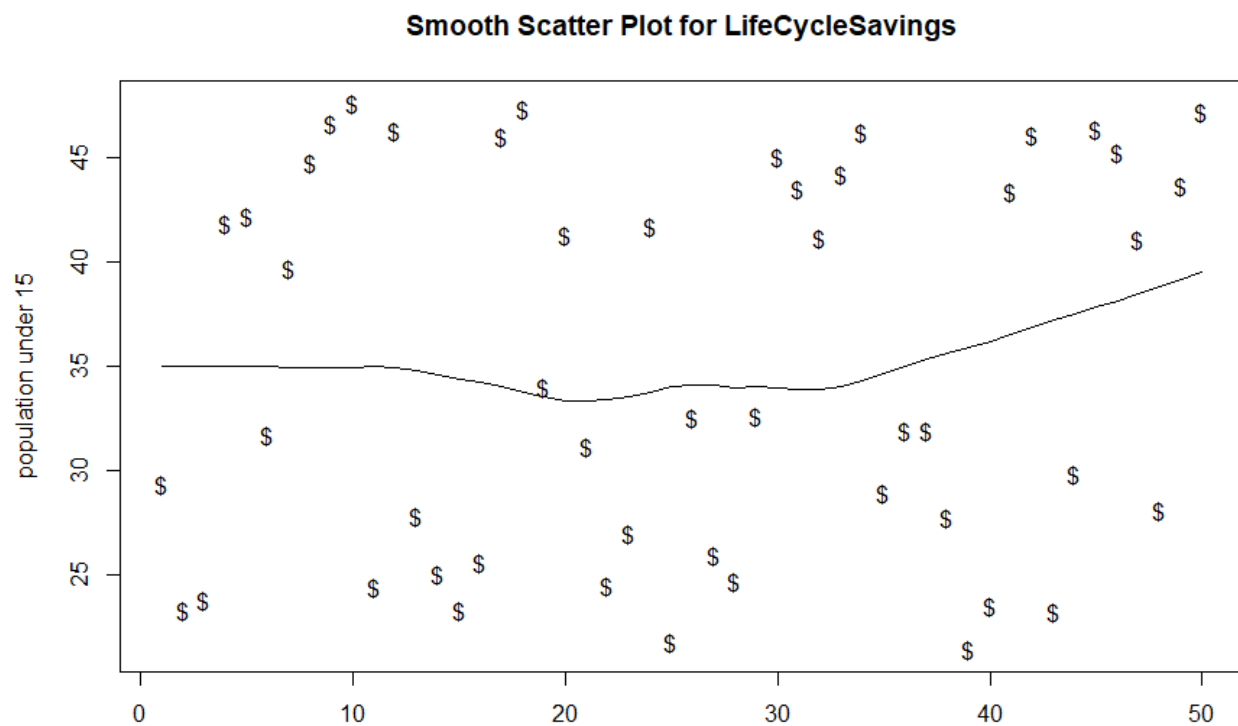


Question 4 (25 points)

Visualize the LifeCycleSavings dataset from R, and three different glyph (icon) -based visualizations. Compare the results. Submit the source code if you chose R, screen shots for your graphs, and a discussion of the results

I chose R for this question. I have attached the source code at the end of this document. There are screenshots of the graphs with discussion. The 3 glyph-based visualizations I used are Heatmap, Glyph Star Glyph and Chernoff Faces

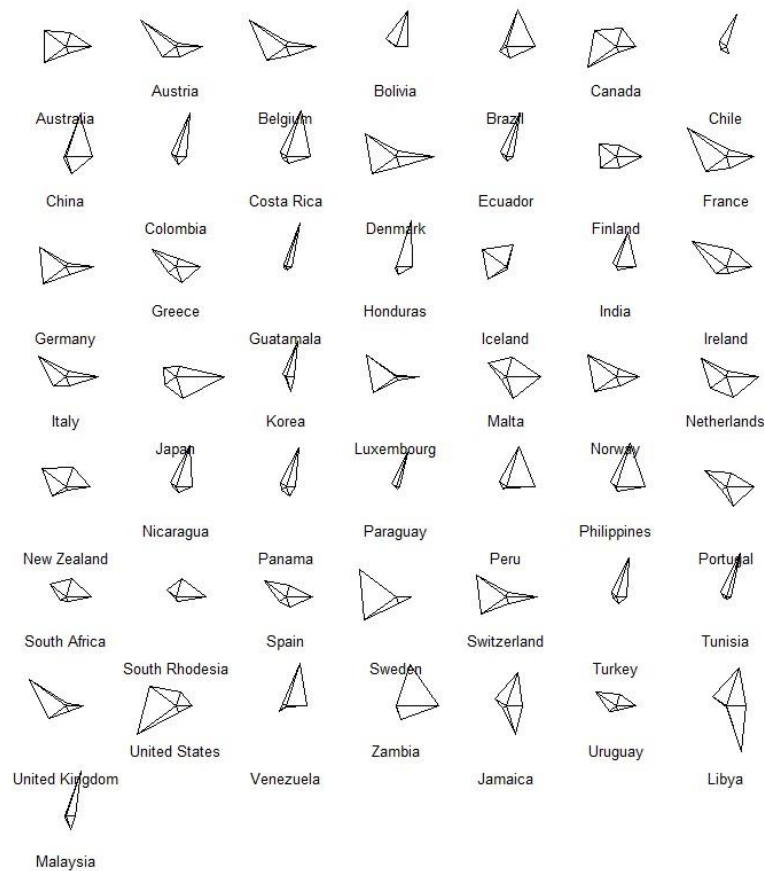
1) Scatter Plot with '\$' sign



This is a Scatter plot with '\$' glyphs that display the percentage value of the pop15 – population under 15 – in the LifeCycleSavings dataset. Also, to make this graph a little specific, we can see the trend by the trend line that is depicted in the center.

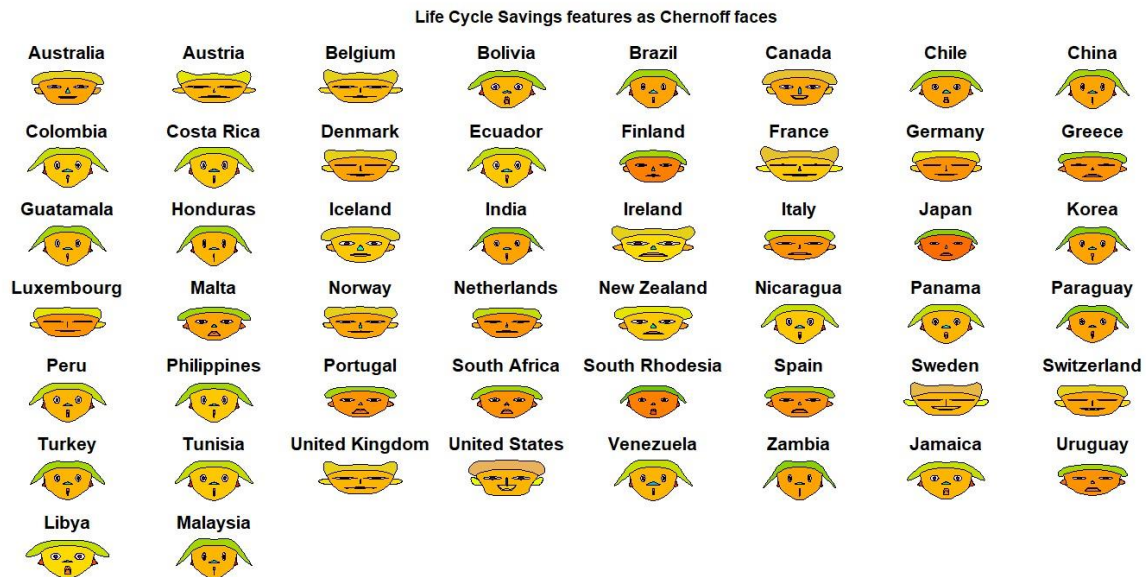
2) Star Glyph

Life Cycle Savings as Glyph stars



The star glyph approach uses the dimensions(length), angle, direction of lines and the number of lines of the glyph – star, as a way to display multivariate attributes. From the graph, I can extract the information for any country I desire. I can even compare two countries for a certain attribute - for instance, the value for country Paraguay is higher than Peru because the line with same orientation is longer for Paraguay as compared to Peru.

3) Chernoff faces



Chernoff faces is quite common or at least famous glyph-based approach. When I was trying to think of the glyph-based approaches, Chernoff faces was fresh in my mind from lecture videos and information on them is really easy to find on internet. Every face feature depicts a value. I have attached the key just below the description. So, for example width of face depicts the attribute pop75. So very clearly, the pop75 value for United Kingdom is more than for Tunisia. Since there were only 5 columns for this data, the features have repeated attributes again and again as seen in the key. But this is a useful approach for large dimensions.

Key :

```
> faces(LifeCycleSavings[,2:4],main = "Life cycle savings features as Chernoff faces")
effect of variables:
modified item      Var
"height of face"   "pop15"
"width of face"    "pop75"
"structure of face" "dpi"
"height of mouth"  "pop15"
"width of mouth"   "pop75"
"smiling"          "dpi"
"height of eyes"   "pop15"
"width of eyes"    "pop75"
"height of hair"   "dpi"
"width of hair"    "pop15"
"style of hair"    "pop75"
"height of nose"   "dpi"
"width of nose"    "pop15"
"width of ear"     "pop75"
"height of ear"    "dpi"
```

R source code below :

R source code :

```
#####  
## attaching the LifeCycleSavings data  
#####  
data(LifeCycleSavings) attach(LifeCycleSavings)  
head(LifeCycleSavings)  
#####  
## Chernoff faces  
#####  
faces(LifeCycleSavings[,2:4],main = "Life Cycle Savings features as Chernoff faces")  
#####  
## Star glyph  
#####  
stars(LifeCycleSavings, main = "Life Cycle Savings as Glyph stars")  
#####  
## Scatter Plot  
##### library(RColorBrewer)  
scatter.smooth(LifeCycleSavings$pop15, pch= '$', cex=1, ylab= "pop15 - numeric % of  
population under 15", xlab=" ", main="Smooth Scatter Plot for LifeCycleSavings")
```