36-315: Statistical Graphics and Visualization

Lab 11

Date: April 1, 2003 **Due: end of lab**

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1. Download all the files for this lab into `My Documents`. Other folders will not necessarily work.
2. Unzip `maps.zip` by pressing right mouse and selecting `Extract All...`. In the wizard, click `Next`, `Next`, and `Finish`. If the computer complains about WinZip, move to another.
3. Open a Word document to record your work.

Start R

4. `Start -> Programs -> Class software -> R 1.5.1`
5. Set the working directory to `My Documents`:

   ```
   File -> Change dir...
   ```

6. Load the special functions for this lab:

   ```
   source("lab11.r")
   ```

Load the data

7. `frame = read.csv("lab11.csv")`

   `frame` contains two variables, measured for each census tract in Pennsylvania:

COUNTY	County containing the census tract
PCTUNEMP	Percent of persons (civilian, 16+) unemployed

Choropleth maps

8. Make a choropleth map of unemployment versus county in Pennsylvania, using the default color palette (`YlGnBu.colors`) of five colors. You will probably want to lower the aspect ratio of your window.
9. Change the color palette to `blue.colors`, using the same number of levels. *Explain the perceptual difference between the two maps. Which one has more distinct levels?*
10. Plot the above two color palettes in the color cone. Using `file.name`, you can save the results in separate files, and use Forward and Back in your browser. *Explain the differences in their construction, and how this affects their perceptual qualities.*
11. Make a new map, with the `YR.colors` palette. *Does this palette make the levels more distinct? Does it help your perception of the patterns?*

12. Plot this palette in the color cone. *Connect the shape and construction of the palette to your perceptions in the previous question.* It may help to increase the number of levels, to get an idea of how this palette works.
13. Make a new map, with the five colors from the `GM.colors` palette. *What patterns and counties does this map emphasize?*
14. Change the palette to `RYB.colors`. *Explain the difference to the previous map.*
15. Plot the above two palettes in the color cone. *Explain the differences in their construction, and how this affects their perceptual qualities.*
16. `topo.colors` is a color palette included in R. Using the methods above, demonstrate that it is a poor choice of palette for statistical graphs.
17. Show us your graphs.

Palettes A color palette is a vector of colors returned by `YlGnBu.colors` or a similar function. These colors can then be viewed as connected dots in the color cone, via

```
color.cone(YlGnBu.colors(5),file.name="YlGnBu")
```

Some of the available color palettes:

```
YlGnBu.colors, blue.colors, YR.colors, GM.colors, BrBg.colors, RYB.colors,
topo.colors, terrain.colors
```

Each is a function which, given a number, returns a vector of that many colors. For example, `YR.colors(5)` returns a vector of 5 colors.

Maps To draw a choropleth map:

```
mc = map("county","penn",fill=T,plot=F)
map.averages(mc,MEDAGE,COUNTY,frame)
```

This plots the average `MEDAGE` in each county. The first line only needs to be executed once in the beginning of the lab, to load the county boundaries that will be used by `map.averages`. To specify the color palette:

```
map.averages(mc,MEDAGE,COUNTY,frame,col=GM.colors(5))
```

In general, the usage is:

```
map.averages(<map object>, <numeric variable in frame>,
             <map regions in frame>, frame, col=<vector of colors>)
```

The default palette is YlGnBu.colors(5).