Your lab assignment today is to approximate the behavior of the global warming graph at http://www.bloomberg.com/graphics/hottest-year-on-record/ as closely as possible, with the exception of the interactive elements, which we will ignore for now.

Start with the provided Shiny app. The following workflow is suggested (note: in the following "current year" refers to the year currently selected on the animation slider):

1. Modify the provided app so that as the animation slider advances you see the temperate plot for different years (just the current year's data is visible at a time)
2. Modify your app from above so that yearly data is *added* to the plot (the current year's data and all previous years' data are visible)
3. Modify the above so that the current year's line plot is distinct from the other years' lines in some way (different color, thicker line, etc)
4. Modify the above so that the transparency of each line depends on its distance from the current year (make years far in the past nearly transparent, years in the recent past lightly transparent, the current year fully opaque)
5. Add a variable into your dataset which records the mean for each year (defined as the average of the 12 months in that year) – easiest to do this inside global.R.
6. Use the new variable created above to modify your application so that the average for the current year appears as a dashed horizontal line on your plot
7. Modify the above so that instead of showing the average for the current year the average for the current *record holding year* (i.e., the year from 1900 to the *current year* with the highest average) is displayed as a dashed horizontal line
8. Modify the above so that the color of the line for a given year is determined by its average value – redish colors for hot years and bluish colors for cold years
9. Do clean up, modify labels and reconsider aesthetic choices.

Notes and hints:

Data processing and variables: Inside your renderPlot function, you may wish to define additional variables based on the current year. You might wish to:

- Create a new dataset which is a subset of your full data and contains only the years up to the current year
- Create a new variable which indicates whether or not observations come from the current year
    - Try something of the form currentData$presentYear = currentData$year == input$currentYear
- Create a new variable which indicates how far into the past a given observation is (consider the difference between the current year and the year of an observation)

Setting scales: Once you set an aesthetic attribute to be mapped to a particular variable, you can further control that behavior with a scale command. The scale commands are of the form scale_*_manual, scale_*_continuous, and scale_*_discrete where * is the name of the attribute. For example, you can use scale_alpha_continuous to control how alpha (transparency) is mapped to a variable in a continuous way (low values of the variable = low alpha values, high values of the variable = high alpha values) or you can use scale_color_manual to manually set how color is mapped to a particular variable.

Horizontal Lines: Use geom_hline to add a horizontal line. Use geom_hline(yintercept=3) to add a horizontal line at height 3.

Line types: Control the thickness of your lines with the *size* argument. Control the type of line with the *linetype* argument. Use *?linetype* to see the integer codes for standard types.

Labels: To get degree symbols into your labels, try something like

```
    scale_y_continuous(name="Temperature",breaks=c(-3,0,3),labels=c(expression(-
3~degree*C),expression(0~degree*C),expression(3~degree*C)))+
```