HW6\_pnegandh

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1 December 2019

# Importing Libraries

library(tidyverse)

## Warning: package 'tidyverse' was built under R version 3.5.3

## -- Attaching packages ------------------------------------------------------------------------------------------------------------------------------------------- tidyverse 1.2.1 --

## v ggplot2 3.2.1 v purrr 0.3.2  
## v tibble 2.1.3 v dplyr 0.8.3  
## v tidyr 1.0.0 v stringr 1.4.0  
## v readr 1.3.1 v forcats 0.4.0

## Warning: package 'ggplot2' was built under R version 3.5.3

## Warning: package 'tibble' was built under R version 3.5.3

## Warning: package 'tidyr' was built under R version 3.5.3

## Warning: package 'readr' was built under R version 3.5.3

## Warning: package 'purrr' was built under R version 3.5.3

## Warning: package 'dplyr' was built under R version 3.5.3

## Warning: package 'forcats' was built under R version 3.5.3

## -- Conflicts ---------------------------------------------------------------------------------------------------------------------------------------------- tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library(maps)

## Warning: package 'maps' was built under R version 3.5.3

##   
## Attaching package: 'maps'

## The following object is masked from 'package:purrr':  
##   
## map

library(openintro)

## Please visit openintro.org for free statistics materials

##   
## Attaching package: 'openintro'

## The following object is masked from 'package:ggplot2':  
##   
## diamonds

## The following objects are masked from 'package:datasets':  
##   
## cars, trees

library(ggthemes)

## Warning: package 'ggthemes' was built under R version 3.5.3

all\_counties = map\_data("county")  
head(all\_counties)

## long lat group order region subregion  
## 1 -86.50517 32.34920 1 1 alabama autauga  
## 2 -86.53382 32.35493 1 2 alabama autauga  
## 3 -86.54527 32.36639 1 3 alabama autauga  
## 4 -86.55673 32.37785 1 4 alabama autauga  
## 5 -86.57966 32.38357 1 5 alabama autauga  
## 6 -86.59111 32.37785 1 6 alabama autauga

election = read.table("county\_data.txt", header = TRUE)  
head(election)

## id name state census\_region pop\_dens pop\_dens4  
## 1 0 <NA> <NA> <NA> [ 50, 100) [ 45, 118)  
## 2 1000 1 AL South [ 50, 100) [ 45, 118)  
## 3 1001 Autauga County AL South [ 50, 100) [ 45, 118)  
## 4 1003 Baldwin County AL South [ 100, 500) [118,71672]  
## 5 1005 Barbour County AL South [ 10, 50) [ 17, 45)  
## 6 1007 Bibb County AL South [ 10, 50) [ 17, 45)  
## pop\_dens6 pct\_black pop female white black travel\_time  
## 1 [ 82, 215) [10.0,15.0) 318857056 50.8 77.7 13.2 25.5  
## 2 [ 82, 215) [25.0,50.0) 4849377 51.5 69.8 26.6 24.2  
## 3 [ 82, 215) [15.0,25.0) 55395 51.5 78.1 18.4 26.2  
## 4 [ 82, 215) [ 5.0,10.0) 200111 51.2 87.3 9.5 25.9  
## 5 [ 25, 45) [25.0,50.0) 26887 46.5 50.2 47.6 24.6  
## 6 [ 25, 45) [15.0,25.0) 22506 46.0 76.3 22.1 27.6  
## land\_area hh\_income su\_gun4 su\_gun6 fips votes\_dem\_2016 votes\_gop\_2016  
## 1 3531905.43 53046 <NA> <NA> 0 NA NA  
## 2 50645.33 43253 <NA> <NA> 1000 NA NA  
## 3 594.44 53682 [11,54] [10,12) 1001 5908 18110  
## 4 1589.78 50221 [11,54] [10,12) 1003 18409 72780  
## 5 884.88 32911 [ 5, 8) [ 7, 8) 1005 4848 5431  
## 6 622.58 36447 [11,54] [10,12) 1007 1874 6733  
## total\_votes\_2016 per\_dem\_2016 per\_gop\_2016 diff\_2016 per\_dem\_2012  
## 1 NA NA NA NA NA  
## 2 NA NA NA NA NA  
## 3 24661 0.2395685 0.7343579 12202 0.2657577  
## 4 94090 0.1956531 0.7735147 54371 0.2156657  
## 5 10390 0.4666025 0.5227141 583 0.5125229  
## 6 8748 0.2142204 0.7696616 4859 0.2621857  
## per\_gop\_2012 diff\_2012 winner partywinner16 winner12 partywinner12  
## 1 NA NA <NA> <NA> <NA> <NA>  
## 2 NA NA <NA> <NA> <NA> <NA>  
## 3 0.7263374 11012 Trump Republican Romney Republican  
## 4 0.7738975 47443 Trump Republican Romney Republican  
## 5 0.4833755 334 Trump Republican Obama Democrat  
## 6 0.7306638 3931 Trump Republican Romney Republican  
## flipped  
## 1 <NA>  
## 2 <NA>  
## 3 No  
## 4 No  
## 5 Yes  
## 6 No

# Cleaning Data

all\_counties = all\_counties %>% mutate(region = str\_replace\_all(subregion, " ", ""))  
head(all\_counties)

## long lat group order region subregion  
## 1 -86.50517 32.34920 1 1 autauga autauga  
## 2 -86.53382 32.35493 1 2 autauga autauga  
## 3 -86.54527 32.36639 1 3 autauga autauga  
## 4 -86.55673 32.37785 1 4 autauga autauga  
## 5 -86.57966 32.38357 1 5 autauga autauga  
## 6 -86.59111 32.37785 1 6 autauga autauga

election = drop\_na(election)  
election$region = tolower(election$name)  
election = election %>% mutate(region = str\_replace\_all(region,   
 " county| parish|\\.| borough|'| ", ""))  
head(election)

## id name state census\_region pop\_dens pop\_dens4  
## 1 1001 Autauga County AL South [ 50, 100) [ 45, 118)  
## 2 1003 Baldwin County AL South [ 100, 500) [118,71672]  
## 3 1005 Barbour County AL South [ 10, 50) [ 17, 45)  
## 4 1007 Bibb County AL South [ 10, 50) [ 17, 45)  
## 5 1009 Blount County AL South [ 50, 100) [ 45, 118)  
## 6 1011 Bullock County AL South [ 10, 50) [ 17, 45)  
## pop\_dens6 pct\_black pop female white black travel\_time land\_area  
## 1 [ 82, 215) [15.0,25.0) 55395 51.5 78.1 18.4 26.2 594.44  
## 2 [ 82, 215) [ 5.0,10.0) 200111 51.2 87.3 9.5 25.9 1589.78  
## 3 [ 25, 45) [25.0,50.0) 26887 46.5 50.2 47.6 24.6 884.88  
## 4 [ 25, 45) [15.0,25.0) 22506 46.0 76.3 22.1 27.6 622.58  
## 5 [ 82, 215) [ 0.0, 2.0) 57719 50.6 96.0 1.8 33.9 644.78  
## 6 [ 9, 25) [50.0,85.3] 10764 45.2 27.2 69.9 26.9 622.81  
## hh\_income su\_gun4 su\_gun6 fips votes\_dem\_2016 votes\_gop\_2016  
## 1 53682 [11,54] [10,12) 1001 5908 18110  
## 2 50221 [11,54] [10,12) 1003 18409 72780  
## 3 32911 [ 5, 8) [ 7, 8) 1005 4848 5431  
## 4 36447 [11,54] [10,12) 1007 1874 6733  
## 5 44145 [11,54] [10,12) 1009 2150 22808  
## 6 32033 [ 0, 5) [ 0, 4) 1011 3530 1139  
## total\_votes\_2016 per\_dem\_2016 per\_gop\_2016 diff\_2016 per\_dem\_2012  
## 1 24661 0.23956855 0.7343579 12202 0.2657577  
## 2 94090 0.19565310 0.7735147 54371 0.2156657  
## 3 10390 0.46660250 0.5227141 583 0.5125229  
## 4 8748 0.21422039 0.7696616 4859 0.2621857  
## 5 25384 0.08469902 0.8985188 20658 0.1234779  
## 6 4701 0.75090406 0.2422889 2391 0.7630688  
## per\_gop\_2012 diff\_2012 winner partywinner16 winner12 partywinner12  
## 1 0.7263374 11012 Trump Republican Romney Republican  
## 2 0.7738975 47443 Trump Republican Romney Republican  
## 3 0.4833755 334 Trump Republican Obama Democrat  
## 4 0.7306638 3931 Trump Republican Romney Republican  
## 5 0.8649291 17780 Trump Republican Romney Republican  
## 6 0.2350508 2808 Clinton Democrat Obama Democrat  
## flipped region  
## 1 No autauga  
## 2 No baldwin  
## 3 Yes barbour  
## 4 No bibb  
## 5 No blount  
## 6 No bullock

setdiff(all\_counties$region, election$region)

## [1] "yellowstonenational" "donaana" "newportnews"   
## [4] "virginiabeach"

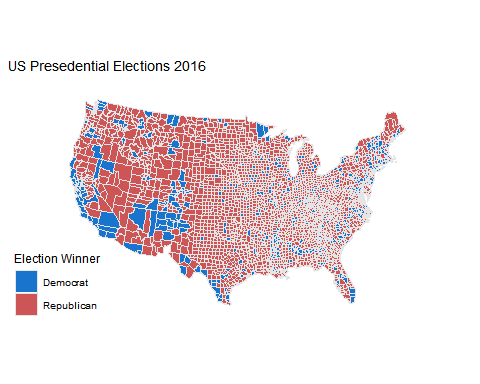
setdiff(election$region, all\_counties$region)

## [1] "districtofcolumbia" "hawaii" "honolulu"   
## [4] "kauai" "maui" "doï¿½aana"   
## [7] "alexandriacity" "bristolcity" "buenavistacity"   
## [10] "charlottesvillecity" "chesapeakecity" "colonialheightscity"  
## [13] "covingtoncity" "danvillecity" "emporiacity"   
## [16] "fairfaxcity" "fallschurchcity" "franklincity"   
## [19] "fredericksburgcity" "galaxcity" "hamptoncity"   
## [22] "harrisonburgcity" "hopewellcity" "lexingtoncity"   
## [25] "lynchburgcity" "manassascity" "manassasparkcity"   
## [28] "martinsvillecity" "newportnewscity" "norfolkcity"   
## [31] "nortoncity" "petersburgcity" "poquosoncity"   
## [34] "portsmouthcity" "radfordcity" "richmondcity"   
## [37] "roanokecity" "salemcity" "stauntoncity"   
## [40] "suffolkcity" "virginiabeachcity" "waynesborocity"   
## [43] "williamsburgcity" "winchestercity"

all\_counties\_election = inner\_join(all\_counties, election, by = "region")

# 2016 US Presedential Election Winners by state

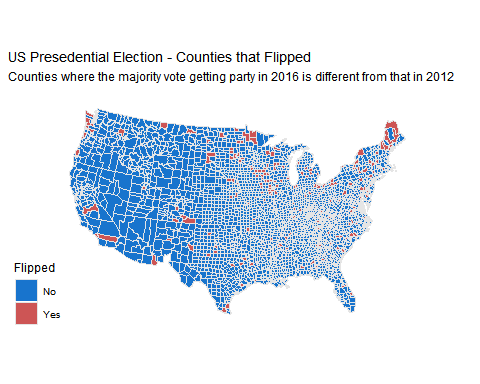
ggplot(all\_counties\_election, aes(long, lat, group = group, fill = partywinner16)) +  
 geom\_polygon(color = "gray90", size = 0.25) +  
 theme\_map() +  
 coord\_map(projection = "lambert", lat0 = 30, lat1 = 40) +  
 scale\_fill\_manual(values = c("dodgerblue3", "indianred3")) +  
 guides(fill=guide\_legend(title="Election Winner")) +  
 ggtitle("US Presedential Elections 2016")



# States that flipped

This plot shows the counties that changed their votes from the 2012 presidential election.

ggplot(all\_counties\_election, aes(long, lat, group = group, fill = flipped)) +  
 geom\_polygon(color = "gray90", size = 0.25) +  
 theme\_map() +  
 coord\_map(projection = "lambert", lat0 = 30, lat1 = 40) +  
 scale\_fill\_manual(values = c("dodgerblue3", "indianred3")) +  
 guides(fill=guide\_legend(title="Flipped")) +  
 ggtitle("US Presedential Election - Counties that Flipped", subtitle = "Counties where the majority vote getting party in 2016 is different from that in 2012")



As we can see from the plot, the majority of the counties in 2016 Presidential elections didn’t switch their party from the one they voted for in 2012 Presedential elections.