Final Project

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Problem 1

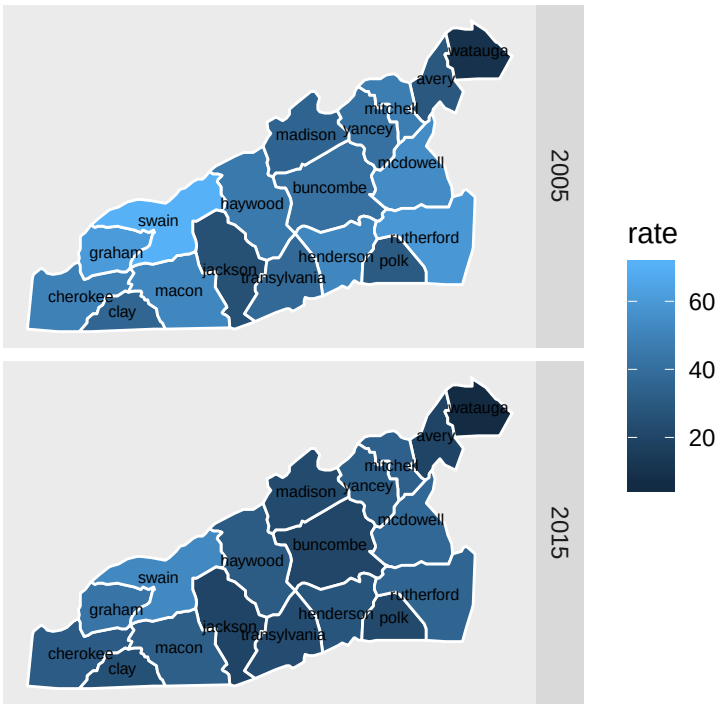
a)

```
## Observations: 40,781
## Variables: 9
## $ Year                   <int> 2003, 2004, 2005, 2006, 2007, 2008, 200...
## $ State                  <chr> "alabama", "alabama", "alabama", "alaba...
## $ County                 <chr> "autauga", "autauga", "autauga", "autau...
## $ State.FIPS.Code        <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...
## $ County.FIPS.Code       <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...
## $ Combined.FIPS.Code     <int> 1001, 1001, 1001, 1001, 1001, 1001, 100...
## $ Birth.Rate             <dbl> 46.37721, 46.05062, 43.94106, 43.82665,...
## $ Lower.Confidence.Limit <dbl> 40.68311, 41.08474, 39.51390, 39.57077,...
## $ Upper.Confidence.Limit <dbl> 52.50848, 51.34079, 48.64665, 48.34535,...
```

b)

```
## Observations: 9,841
## Variables: 9
## $ group     <dbl> 1862, 1862, 1862, 1862, 1862, 1862, 1862, 1862, 1862...
## $ state     <chr> "north carolina", "north carolina", "north carolina"...
## $ county    <chr> "avery", "avery", "avery", "avery", "avery", "avery"...
## $ latitude  <dbl> 35.91872, 35.93018, 35.97029, 35.98175, 36.00467, 36...
## $ longitude <dbl> -81.99026, -82.01318, -82.05901, -82.08766, -82.0532...
## $ year      <int> 2003, 2003, 2003, 2003, 2003, 2003, 2003, 2003, 2003...
## $ rate      <dbl> 30.32039, 30.32039, 30.32039, 30.32039, 30.32039, 30...
## $ LCL       <dbl> 24.70285, 24.70285, 24.70285, 24.70285, 24.70285, 24...
## $ UCL       <dbl> 36.65303, 36.65303, 36.65303, 36.65303, 36.65303, 36...
```

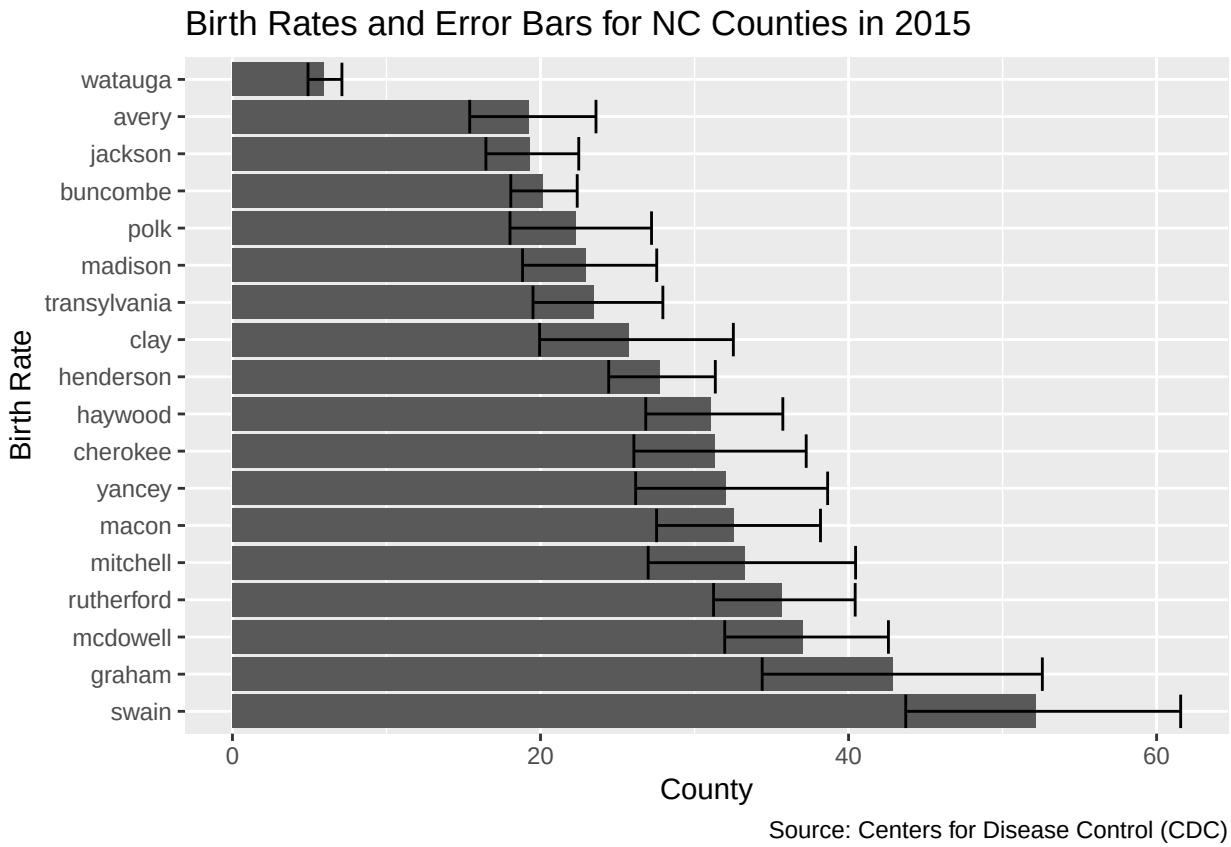
c) 'facet_grid' Plot



d)

```
## Observations: 234
## Variables: 5
## $ county <chr> "avery", "avery", "avery", "avery", "avery", "avery", "...
## $ year   <int> 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2...
## $ rate   <dbl> 30.32039, 29.92598, 29.12801, 29.81659, 30.35145, 29.90...
## $ LCL    <dbl> 24.70285, 24.70310, 24.25709, 24.98222, 25.52058, 25.17...
## $ UCL    <dbl> 36.65303, 35.74552, 34.52126, 35.14882, 35.66998, 35.10...
```

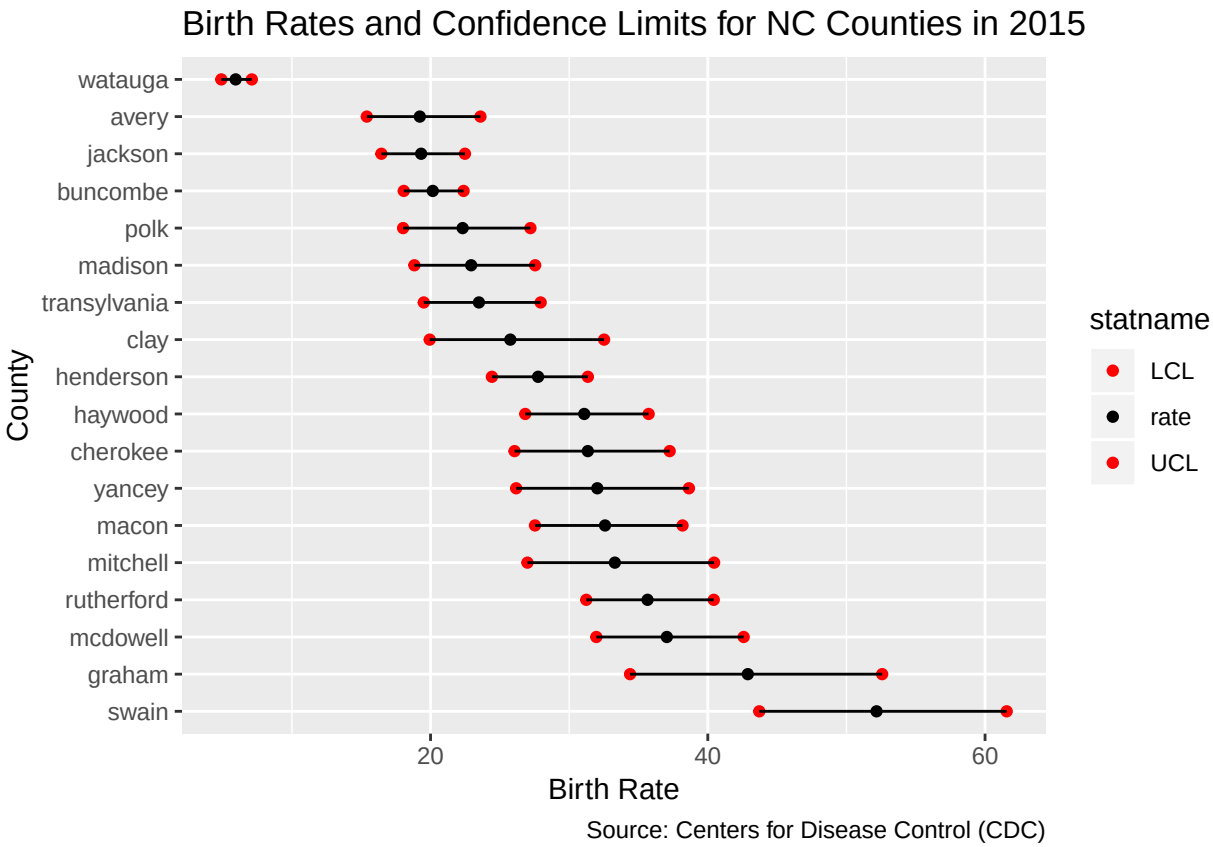
d) Horizontal Bar Plot



e)

```
## Observations: 702
## Variables: 4
## $ county    <chr> "avery", "avery", "avery", "avery", "avery", "avery"...
## $ year      <int> 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011...
## $ statname  <chr> "LCL", "LCL", "LCL", "LCL", "LCL", "LCL", "LCL", "LC...
## $ statvalue <dbl> 24.70285, 24.70310, 24.25709, 24.98222, 25.52058, 25...
```

e) Cleveland Dot Plot



Problem 2

a)

```
## Observations: 808
## Variables: 6
## $ females <int> 1840000, 1760000, 1682000, 1607000, 1535000, 1467000, ...
## $ country <chr> "United States", "United States", "United States", "Un...
## $ age     <int> 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, ...
## $ males   <int> 1923000, 1840000, 1760000, 1682000, 1607000, 1535000, ...
## $ year    <int> 1950, 1950, 1950, 1950, 1950, 1950, 1950, 1950, 1950, ...
## $ total   <int> 3763000, 3600000, 3442000, 3289000, 3142000, 3002000, ...
```

b)

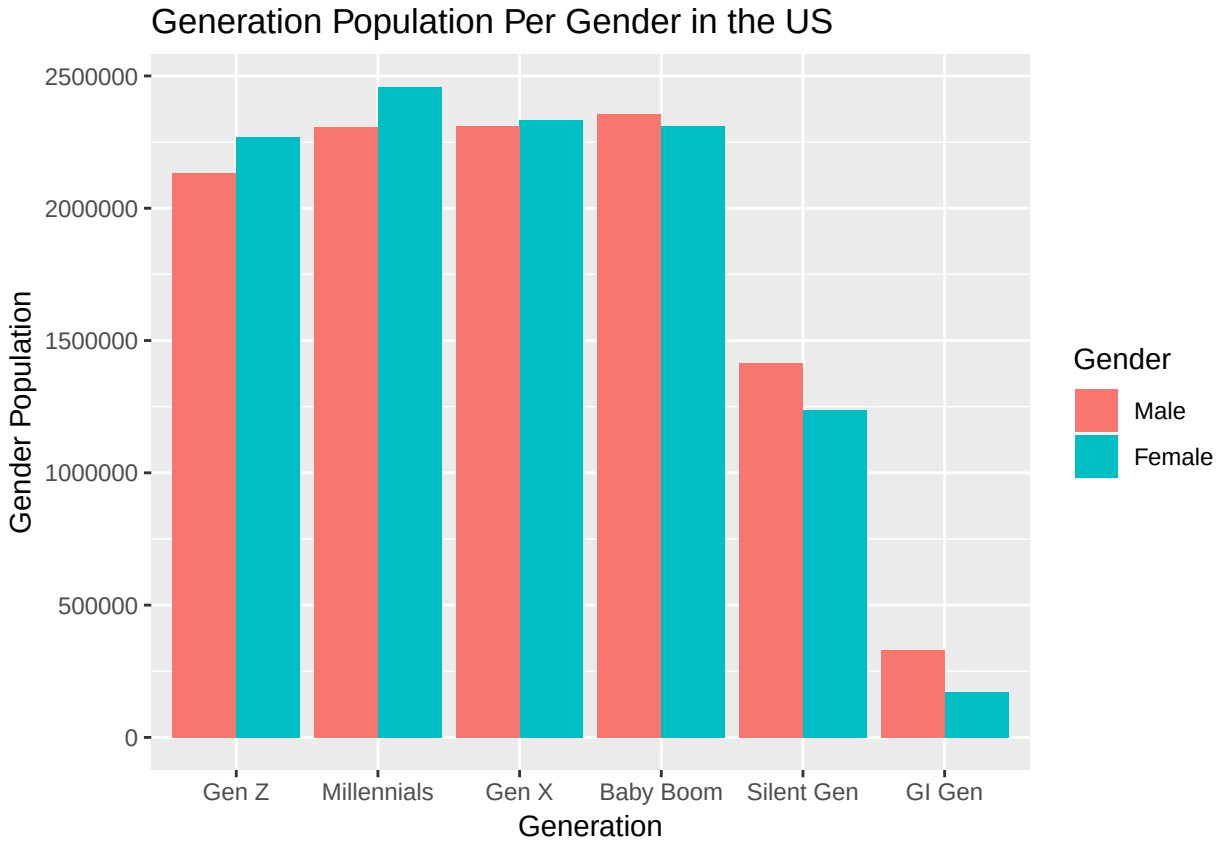
```
## 'data.frame':    808 obs. of  7 variables:
##  $ females: int  1840000 1760000 1682000 1607000 1535000 1467000 1403000 1343000 1288000 1239000 ...
##  $ country: chr  "United States" "United States" "United States" "United States" ...
##  $ age    : int  0 1 2 3 4 5 6 7 8 9 ...
##  $ males  : int  1923000 1840000 1760000 1682000 1607000 1535000 1467000 1404000 1345000 1292000 ...
##  $ year   : int  1950 1950 1950 1950 1950 1950 1950 1950 1950 1950 ...
##  $ total  : int  3763000 3600000 3442000 3289000 3142000 3002000 2870000 2747000 2634000 2532000 ...
```

```
##  $ agecats: chr  "under 18" "under 18" "under 18" "under 18" ...
```

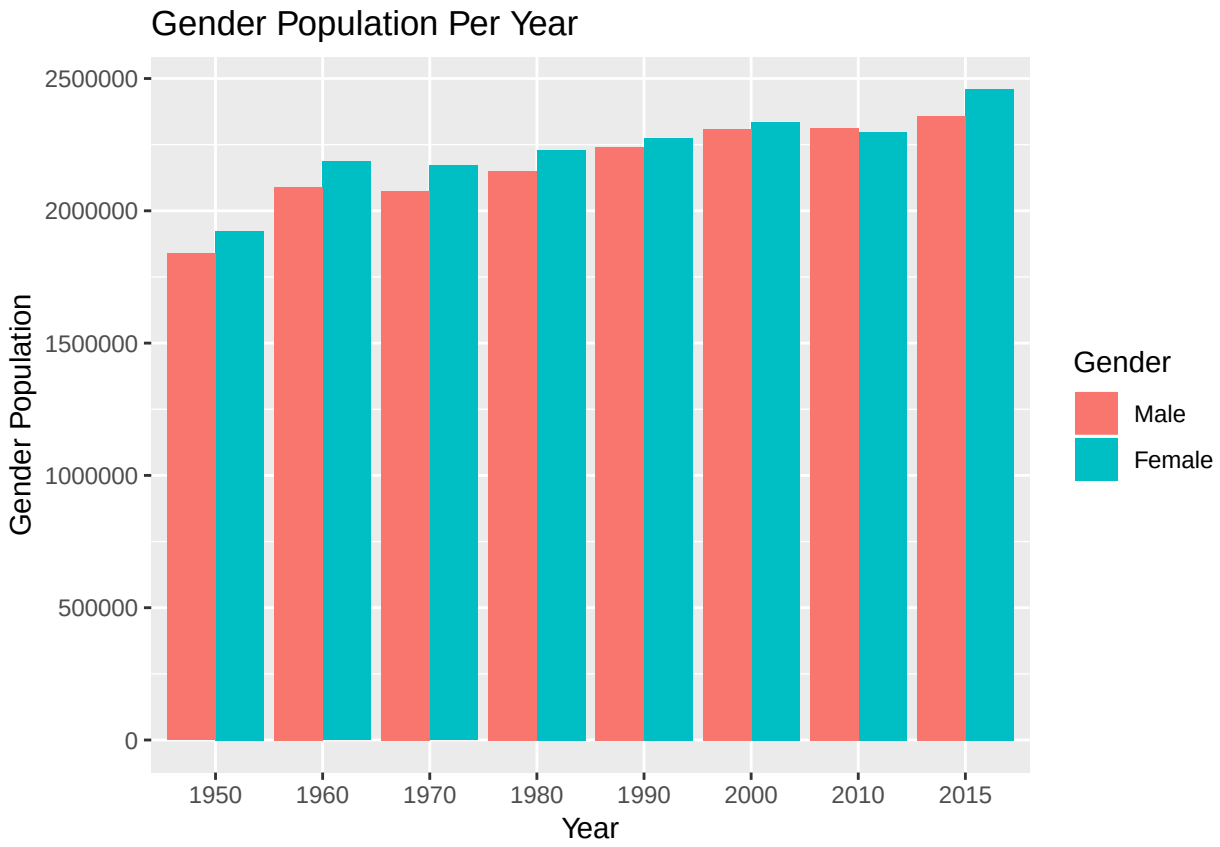
c)

```
## [1] 535
## [1] 0.3378713
```

d) **Plot 1**



d) Plot 2



Problem 3

a)

```
## Observations: 19
## Variables: 22
## $ year            <chr> "1999", "2000", "20015", "2002", "2003", "2004...
## $ population      <dbl> 272690813, 281421906, 285317559, 287973924, 29...
## $ violent         <dbl> 1426044, 1425486, 1439480, 1423677, 1383676, 1...
## $ violentrate     <dbl> 523.0, 506.5, 504.5, 494.4, 475.8, 463.2, 469....
## $ murder          <dbl> 15522, 15586, 16037, 16229, 16528, 16148, 1674...
## $ murderrate      <dbl> 5.7, 5.5, 5.6, 5.6, 5.7, 5.5, 5.6, 5.8, 5.7, 5...
## $ raperevised     <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA...
## $ raperevisedrate <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA...
## $ rapelegacy      <dbl> 89411, 90178, 90863, 95235, 93883, 95089, 9434...
## $ rapelegacyrate  <dbl> 32.8, 32.0, 31.8, 33.1, 32.3, 32.4, 31.8, 31.6...
## $ robbery         <dbl> 409371, 408016, 423557, 420806, 414235, 401470...
## $ robberyrate     <dbl> 150.1, 145.0, 148.5, 146.1, 142.5, 136.7, 140....
## $ assault         <dbl> 911740, 911706, 909023, 891407, 859030, 847381...
## $ assaultrate     <dbl> 334.3, 324.0, 318.6, 309.5, 295.4, 288.6, 290....
## $ property        <dbl> 10208334, 10182584, 10437189, 10455277, 104428...
## $ propertyrate    <dbl> 3743.6, 3618.3, 3658.1, 3630.6, 3591.2, 3514.1...
## $ burglary        <dbl> 2100739, 2050992, 2116531, 2151252, 2154834, 2...
```

```
## $ burglaryrate    <dbl> 770.4, 728.8, 741.8, 747.0, 741.0, 730.3, 726....
## $ larceny         <dbl> 6955520, 6971590, 7092267, 7057379, 7026802, 6...
## $ larcenyrate     <dbl> 2550.7, 2477.3, 2485.7, 2450.7, 2416.5, 2362.3...
## $ vehicle         <dbl> 1152075, 1160002, 1228391, 1246646, 1261226, 1...
## $ vehiclerate     <dbl> 422.5, 412.2, 430.5, 432.9, 433.7, 421.5, 416....
```

b)

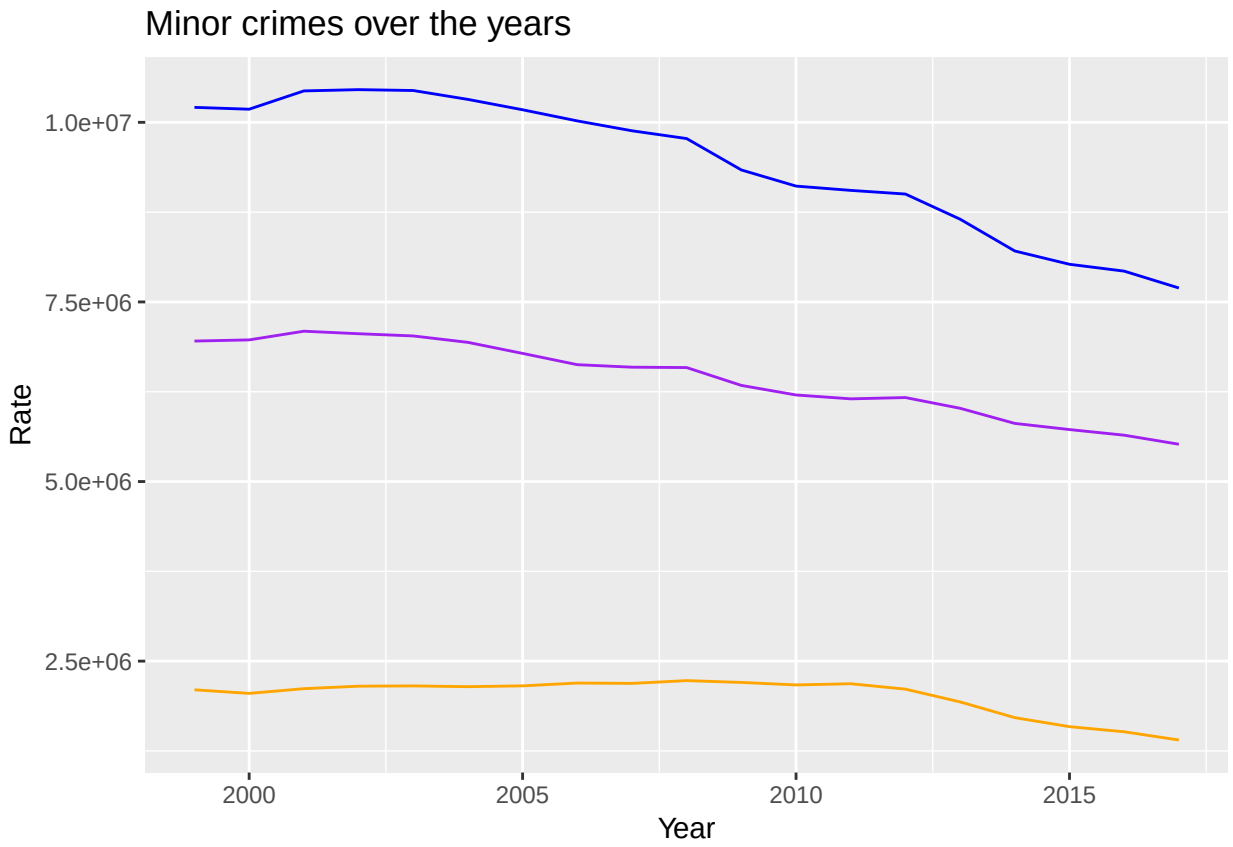
```
## Observations: 19
## Variables: 22
## $ year            <dbl> 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006...
## $ population      <dbl> 272690813, 281421906, 285317559, 287973924, 29...
## $ violent         <dbl> 1426044, 1425486, 1439480, 1423677, 1383676, 1...
## $ violentrate     <dbl> 523.0, 506.5, 504.5, 494.4, 475.8, 463.2, 469....
## $ murder          <dbl> 15522, 15586, 16037, 16229, 16528, 16148, 1674...
## $ murderrate      <dbl> 5.7, 5.5, 5.6, 5.6, 5.7, 5.5, 5.6, 5.8, 5.7, 5...
## $ raperevised     <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA...
## $ raperevisedrate <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA...
## $ rapelegacy      <dbl> 89411, 90178, 90863, 95235, 93883, 95089, 9434...
## $ rapelegacyrate  <dbl> 32.8, 32.0, 31.8, 33.1, 32.3, 32.4, 31.8, 31.6...
## $ robbery         <dbl> 409371, 408016, 423557, 420806, 414235, 401470...
## $ robberyrate     <dbl> 150.1, 145.0, 148.5, 146.1, 142.5, 136.7, 140....
## $ assault         <dbl> 911740, 911706, 909023, 891407, 859030, 847381...
## $ assaultrate     <dbl> 334.3, 324.0, 318.6, 309.5, 295.4, 288.6, 290....
## $ property        <dbl> 10208334, 10182584, 10437189, 10455277, 104428...
## $ propertyrate    <dbl> 3743.6, 3618.3, 3658.1, 3630.6, 3591.2, 3514.1...
## $ burglary        <dbl> 2100739, 2050992, 2116531, 2151252, 2154834, 2...
## $ burglaryrate    <dbl> 770.4, 728.8, 741.8, 747.0, 741.0, 730.3, 726....
## $ larceny         <dbl> 6955520, 6971590, 7092267, 7057379, 7026802, 6...
## $ larcenyrate     <dbl> 2550.7, 2477.3, 2485.7, 2450.7, 2416.5, 2362.3...
## $ vehicle         <dbl> 1152075, 1160002, 1228391, 1246646, 1261226, 1...
## $ vehiclerate     <dbl> 422.5, 412.2, 430.5, 432.9, 433.7, 421.5, 416....
```

c)

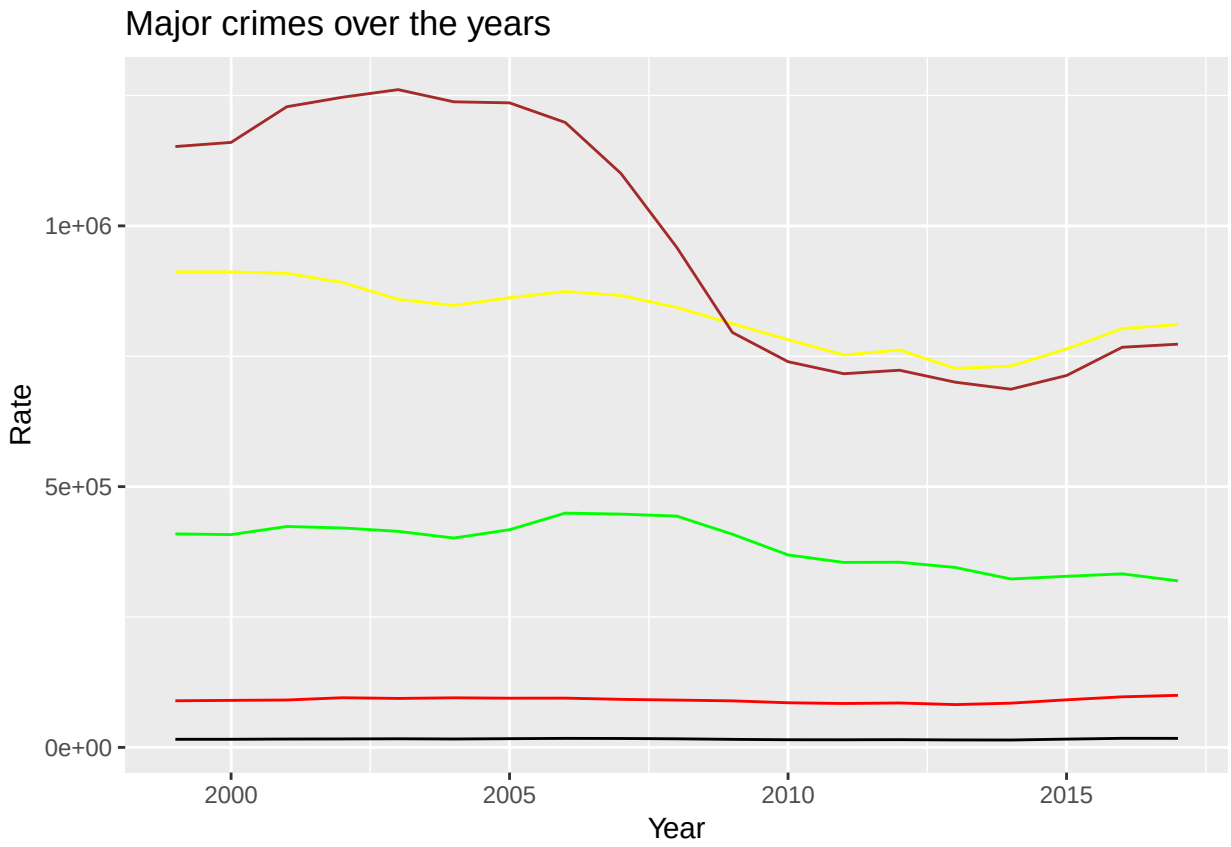
```
## [1] 5
```

```
## [1] 2013 2014 2015 2016 2017
```

d) plot 1


Minor crimes over the years
1.0e+07
7.5e+06
5.0e+06
2.5e+06
Rate
2000
2005
2010
2015
Year

d) **plot 2**


Major crimes over the years
Rate
1e+06
5e+05
0e+00
2000
2005
2010
2015
Year