into all square root values. This will set the largest value to 1.25 inches and all other values in proportion to the largest value.
6. You are now ready to construct the map.
7. **VERY IMPORTANT** - The circles should be transparent that is to say there should be NO FILL. You can make a perfect circle with the required diameter by drawing any size circle (use the oval tool and hold down the shift key when making the circle).

You can also get an ellipse of a specified size by selecting the ellipse tool and clicking one in an empty space on the map. A dialog box will pop up and let you specify a size interactively. This technique will guarantee the exact circle size and that the circles will be perfectly round. Pretty Spiffy, No?

## **MAP 2: Proportional Circle Map: Flannery Method**

### **Circle Diameters**

Use the Flannery method to create proportionate circles from the manufacturing data. When placing the circles on the map use the solid circle method. SET THE SMALLEST CIRCLE TO THE SAME DIAMETER AS THE SMALLEST CIRCLE ON MAP 1 AND MAKE ALL OTHER CIRCLES PROPORTIONAL TO THE SMALLEST CIRCLE BASED ON THEIR VALUES.

### **Legend**

Your legend should contain the same values that you used on the first map, but remember to rescale your proportional circles!

### **Map Design**

The map should include an appropriate legend, title, and neatline. Place your name outside the neatline and in the lower right corner. Indicate the circle computation technique (Flannery method) inside the neatline in the lower left corner. Remember it is assumed that you are to create visually correct and visually interesting graphics for all projects.

The general procedures for processing the data and constructing the map are outlined as follows:

1. Instead of taking the square root ( $n^{.5}$ ) of the manufacturing data use the exponent .5716 ( $n^{.5716}$ ) using Excel. In Excel taking a number or cell to a power is accomplished by using the ^ symbol (*shift-6*). For example, taking the square root of four is  $4^{0.5}$ .
2. Divide the smallest value computed in step #1 by the diameter of the smallest circle in map #1.

3. Take the result of step #2 and divide it into all computed Flannery values. This will set all of the circles proportionate to the smallest circle.
4. You are now ready to construct the map.
5. The circles should be made with a **black fill and bounded with a white circle of 0.5 points thick**. You can make a perfect circle by clicking once on the **ellipse tool** and then holding down the **option** and **shift** keys while making the circle.

But, Dr. Klein these black circles are ugly and this will hide the country borders below the circles and play havoc with me making a nice looking map. In the bad old days, this would be the case. However **Adobe Illustrator 10** supports object transparency. You can set the transparency of an object so that thing below it will show through. If the transparency is 0, the object is opaque; if the transparency is 100%, the object is translucent. The option to show or hide the transparency tab is under the Window menu. You will want to experiment with the transparency to obtain a good balance for your map. I think you will appreciate the advantage of this recent technology!

6. Once the circles are in place create an appropriate legend, title, and neatline. Place your name outside the neatline and in the lower right corner. Indicate the circle computation technique (square root method or Flannery method) outside the neatline and below the lower left corner.

### **Turn in**

Two Completed Proportional Circles

**If you have any problems do not hesitate to see me or the TA.**