Lab 0

Shyam BV

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```
source("http://www.openintro.org/stat/data/arbuthnot.R")
dim(arbuthnot)
```

```
## [1] 82  3
```

```
names(arbuthnot)
```

```
## [1] "year"  "boys"  "girls"
```

```
arbuthnot$boys
```

```
##  [1] 5218 4858 4422 4994 5158 5035 5106 4917 4703 5359 5366 5518 5470 5460
## [15] 4793 4107 4047 3768 3796 3363 3079 2890 3231 3220 3196 3441 3655 3668
## [29] 3396 3157 3209 3724 4748 5216 5411 6041 5114 4678 5616 6073 6506 6278
## [43] 6449 6443 6073 6113 6058 6552 6423 6568 6247 6548 6822 6909 7577 7575
## [57] 7484 7575 7737 7487 7604 7909 7662 7602 7676 6985 7263 7632 8062 8426
## [71] 7911 7578 8102 8031 7765 6113 8366 7952 8379 8239 7840 7640
```

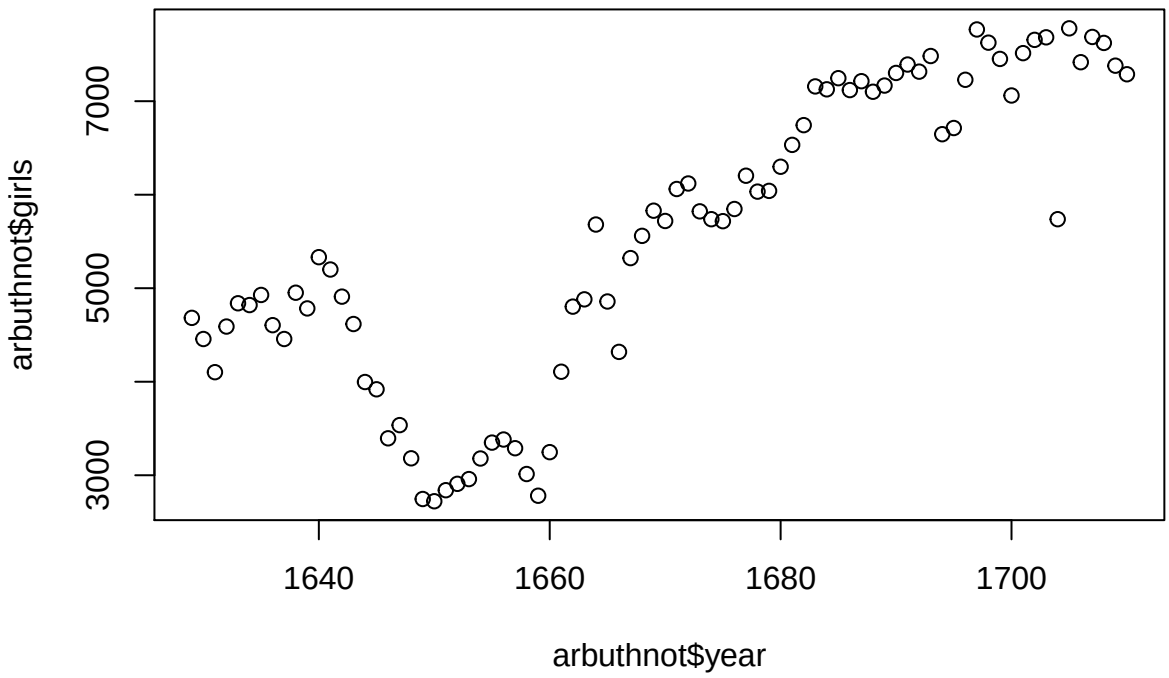
Excercise 1

What command would you use to extract just the counts of girls baptized? Try it!

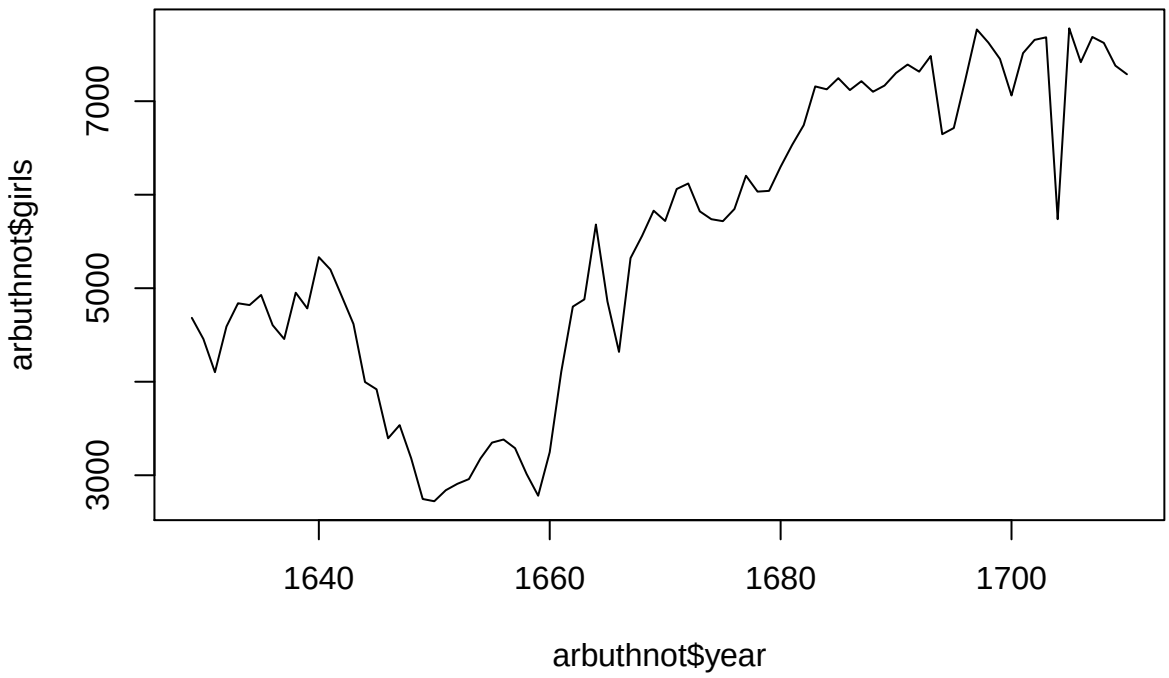
```
NROW(arbuthnot$girls)
```

```
## [1] 82
```

```
plot(x = arbuthnot$year, y = arbuthnot$girls)
```




```
plot(x = arbuthnot$year, y = arbuthnot$girls, type = "l")
```




```
?plot
```

```
## starting httpd help server ...
```

```
##  done
```

Excercise 2

Is there an apparent trend in the number of girls baptized over the years? How would you describe it?

Yes. There is an increasing trend in the number of girls baptized over the years. Althought it did not follow perferct regression. It has an increasing trend.

```
5218 + 4683
```

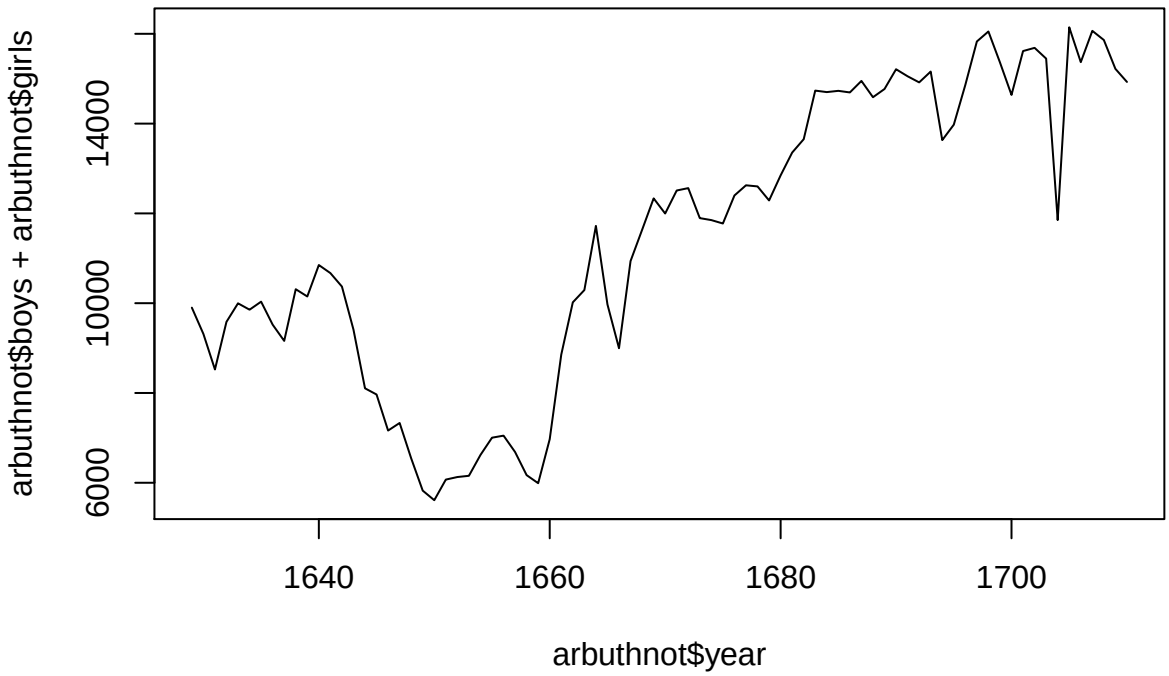
```
## [1] 9901
```

```
arbuthnot$boys + arbuthnot$girls
```

```
##  [1]  9901  9315  8524  9584  9997  9855 10034  9522  9160 10311 10150
## [12] 10850 10670 10370  9410  8104  7966  7163  7332  6544  5825  5612
## [23]  6071  6128  6155  6620  7004  7050  6685  6170  5990  6971  8855
## [34] 10019 10292 11722  9972  8997 10938 11633 12335 11997 12510 12563
```

```
## [45] 11895 11851 11775 12399 12626 12601 12288 12847 13355 13653 14735
## [56] 14702 14730 14694 14951 14588 14771 15211 15054 14918 15159 13632
## [67] 13976 14861 15829 16052 15363 14639 15616 15687 15448 11851 16145
## [78] 15369 16066 15862 15220 14928
```

```
plot(arbuthnot$year, arbuthnot$boys + arbuthnot$girls, type = "l")
```




```
5218 / 4683
```

```
## [1] 1.114243
```

```
arbuthnot$boys / arbuthnot$girls
```

```
##  [1] 1.114243 1.089971 1.078011 1.088017 1.065923 1.044606 1.036120
##  [8] 1.067752 1.055194 1.082189 1.121656 1.034884 1.051923 1.112016
## [15] 1.038120 1.027521 1.032661 1.109867 1.073529 1.057215 1.121267
## [22] 1.061719 1.137676 1.107290 1.080095 1.082416 1.091371 1.084565
## [29] 1.032533 1.047793 1.153901 1.146905 1.156075 1.085988 1.108584
## [36] 1.063369 1.052697 1.083121 1.055242 1.092266 1.116143 1.097744
## [43] 1.064016 1.052778 1.043112 1.065354 1.059647 1.120575 1.035467
## [50] 1.088679 1.034100 1.039530 1.044237 1.024466 1.058536 1.062860
## [57] 1.032846 1.064054 1.072498 1.054359 1.060974 1.083128 1.036526
## [64] 1.039092 1.025792 1.050850 1.081931 1.055748 1.037981 1.104904
## [71] 1.061594 1.073219 1.078254 1.048981 1.010673 1.065354 1.075460
## [78] 1.072132 1.090022 1.080808 1.062331 1.048299
```

```
5218 / (5218 + 4683)
```

```
## [1] 0.5270175
```

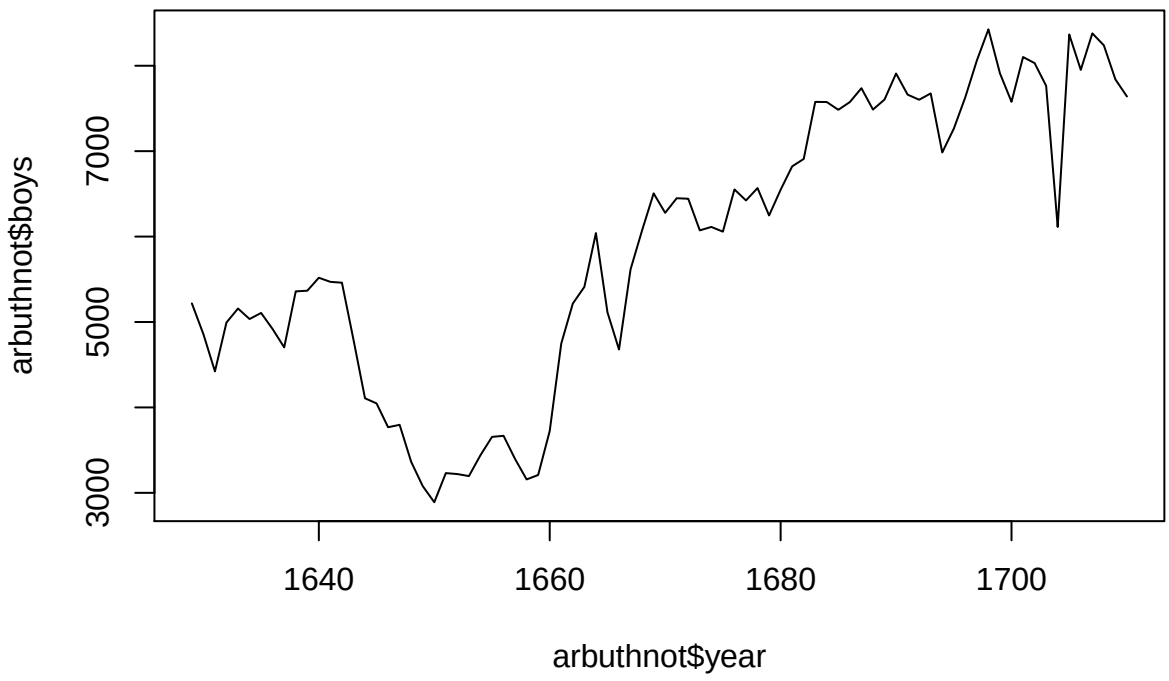
```
arbuthnot$boys / (arbuthnot$boys + arbuthnot$girls)
```

```
##  [1] 0.5270175 0.5215244 0.5187705 0.5210768 0.5159548 0.5109082 0.5088698
##  [8] 0.5163831 0.5134279 0.5197362 0.5286700 0.5085714 0.5126523 0.5265188
## [15] 0.5093518 0.5067868 0.5080341 0.5260366 0.5177305 0.5139059 0.5285837
## [22] 0.5149679 0.5322023 0.5254569 0.5192526 0.5197885 0.5218447 0.5202837
## [29] 0.5080030 0.5116694 0.5357262 0.5342132 0.5361942 0.5206108 0.5257482
## [36] 0.5153557 0.5128359 0.5199511 0.5134394 0.5220493 0.5274422 0.5232975
## [43] 0.5155076 0.5128552 0.5105507 0.5158214 0.5144798 0.5284297 0.5087122
## [50] 0.5212285 0.5083822 0.5096910 0.5108199 0.5060426 0.5142178 0.5152360
## [57] 0.5080788 0.5155165 0.5174905 0.5132301 0.5147925 0.5199527 0.5089677
## [64] 0.5095857 0.5063659 0.5123973 0.5196766 0.5135590 0.5093183 0.5249190
## [71] 0.5149385 0.5176583 0.5188268 0.5119526 0.5026541 0.5158214 0.5181790
## [78] 0.5174052 0.5215362 0.5194175 0.5151117 0.5117899
```

Excercise 3

Now, make a plot of the proportion of boys over time. What do you see?

```
plot(x = arbuthnot$year, y = arbuthnot$boys, type = "l")
```



```
arbuthnot$boys > arbuthnot$girls
```

```
##  [1] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
## [15] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
## [29] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
## [43] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
## [57] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
## [71] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
```

On Your Own:

1. What years are included in this data set? What are the dimensions of the data frame and what are the variable or column names?

```
source("https://www.openintro.org/stat/data/present.R")

present$year
```

```
##  [1] 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953
## [15] 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967
## [29] 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981
## [43] 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995
## [57] 1996 1997 1998 1999 2000 2001 2002
```

```
dim(present)
```

```
## [1] 63  3
```

```
names(present)
```

```
## [1] "year"  "boys"  "girls"
```

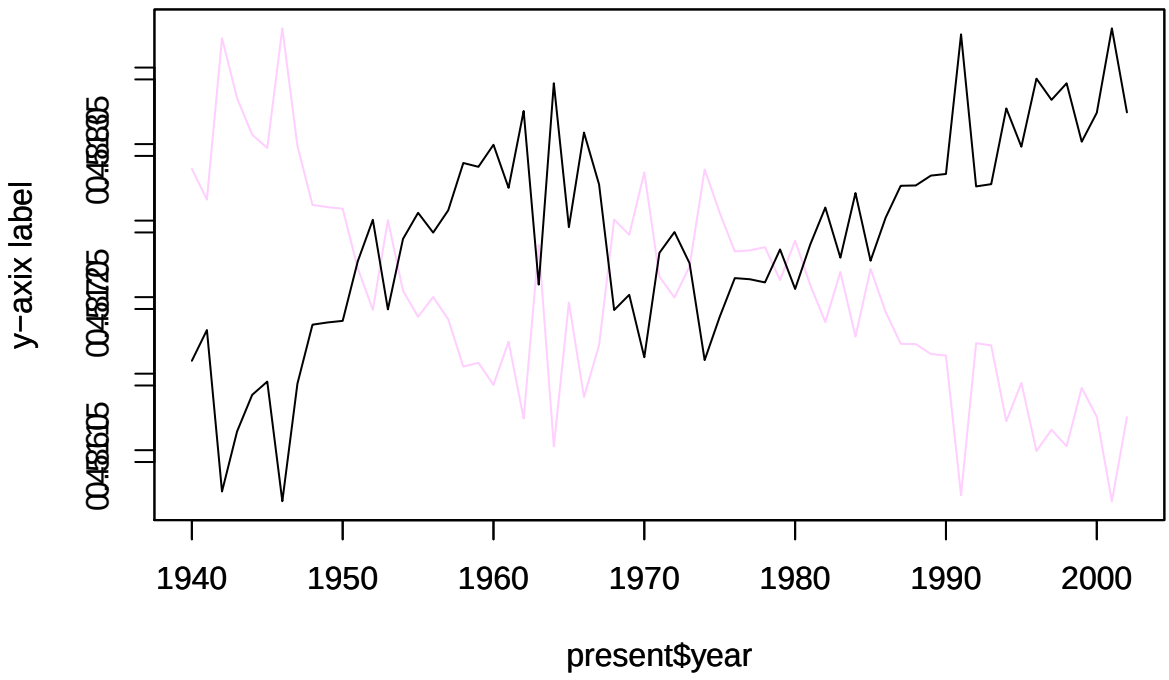
2. How do these counts compare to Arbuthnot's? Are they on a similar scale?

```
ncol(arbuthnot) > ncol(present)
```

```
## [1] FALSE
```

3. Make a plot that displays the boy-to-girl ratio for every year in the data set. What do you see? Does Arbuthnot's observation about boys being born in greater proportion than girls hold up in the U.S.? Include the plot in your response.

```
plot(x = present$year, y =  present$boys/(present$girls + present$boys),  col="#FFCFFF", ylab="y-axix la
par(new=T)
plot(x = present$year, y =  present$girls/(present$girls + present$boys),ylab="y-axix label", type="l")
```



First plot shows that there is an decreasing ratio of boys over years. Second plot shows the increasing ratio of girls over years.

Excercise 4

```
present[which.max(present$boys+present$girls),1:3]
```

```
##    year    boys   girls
## 22 1961 2186274 2082052
```