Lab4_EDA

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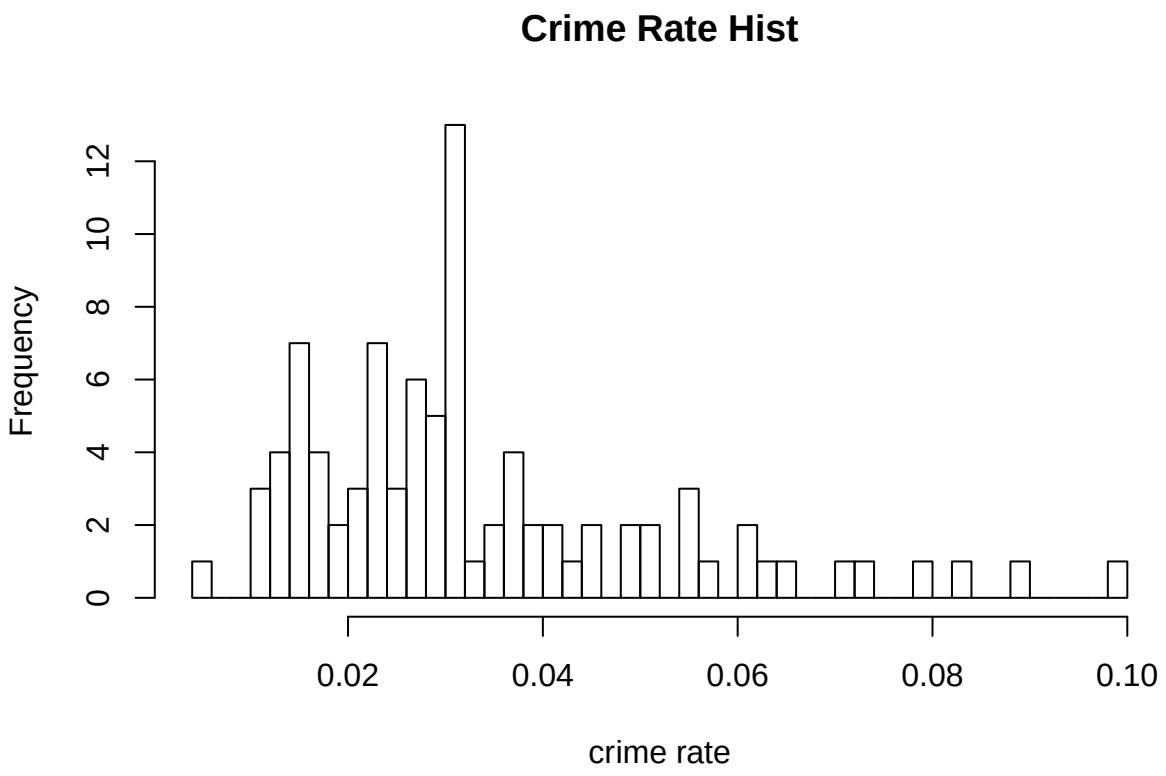
8/12/2017

```
df <- read.csv("crime.csv", stringsAsFactors = T)
#str(df)
#describe(df)
#unique(df)
summary(df)
```

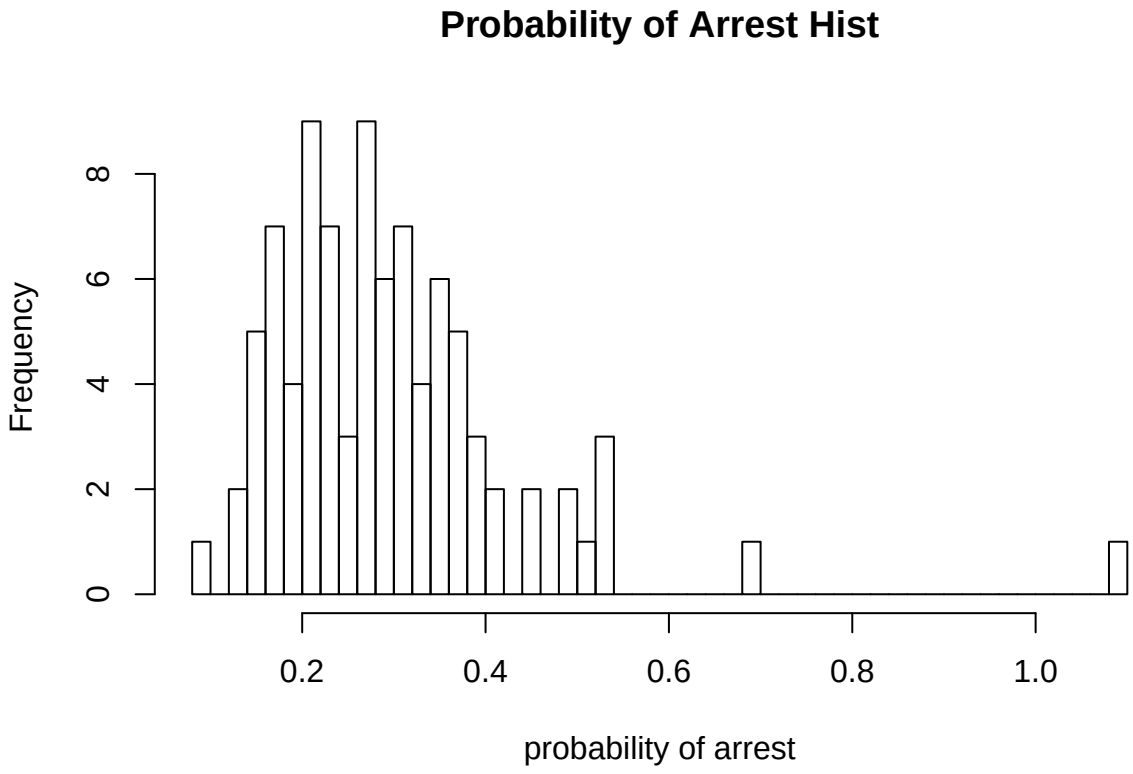
```
##        X             county           year        crmrte
##  Min.   : 1.00   Min.   :  1.0   Min.   :87   Min.   :0.005533
##  1st Qu.:23.25   1st Qu.: 51.5   1st Qu.:87   1st Qu.:0.020604
##  Median :45.50   Median :103.0   Median :87   Median :0.030002
##  Mean   :45.50   Mean   :100.6   Mean   :87   Mean   :0.033510
##  3rd Qu.:67.75   3rd Qu.:150.5   3rd Qu.:87   3rd Qu.:0.040249
##  Max.   :90.00   Max.   :197.0   Max.   :87   Max.   :0.098966
##      prbarr           prbconv           prbpris           avgsen
##  Min.   :0.09277   Min.   :0.06838   Min.   :0.1500   Min.   : 5.380
##  1st Qu.:0.20495   1st Qu.:0.34422   1st Qu.:0.3642   1st Qu.: 7.375
##  Median :0.27146   Median :0.45170   Median :0.4222   Median : 9.110
##  Mean   :0.29524   Mean   :0.55086   Mean   :0.4106   Mean   : 9.689
##  3rd Qu.:0.34487   3rd Qu.:0.58513   3rd Qu.:0.4576   3rd Qu.:11.465
##  Max.   :1.09091   Max.   :2.12121   Max.   :0.6000   Max.   :20.700
##      polpc              density           taxpc             west
##  Min.   :0.0007459   Min.   :0.2034   Min.   : 25.69   Min.   :0.0000
##  1st Qu.:0.0012378   1st Qu.:0.5472   1st Qu.: 30.73   1st Qu.:0.0000
##  Median :0.0014897   Median :0.9792   Median : 34.92   Median :0.0000
##  Mean   :0.0017080   Mean   :1.4379   Mean   : 38.16   Mean   :0.2333
##  3rd Qu.:0.0018856   3rd Qu.:1.5693   3rd Qu.: 41.01   3rd Qu.:0.0000
##  Max.   :0.0090543   Max.   :8.8277   Max.   :119.76   Max.   :1.0000
##     central            urban            pctmin80           wcon
##  Min.   :0.0000   Min.   :0.00000   Min.   : 1.284   Min.   :193.6
##  1st Qu.:0.0000   1st Qu.:0.00000   1st Qu.:10.024   1st Qu.:250.8
##  Median :0.0000   Median :0.00000   Median :24.852   Median :281.2
##  Mean   :0.3778   Mean   :0.08889   Mean   :25.713   Mean   :285.4
##  3rd Qu.:1.0000   3rd Qu.:0.00000   3rd Qu.:38.183   3rd Qu.:315.0
##  Max.   :1.0000   Max.   :1.00000   Max.   :64.348   Max.   :436.8
##       wtuc             wtrd             wfir             wser
##  Min.   :187.6   Min.   :154.2   Min.   :170.9   Min.   : 133.0
##  1st Qu.:374.3   1st Qu.:190.7   1st Qu.:285.6   1st Qu.: 229.3
##  Median :404.8   Median :203.0   Median :317.1   Median : 253.1
##  Mean   :410.9   Mean   :210.9   Mean   :321.6   Mean   : 275.3
##  3rd Qu.:440.7   3rd Qu.:224.3   3rd Qu.:342.6   3rd Qu.: 277.6
##  Max.   :613.2   Max.   :354.7   Max.   :509.5   Max.   :2177.1
##       wmfg             wfed             wsta             wloc
##  Min.   :157.4   Min.   :326.1   Min.   :258.3   Min.   :239.2
##  1st Qu.:288.6   1st Qu.:398.8   1st Qu.:329.3   1st Qu.:297.2
##  Median :321.1   Median :448.9   Median :358.4   Median :307.6
##  Mean   :336.0   Mean   :442.6   Mean   :357.7   Mean   :312.3
##  3rd Qu.:359.9   3rd Qu.:478.3   3rd Qu.:383.2   3rd Qu.:328.8
```

```
##  Max.   :646.9   Max.   :598.0   Max.   :499.6   Max.   :388.1
##       mix             pctymle
##  Min.   :0.01961   Min.   :0.06216
##  1st Qu.:0.08060   1st Qu.:0.07437
##  Median :0.10095   Median :0.07770
##  Mean   :0.12905   Mean   :0.08403
##  3rd Qu.:0.15206   3rd Qu.:0.08352
##  Max.   :0.46512   Max.   :0.24871
```

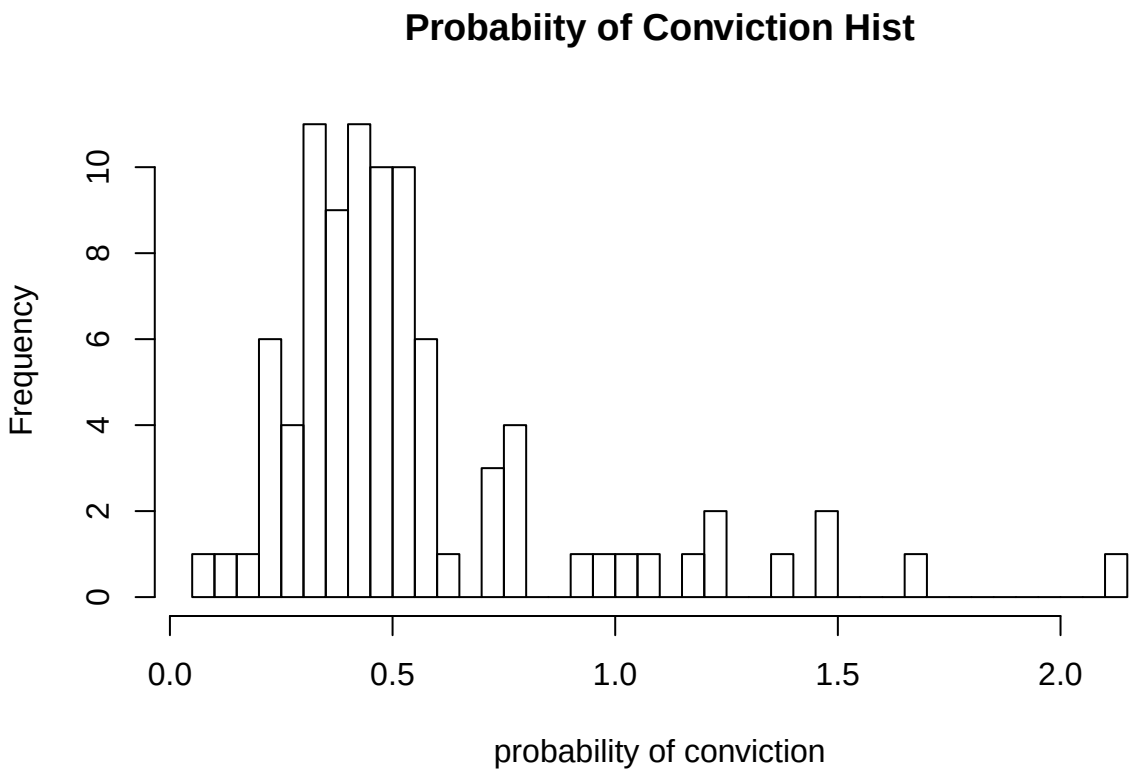
```
hist(df$crmrte, breaks = 50, xlab = "crime rate", ylab = "Frequency", main = "Crime Rate Hist")
```



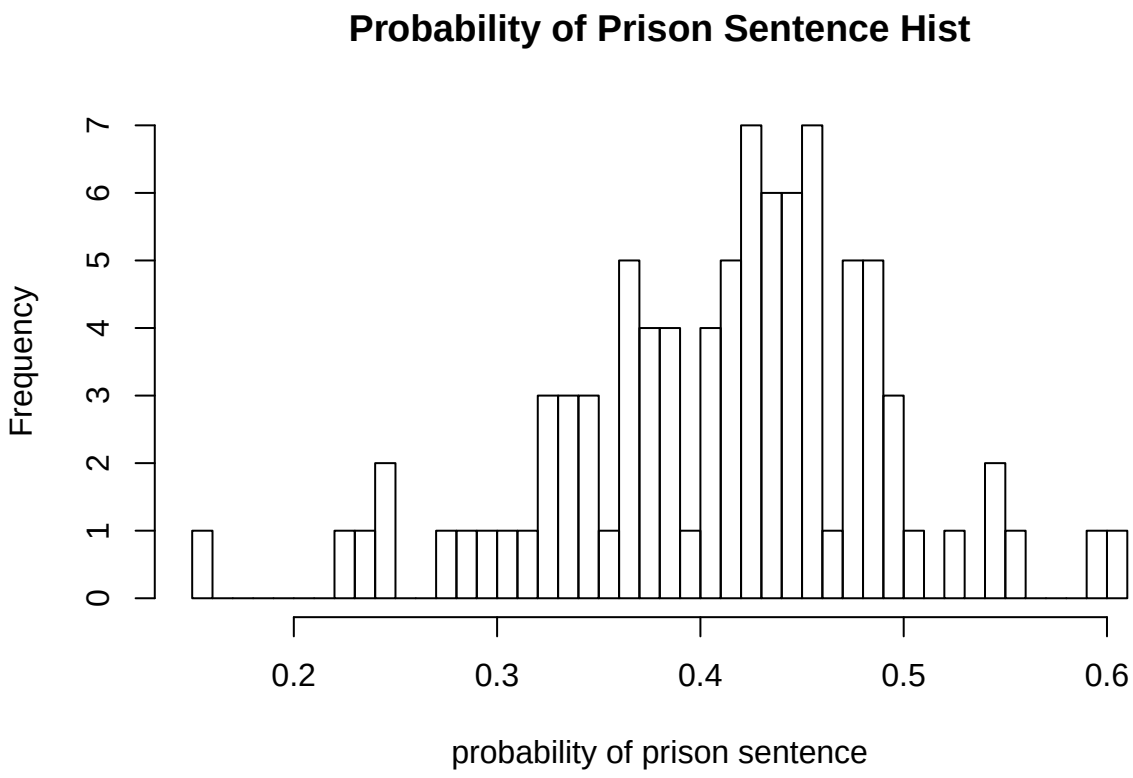

```
hist(df$prbarr, breaks = 50, xlab = "probability of arrest", ylab = "Frequency", main = "Probability of
```



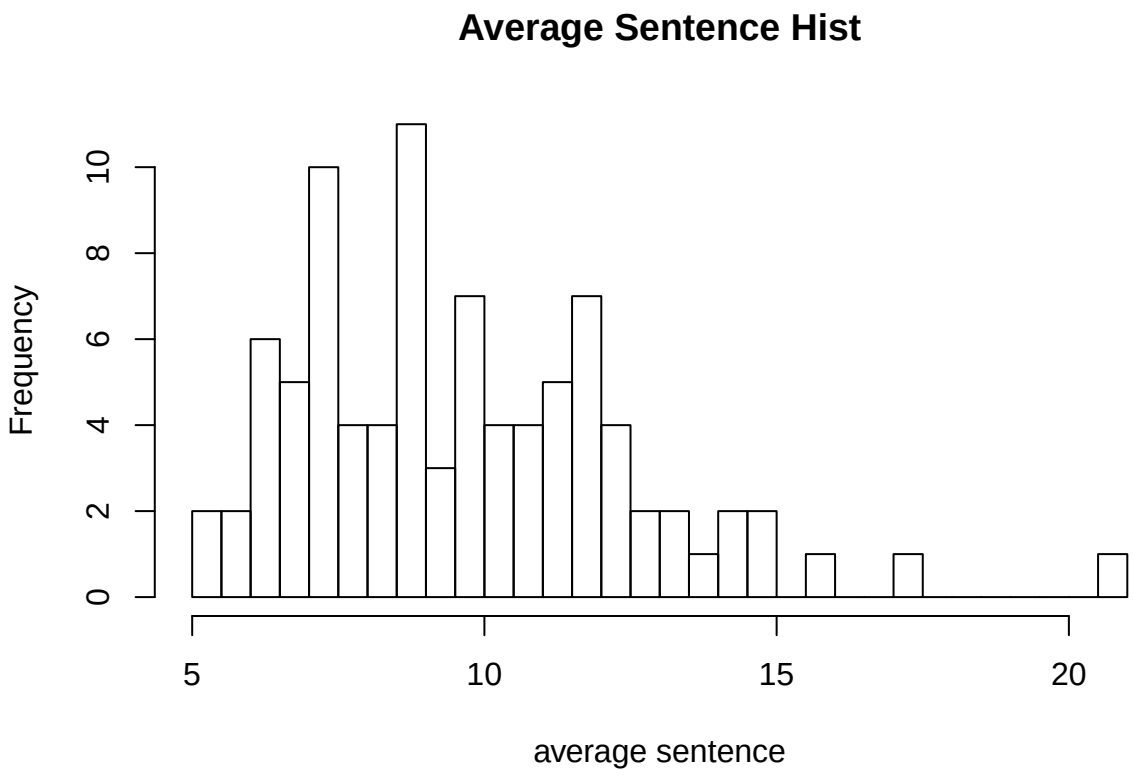

```
hist(df$prbconv, breaks = 50, xlab = "probability of conviction", ylab = "Frequency", main = "Probabiity
```



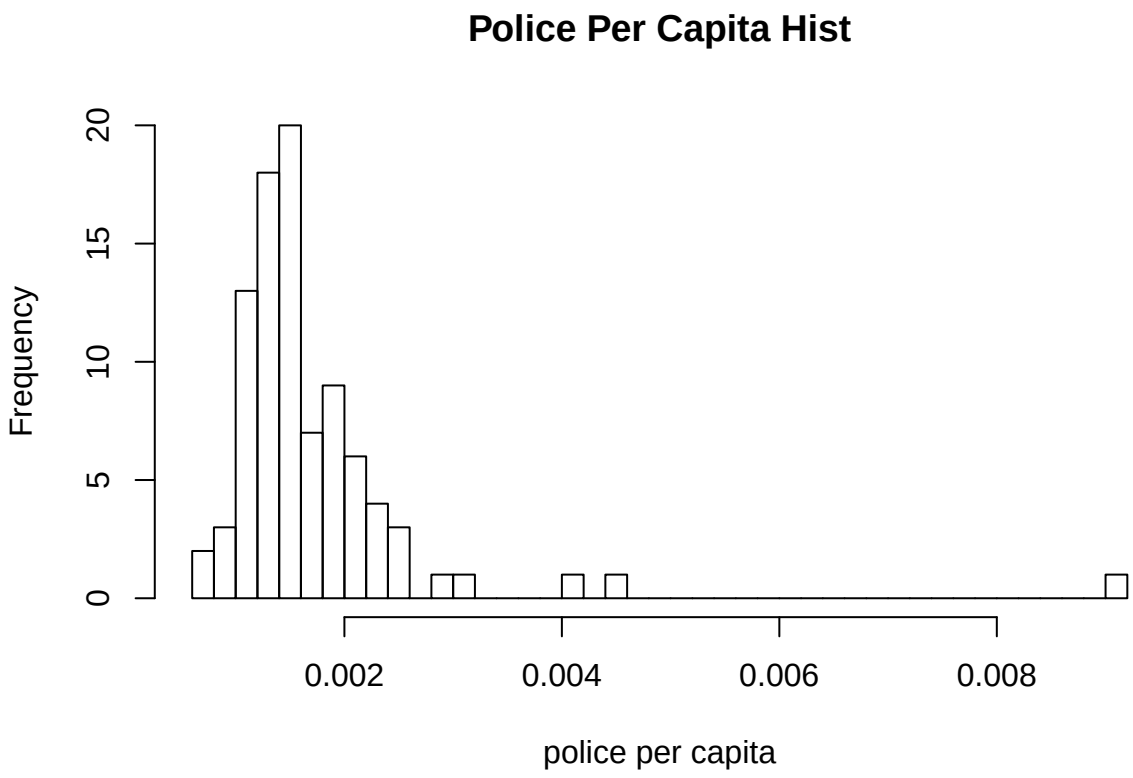

```
hist(df$prbpris, breaks = 50, xlab = "probability of prison sentence", ylab = "Frequency", main = "Proba
```



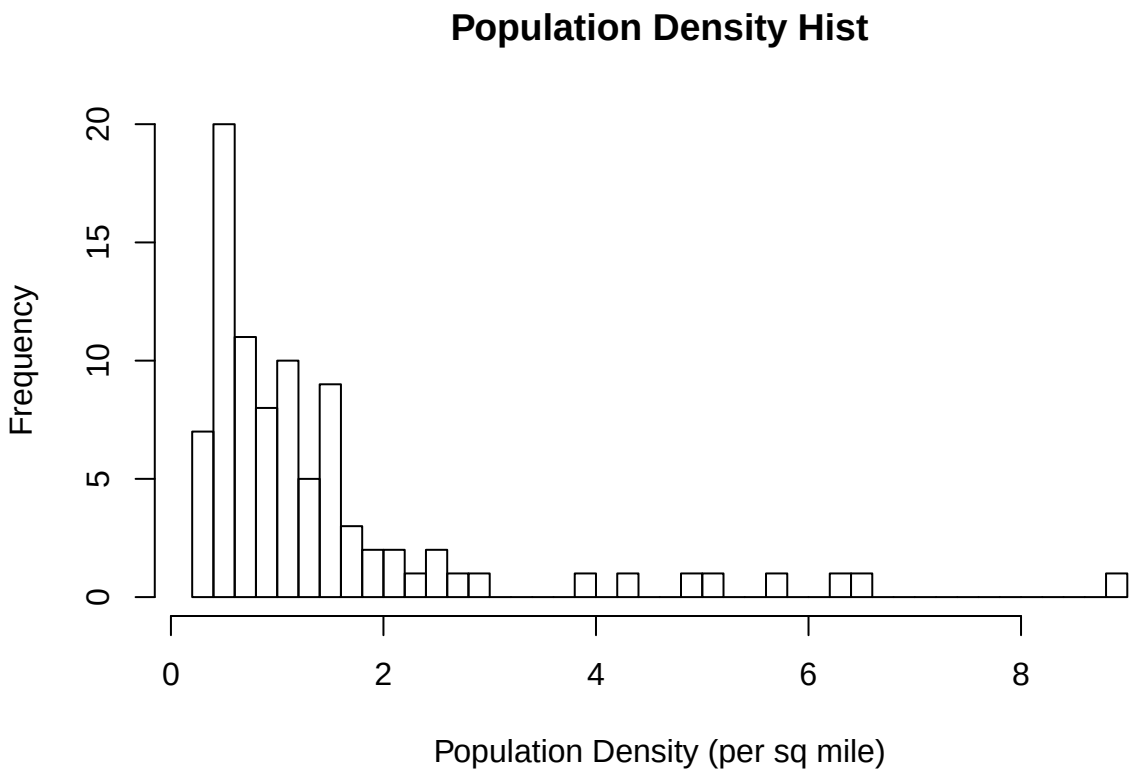

```
hist(df$avgsen, breaks = 50, xlab = "average sentence", ylab = "Frequency", main = "Average Sentence His
```



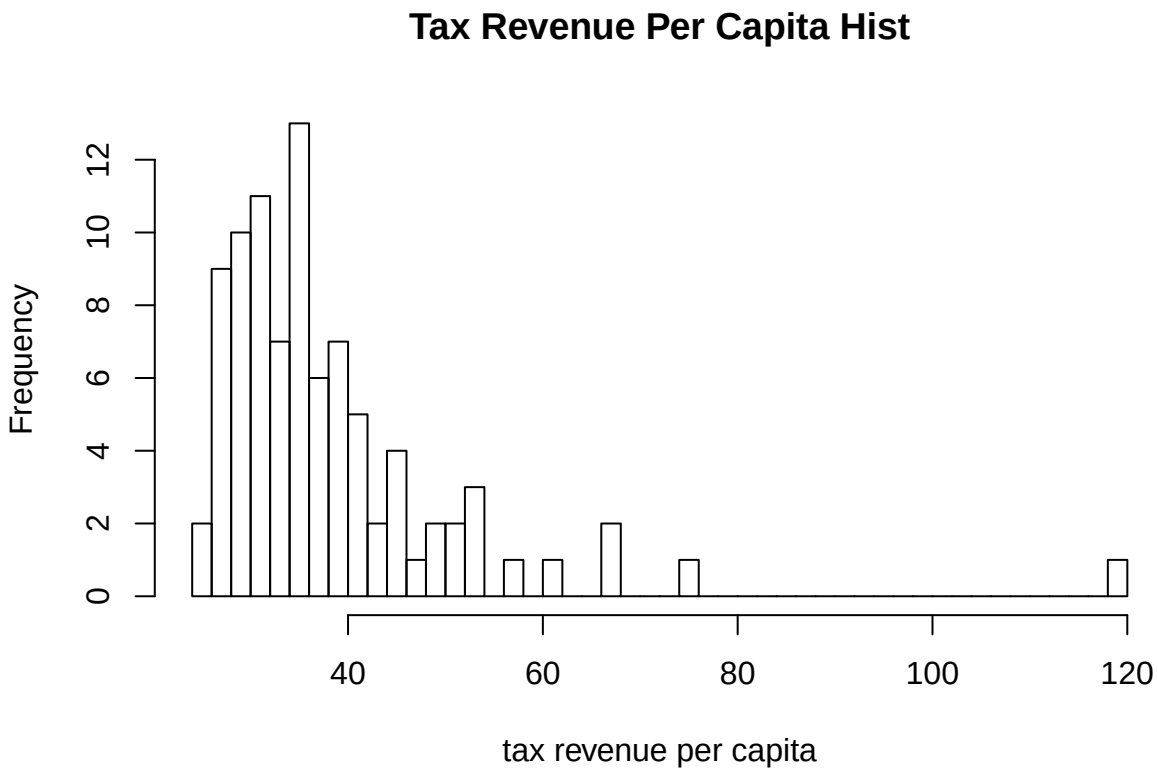

```
hist(df$polpc, breaks = 50, xlab = "police per capita", ylab = "Frequency", main = "Police Per Capita Hi
```



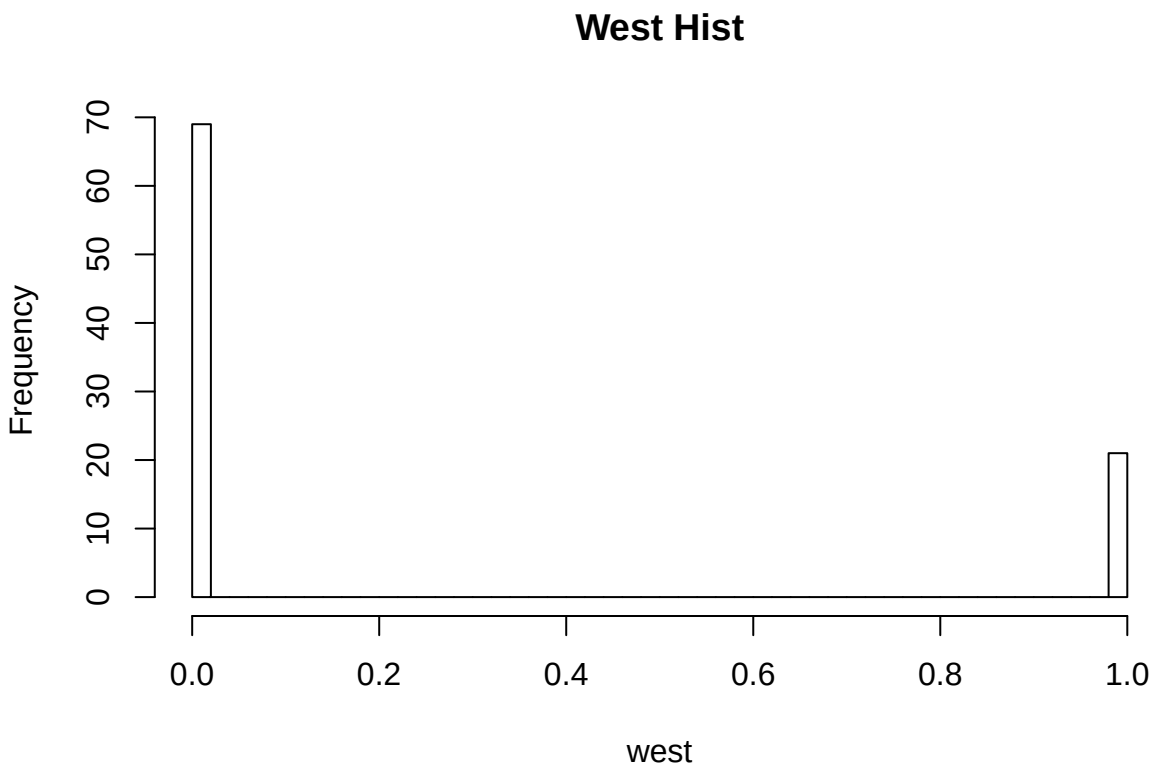

```
hist(df$density, breaks = 50, xlab = "Population Density (per sq mile)", ylab = "Frequency", main = "Po
```



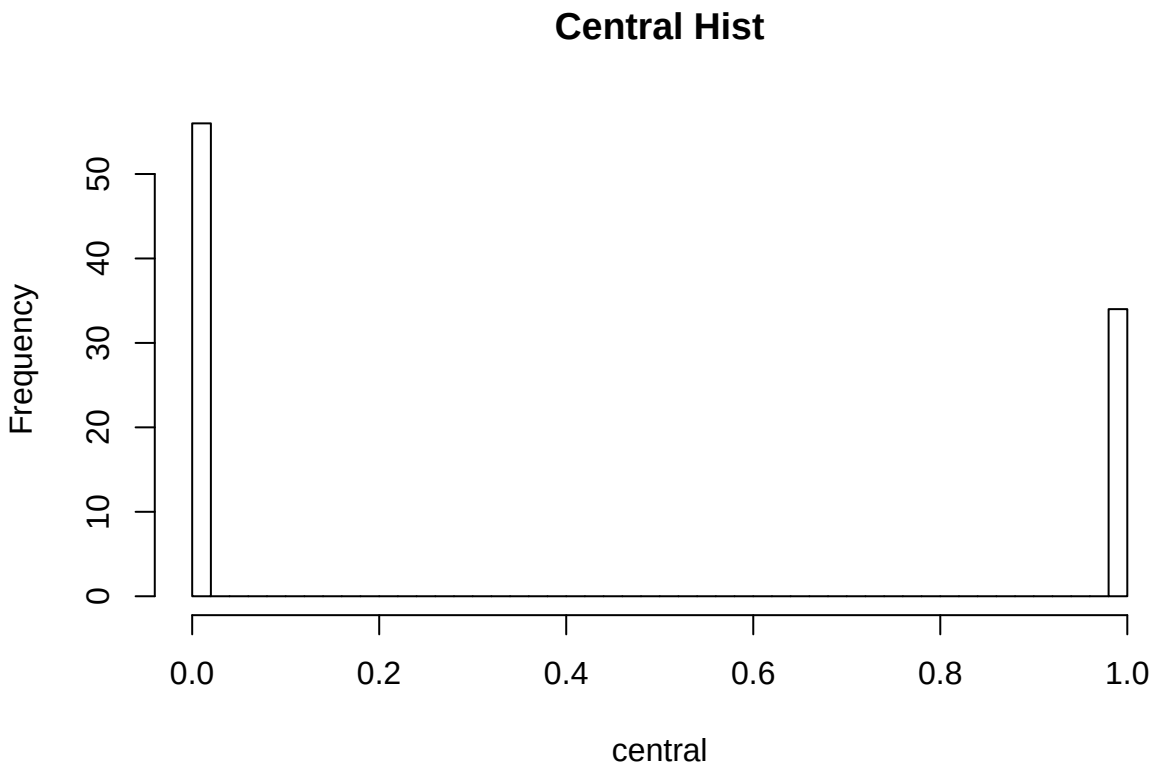

```
hist(df$taxpc, breaks = 50, xlab = "tax revenue per capita", ylab = "Frequency", main = "Tax Revenue Pe
```



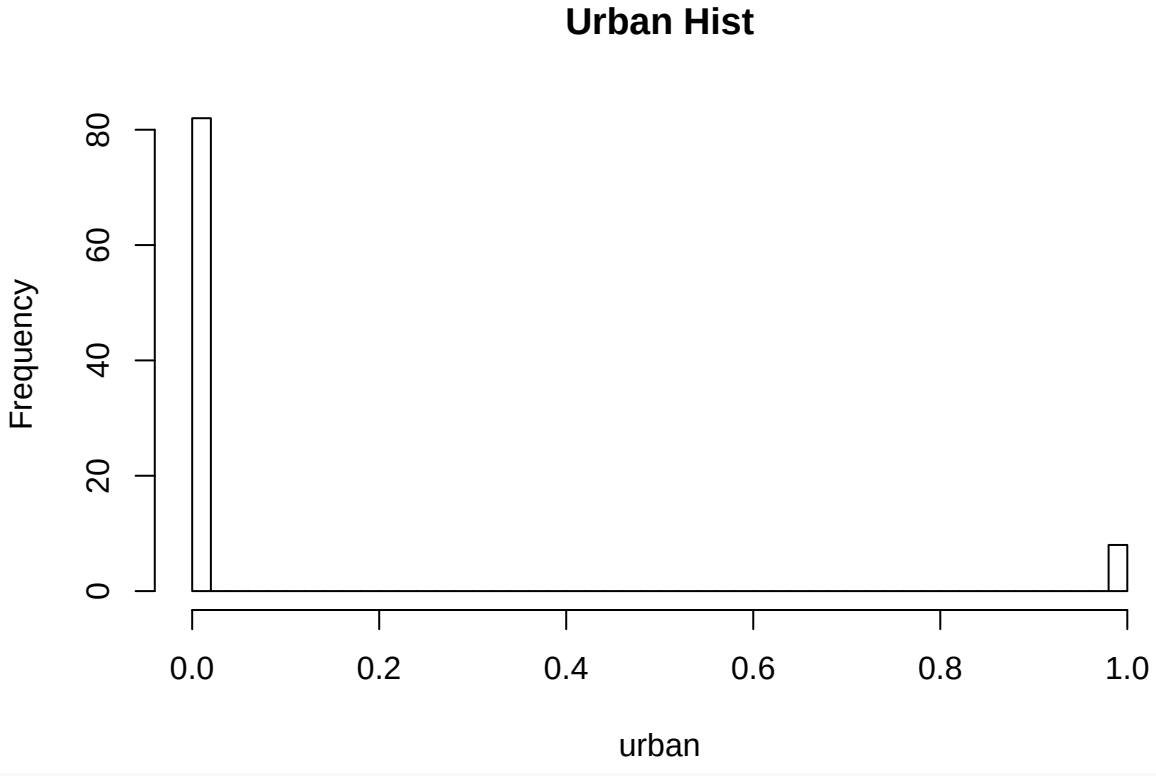

```r
hist(df$west, breaks = 50, xlab = "west", ylab = "Frequency", main = "West Hist")
```



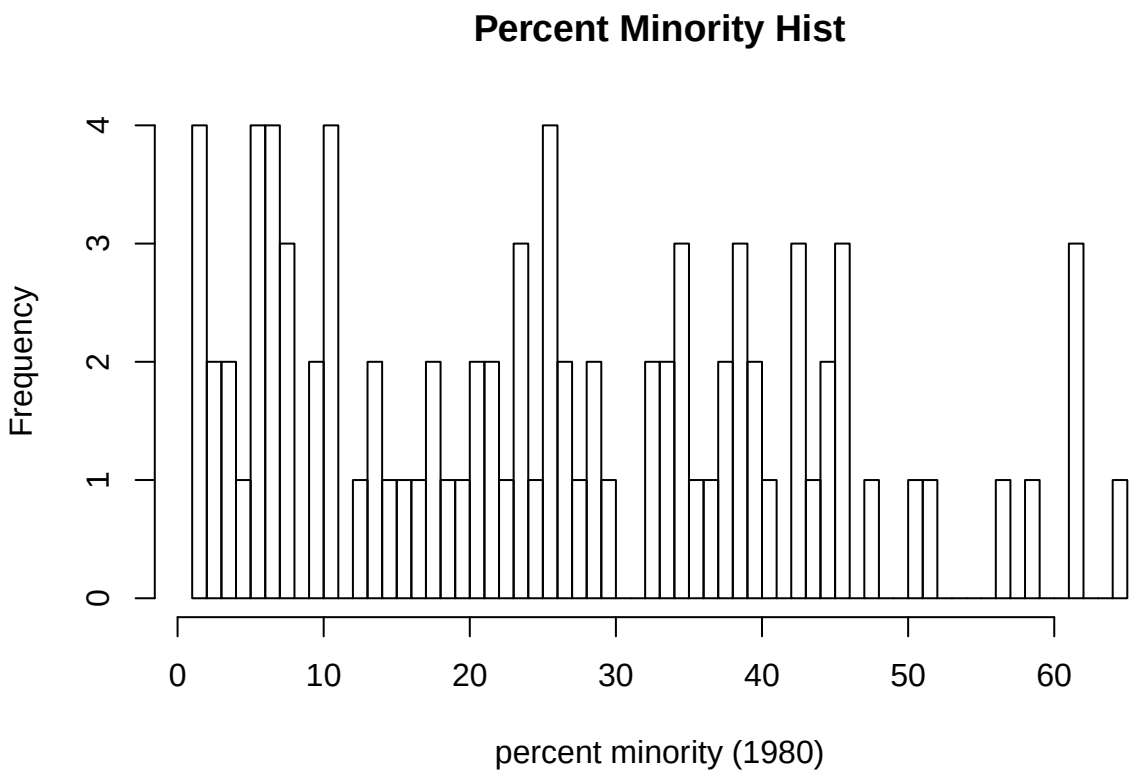

```r
hist(df$central, breaks = 50, xlab = "central", ylab = "Frequency", main = "Central Hist")
```



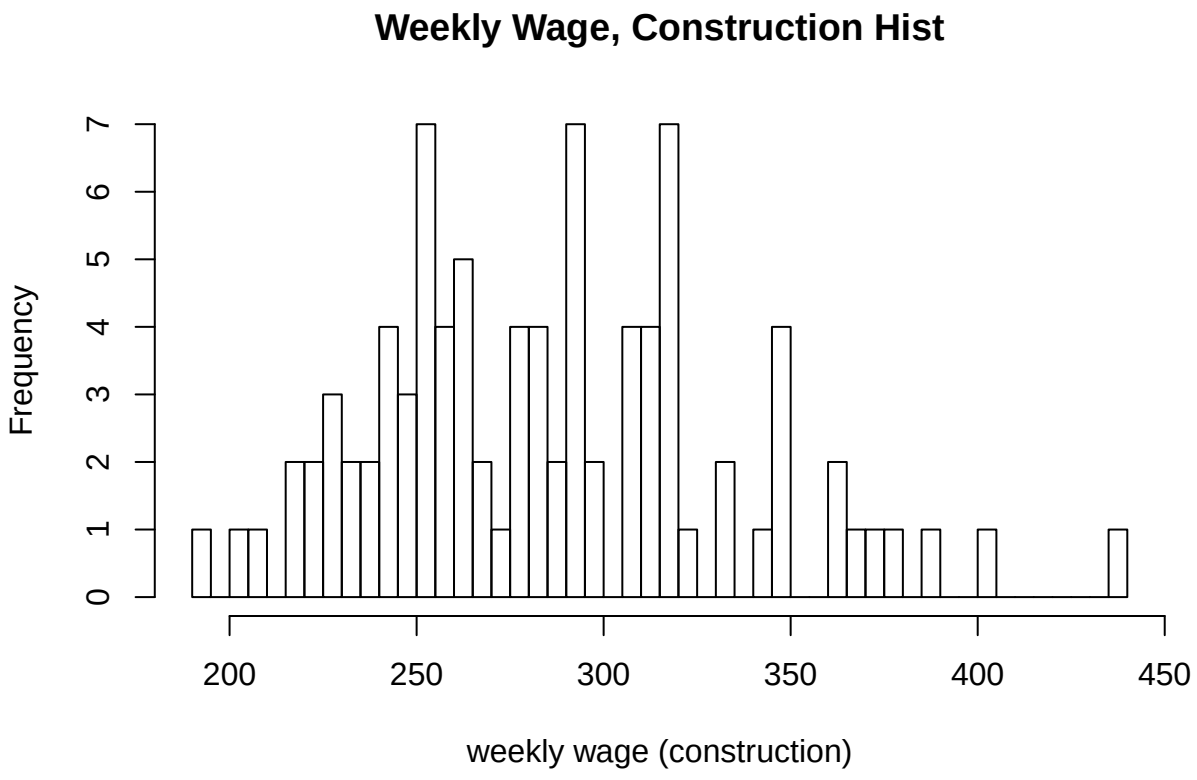

```
hist(df$urban, breaks = 50, xlab = "urban", ylab = "Frequency", main = "Urban Hist")
```



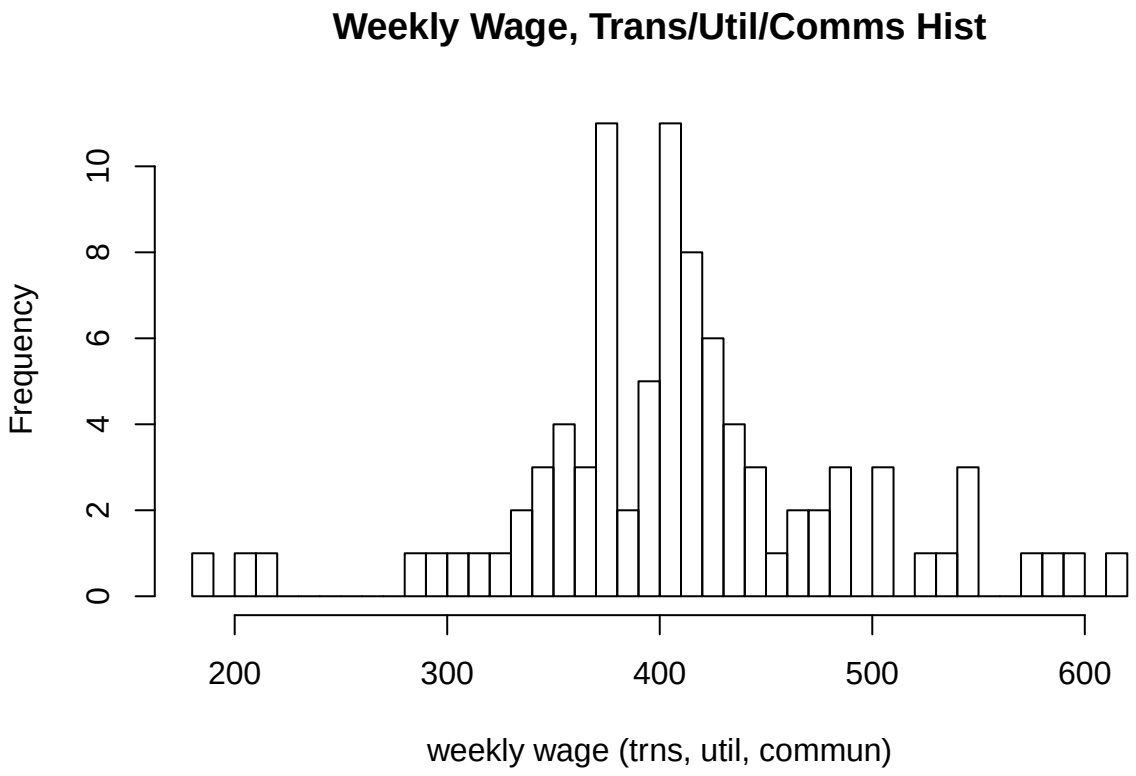

```
hist(df$pctmin80, breaks = 50, xlab = "percent minority (1980)", ylab = "Frequency", main = "Percent Mi
```



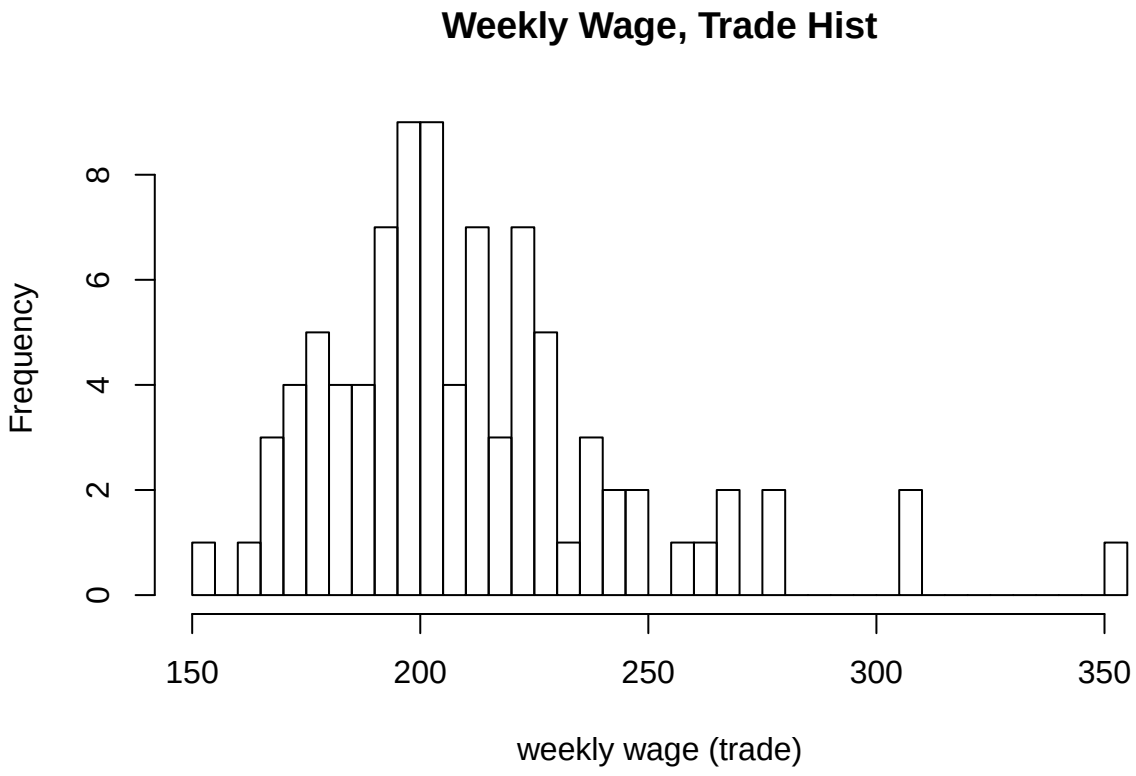

```
hist(df$wcon, breaks = 50, xlab = "weekly wage (construction)", ylab = "Frequency", main = "Weekly Wage
```



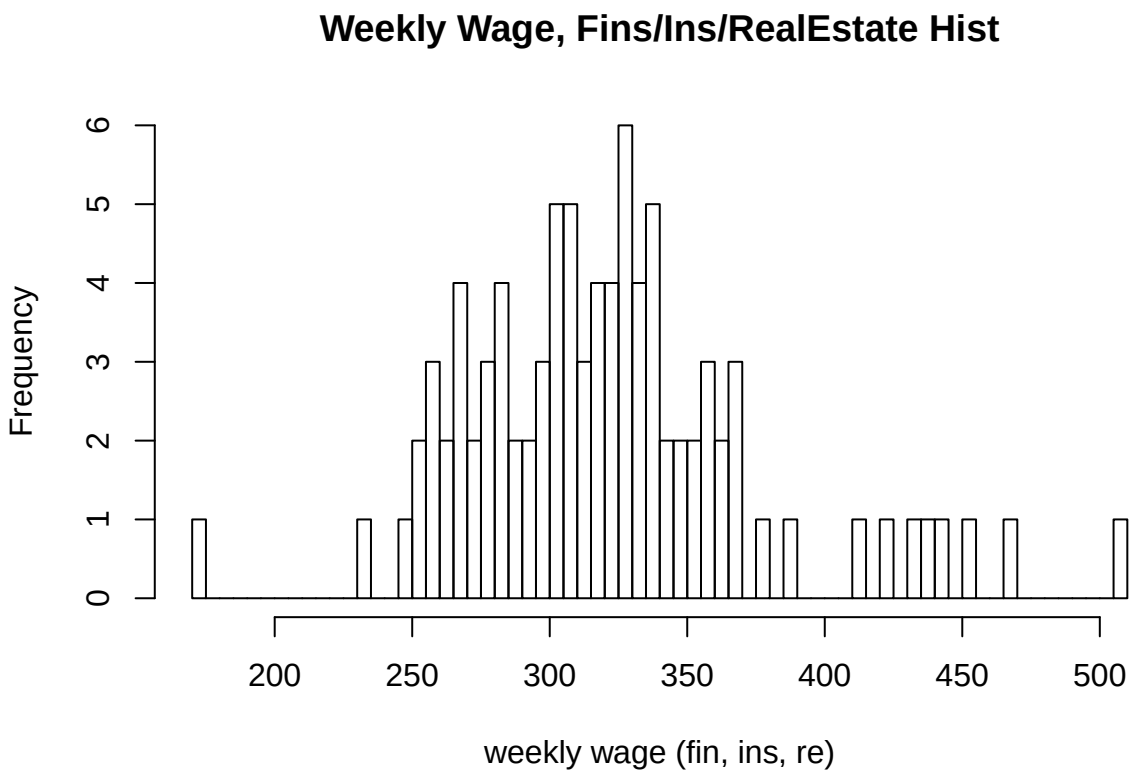

```
hist(df$wtuc, breaks = 50, xlab = "weekly wage (trns, util, commun)", ylab = "Frequency", main = "Weekl
```




```
hist(df$wtrd, breaks = 50, xlab = "weekly wage (trade)", ylab = "Frequency", main = "Weekly Wage, Trade
```



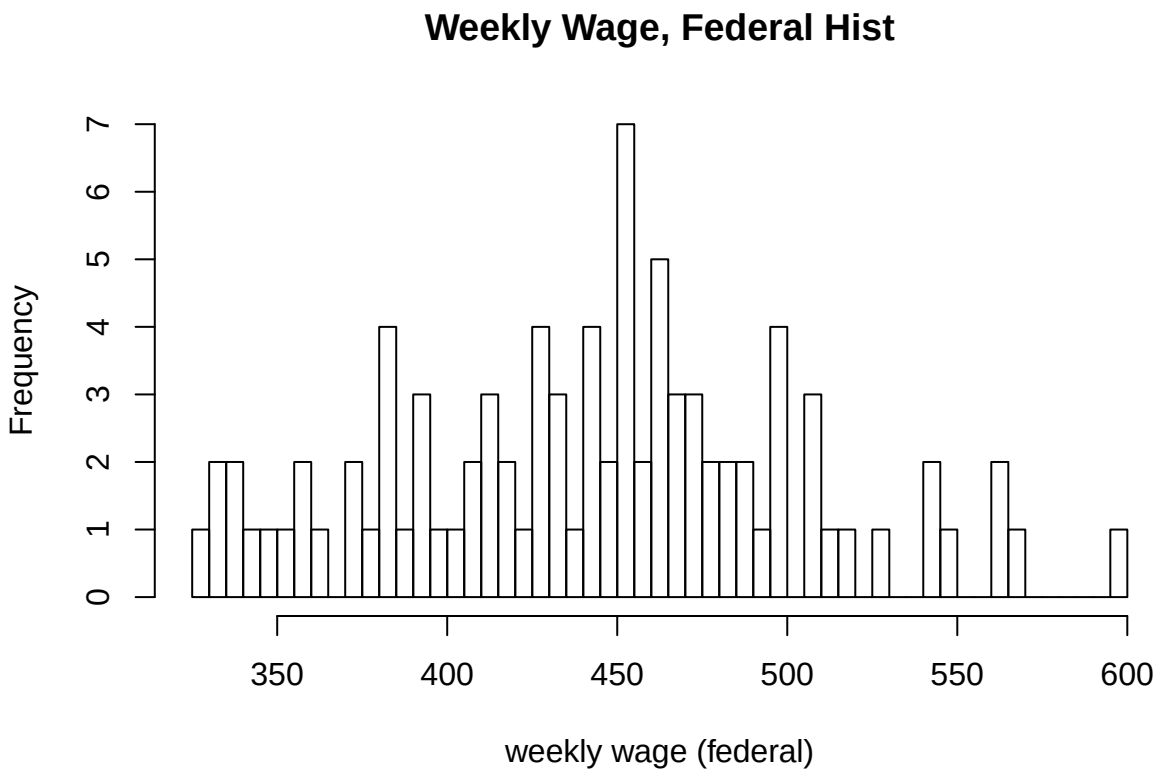

```
hist(df$wfir, breaks = 50, xlab = "weekly wage (fin, ins, re)", ylab = "Frequency", main = "Weekly Wage
```



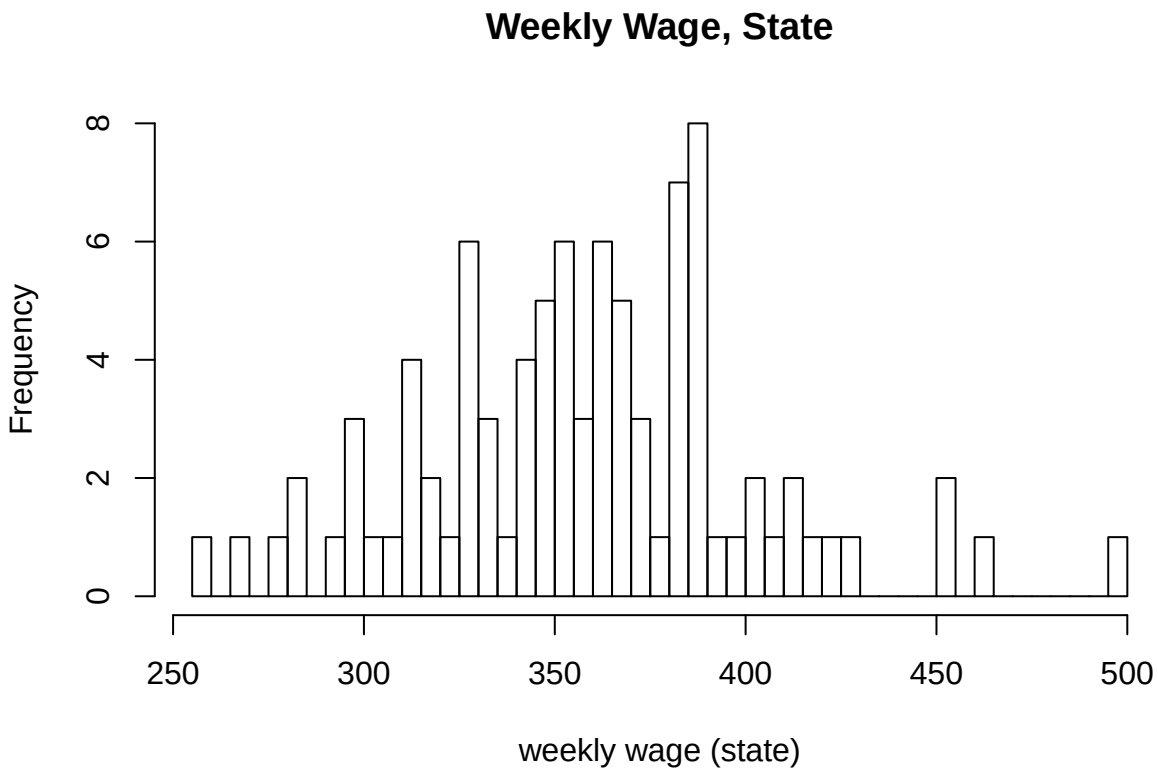

```
hist(df$wser, breaks = 50, xlab = "weekly wage (service)", ylab = "Frequency", main = "Weekly Wage, Ser
```


```
hist(df$wmfg, breaks = 50, xlab = "weekly wage (manufacturing)", ylab = "Frequency", main = "Weekly Wag
```

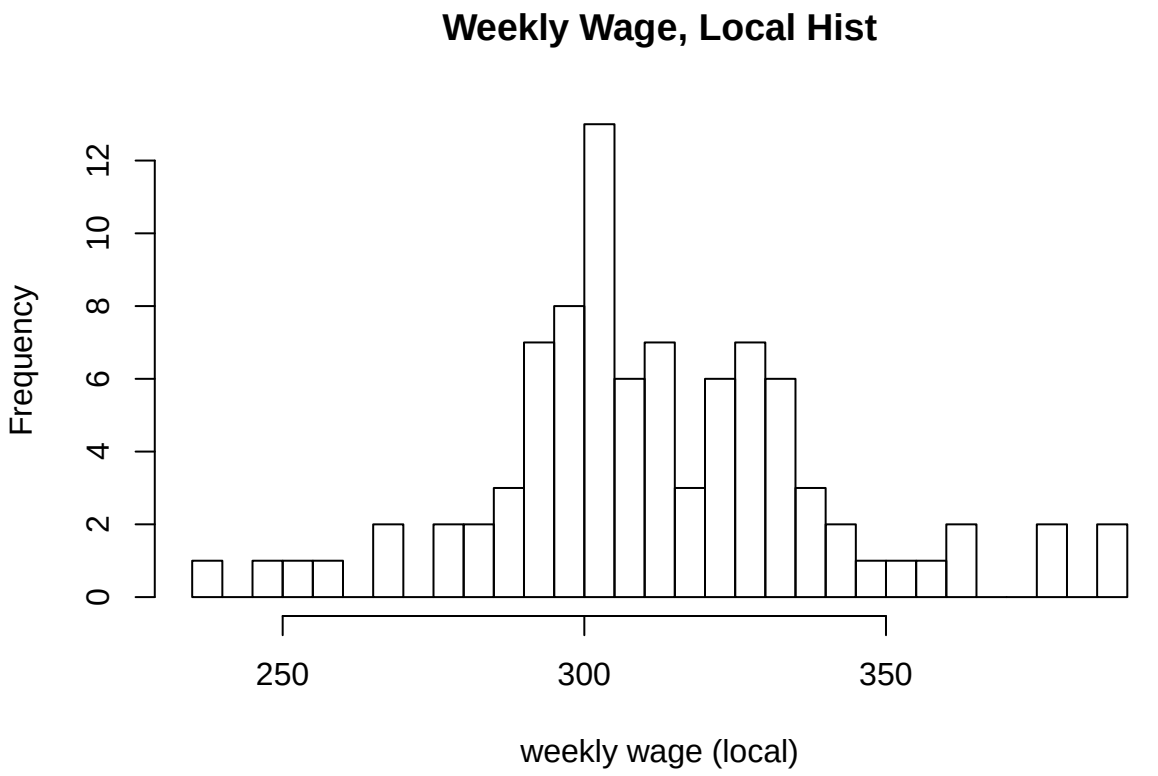

```
hist(df$wfed, breaks = 50, xlab = "weekly wage (federal)", ylab = "Frequency", main = "Weekly Wage, Fede
```



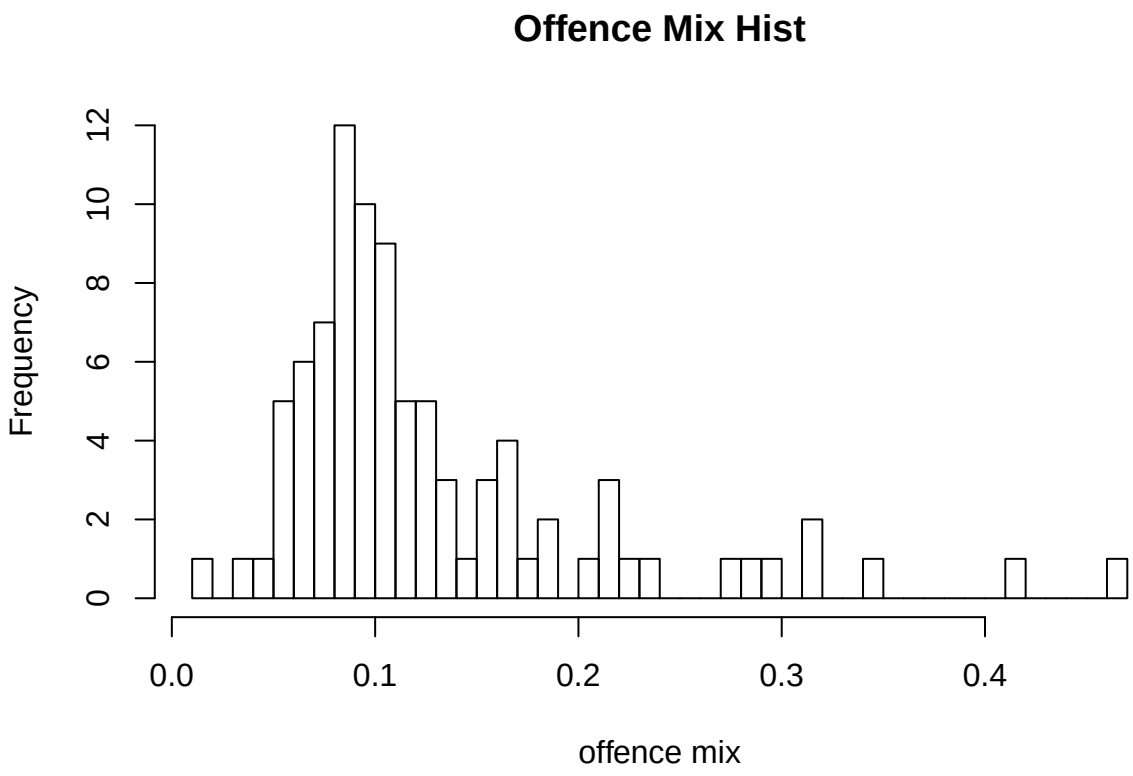

```
hist(df$wsta, breaks = 50, xlab = "weekly wage (state)", ylab = "Frequency", main = "Weekly Wage, State
```



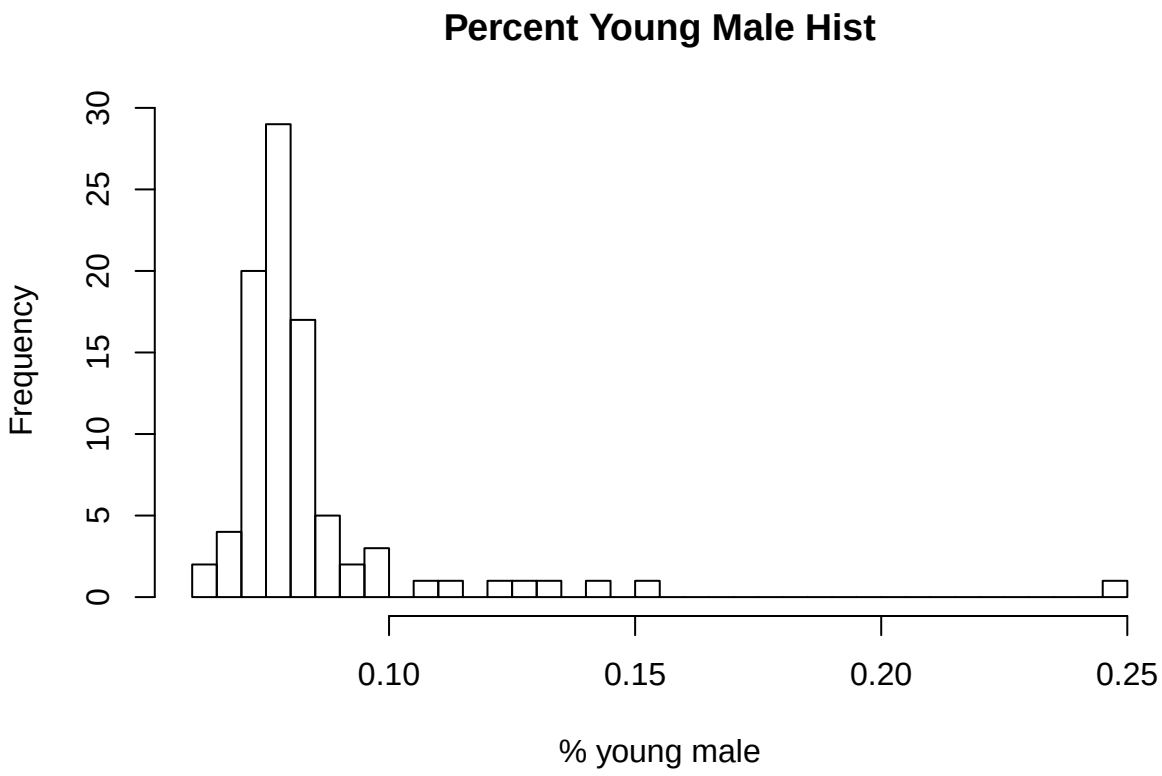

```
hist(df$wloc, breaks = 50, xlab = "weekly wage (local)", ylab = "Frequency", main = "Weekly Wage, Local
```



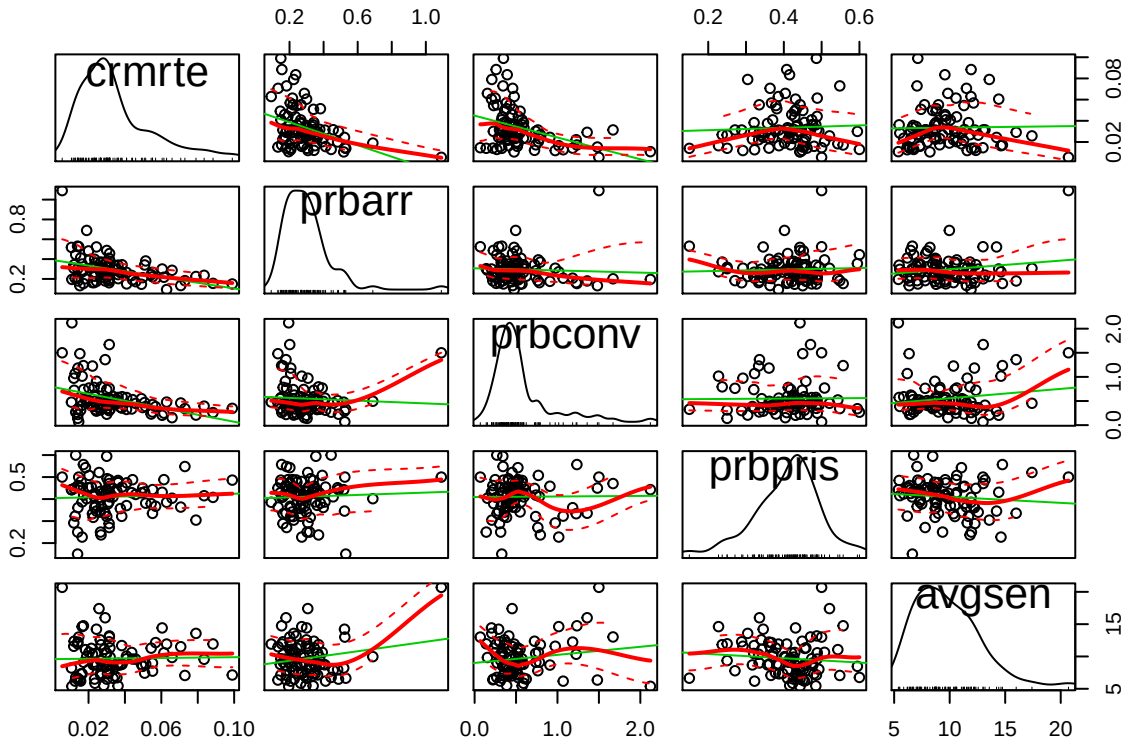

```
hist(df$mix, breaks = 50, xlab = "offence mix", ylab = "Frequency", main = "Offence Mix Hist")
```



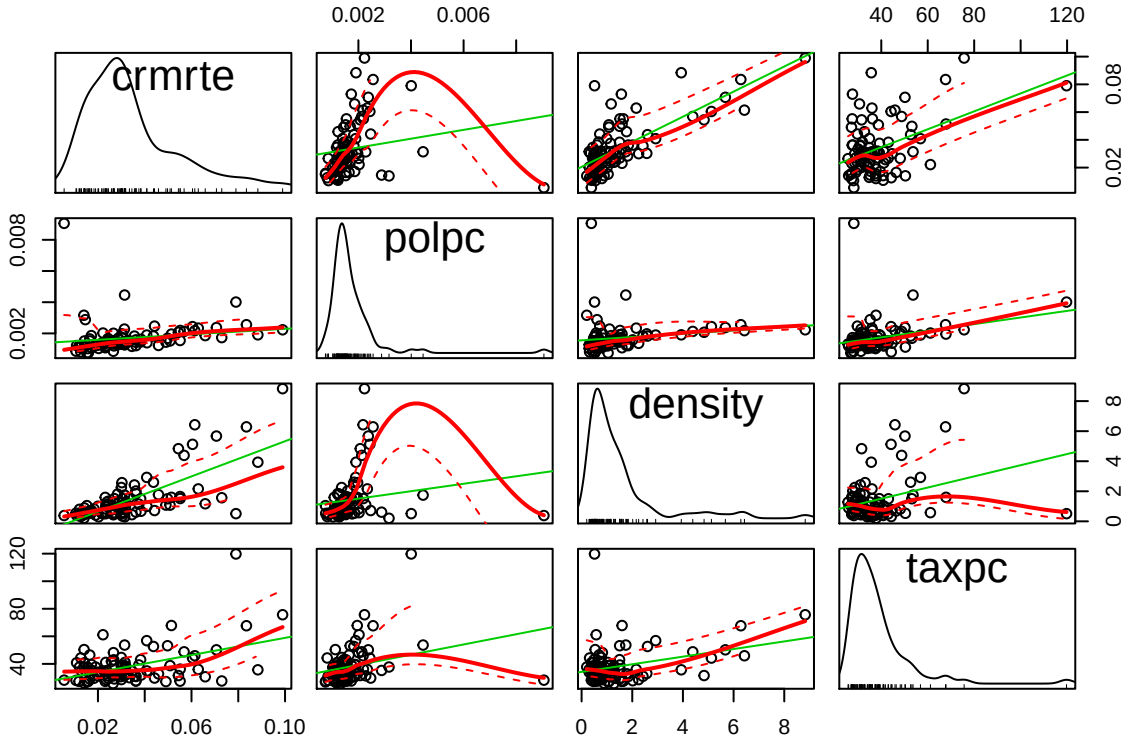

```
hist(df$pctymle, breaks = 50, xlab = "% young male", ylab = "Frequency", main = "Percent Young Male His
```



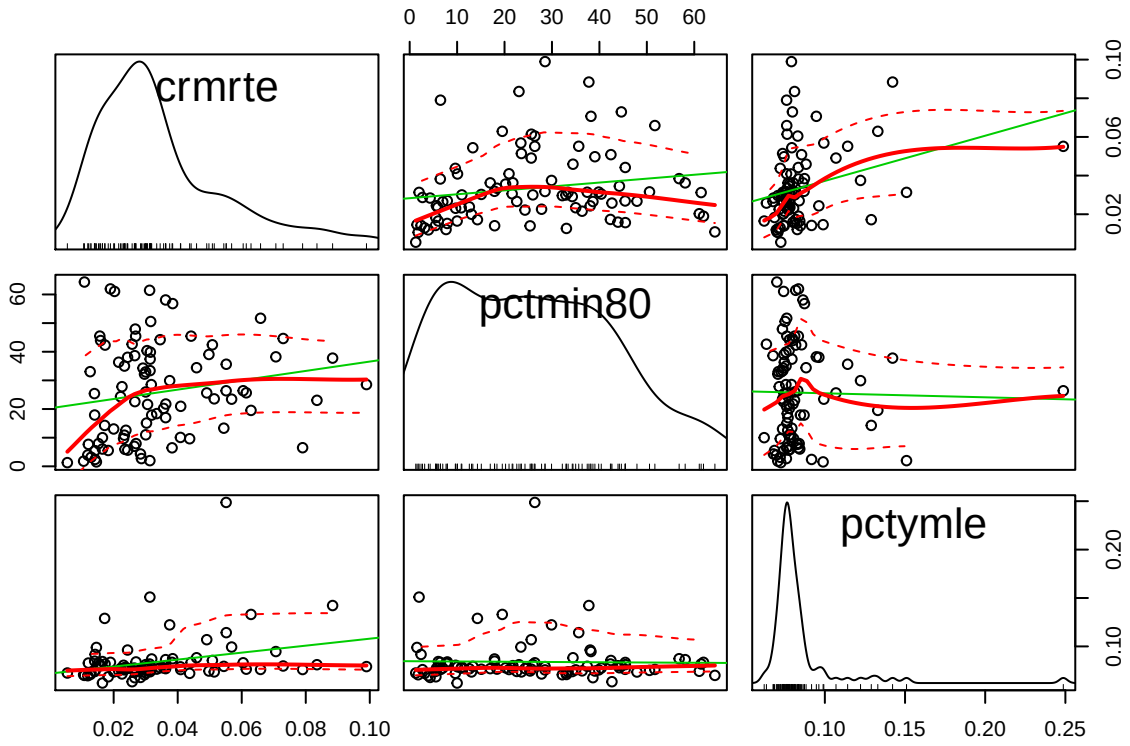

```
scatterplotMatrix(~crmrte + prbarr + prbconv + prbpris + avgsen, data= df )
```



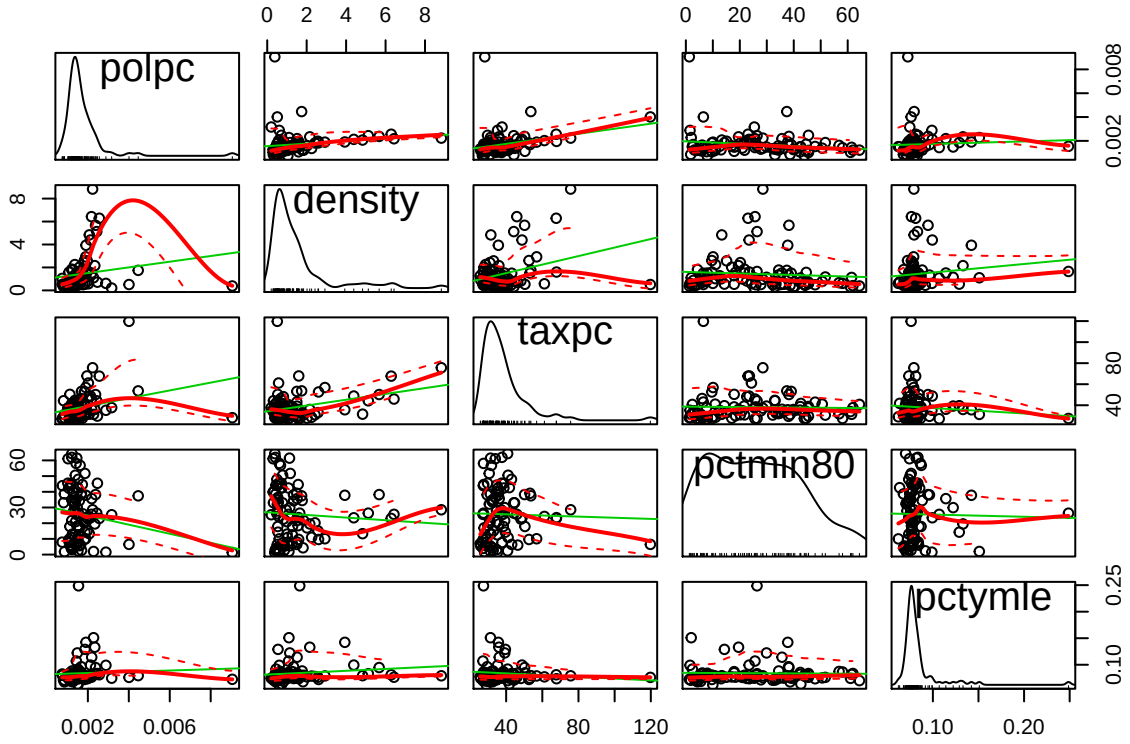

```
scatterplotMatrix(~crmrte + polpc + density + taxpc, data= df )
```




```
scatterplotMatrix(~crmrte + pctmin80 + pctymle, data= df )
```




```
scatterplotMatrix(~polpc + density + taxpc + pctmin80 + pctymle, data= df )
```




```
df[df$crmrte >= 0.0950 | df$pctymle >= 0.20,]   #county:119,133
```

```
##      X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 53 53    119   87 0.0989659 0.149094 0.347800 0.486183   7.13 0.00223135
## 59 59    133   87 0.0551287 0.266960 0.271947 0.334951   8.99 0.00154457
```

```
##     density    taxpc west central urban pctmin80     wcon     wtuc
## 53 8.827652 75.67243    0       1     1  28.5460 436.7666 548.3239
## 59 1.650066 27.46926    0       0     0  26.3814 264.0406 318.9644
##        wtrd     wfir     wser   wmfg  wfed   wsta   wloc       mix
## 53 354.6761 509.4655 354.3007 494.30 568.4 329.22 379.77 0.1686990
## 59 183.2609 265.1232 230.6581 258.25 326.1 329.43 301.64 0.1217632
##       pctymle
## 53 0.07916495
## 59 0.24871162
```

```
df[df$prbarr >= 0.80, ]   #county:115
```

```
##     X county year    crmrte  prbarr prbconv prbpris avgsen      polpc
## 51 51    115   87 0.0055332 1.09091     1.5     0.5   20.7 0.00905433
##      density   taxpc west central urban pctmin80     wcon     wtuc
## 51 0.3858093 28.1931    1       0     0  1.28365 204.2206 503.2351
##        wtrd     wfir     wser   wmfg  wfed   wsta   wloc mix    pctymle
## 51 217.4908 342.4658 245.2061 448.42 442.2 340.39 386.12 0.1 0.07253495
```

```
df[df$prbconv >= 1.6, ]   #county:185, 195
```

```
##     X county year    crmrte   prbarr prbconv  prbpris avgsen      polpc
## 84 84    185   87 0.0108703 0.195266 2.12121 0.442857   5.38 0.00122210
## 89 89    195   87 0.0313973 0.201397 1.67052 0.470588  13.02 0.00445923
##      density    taxpc west central urban pctmin80     wcon     wtuc
## 84 0.3887588 40.82454    0       1     0  64.3482 226.8245 331.5650
## 89 1.7459893 53.66693    0       0     0  37.4311 315.1641 377.9356
##        wtrd     wfir      wser   wmfg   wfed   wsta   wloc        mix
## 84 167.3726 264.4231 2177.0681 247.72 381.33 367.25 300.13 0.04968944
## 89 246.0614 411.4330  296.8684 392.27 480.79 303.11 337.28 0.15612382
##       pctymle
## 84 0.07008217
## 89 0.07945071
```

```
df[df$prbpris >= 0.575, ] #county:5,145
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 3   3      5   87 0.0129603 0.444444 0.267857 0.600000   6.76 0.00123431
## 65 65    145   87 0.0299856 0.354733 0.340491 0.594595   8.47 0.00137040
##      density    taxpc west central urban pctmin80     wcon     wtuc
## 3  0.4127659 34.81605    1       0     0  3.16053 226.9470 372.2084
## 65 0.7788945 44.64758    0       1     0 32.95160 305.3435 538.8488
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc       mix
## 3  229.3209 305.9441 209.6972 237.65 358.98 331.53 281.37 0.4651163
## 65 200.7432 302.1978 219.6343 334.65 414.63 298.78 295.00 0.2253333
##       pctymle
## 3  0.07211538
## 65 0.07275662
```

```
df[df$avgsen >= 15, ]    #county:41,115,127
```

```
##     X county year    crmrte   prbarr prbconv  prbpris avgsen      polpc
## 19 19     41   87 0.0257713 0.307246 0.45283 0.520833  17.41 0.00149399
## 51 51    115   87 0.0055332 1.090910 1.50000 0.500000  20.70 0.00905433
## 56 56    127   87 0.0291496 0.179616 1.35814 0.335616  15.99 0.00158289
##      density    taxpc west central urban pctmin80     wcon     wtuc
## 19 0.7417582 41.76929    0       0     0 42.64210 256.4102 379.0005
```

```
## 51 0.3858093 28.19310    1       0     0  1.28365 204.2206 503.2351
## 56 1.3388889 32.02376    0       0     0 34.27990 290.9091 426.3901
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 19 238.5589 271.7391 232.5916 332.07 451.84 389.99 312.05 0.09872611
## 51 217.4908 342.4658 245.2061 448.42 442.20 340.39 386.12 0.10000000
## 56 257.6008 441.1413 305.7612 329.87 508.61 380.30 329.71 0.06305506
##       pctymle
## 19 0.06355526
## 51 0.07253495
## 56 0.07400288
```

```
df[df$polpc >= 0.004, ]    #county:55,115,195
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 25 25     55   87 0.0790163 0.224628 0.207831 0.304348  13.57 0.00400962
## 51 51    115   87 0.0055332 1.090910 1.500000 0.500000  20.70 0.00905433
## 89 89    195   87 0.0313973 0.201397 1.670520 0.470588  13.02 0.00445923
##      density     taxpc west central urban pctmin80     wcon     wtuc
## 25 0.5115089 119.76145    0       0     0  6.49622 309.5238 445.2762
## 51 0.3858093  28.19310    1       0     0  1.28365 204.2206 503.2351
## 89 1.7459893  53.66693    0       0     0 37.43110 315.1641 377.9356
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 25 189.7436 284.5933 221.3903 319.21 338.91 361.68 326.08 0.08437271
## 51 217.4908 342.4658 245.2061 448.42 442.20 340.39 386.12 0.10000000
## 89 246.0614 411.4330 296.8684 392.27 480.79 303.11 337.28 0.15612382
##       pctymle
## 25 0.07613807
## 51 0.07253495
## 89 0.07945071
```

```
df[df$density >= 6, ]  #county:67,119,129
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 31 31     67   87 0.0614177 0.217215 0.248276 0.488426  10.57 0.00217747
## 53 53    119   87 0.0989659 0.149094 0.347800 0.486183   7.13 0.00223135
## 57 57    129   87 0.0834982 0.236601 0.393413 0.415158   9.57 0.00255849
##     density    taxpc west central urban pctmin80     wcon     wtuc
## 31 6.427185 45.89987    0       1     1  25.6546 206.5527 379.5547
## 53 8.827652 75.67243    0       1     1  28.5460 436.7666 548.3239
## 57 6.286487 67.67963    0       0     1  23.0441 315.5760 392.0999
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 31 189.1807 278.0352 230.4981 275.72 419.07 400.59 313.55 0.21999694
## 53 354.6761 509.4655 354.3007 494.30 568.40 329.22 379.77 0.16869897
## 57 220.4530 363.2880 292.7027 464.49 548.49 421.36 319.08 0.07871422
##       pctymle
## 31 0.07647973
## 53 0.07916495
## 57 0.08109921
```

```
df[df$taxpc >= 60, ]  #county:19,55,105,119,129
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 10 10     19   87 0.0221567 0.162860 1.225610 0.333333  10.34 0.00202425
## 25 25     55   87 0.0790163 0.224628 0.207831 0.304348  13.57 0.00400962
## 46 46    105   87 0.0514152 0.381400 0.384236 0.381410   8.81 0.00195614
## 53 53    119   87 0.0989659 0.149094 0.347800 0.486183   7.13 0.00223135
```

```
## 57 57    129   87 0.0834982 0.236601 0.393413 0.415158   9.57 0.00255849
##      density     taxpc west central urban pctmin80     wcon     wtuc
## 10 0.5767442  61.15251    0       0     0 24.31170 260.1381 613.2261
## 25 0.5115089 119.76145    0       0     0  6.49622 309.5238 445.2762
## 46 1.5984555  67.84798    0       1     0 23.54980 314.0595 401.1326
## 53 8.8276520  75.67243    0       1     1 28.54600 436.7666 548.3239
## 57 6.2864866  67.67963    0       0     1 23.04410 315.5760 392.0999
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 10 191.2452 290.5141 266.0934 567.06 403.15 258.33 299.44 0.05334728
## 25 189.7436 284.5933 221.3903 319.21 338.91 361.68 326.08 0.08437271
## 46 237.8523 323.9486 274.8686 352.08 463.11 267.78 343.13 0.10368066
## 53 354.6761 509.4655 354.3007 494.30 568.40 329.22 379.77 0.16869897
## 57 220.4530 363.2880 292.7027 464.49 548.49 421.36 319.08 0.07871422
##       pctymle
## 10 0.07713232
## 25 0.07613807
## 46 0.07365920
## 53 0.07916495
## 57 0.08109921
```

```
df[df$taxpc <= 27, ] #county:3,151,197
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 2   2      3   87 0.0152532 0.132029 1.481480 0.450000   6.35 0.00074588
## 68 68    151   87 0.0264557 0.299198 0.360153 0.340426  12.57 0.00132430
## 90 90    197   87 0.0141928 0.207595 1.182930 0.360825  12.23 0.00118573
##     density    taxpc west central urban pctmin80     wcon     wtuc
## 2  1.046332 26.89208    0       1     0  7.91632 255.1020 376.2542
## 68 1.273764 25.69287    0       1     0  6.97606 340.4792 415.1317
## 90 0.889881 25.95258    1       0     0  5.46081 314.1660 341.8803
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 2  196.0101 258.5650 192.3077 300.38 409.83 362.96 301.47 0.03022670
## 68 218.7198 322.4150 278.1124 294.37 474.26 298.66 294.72 0.07342084
## 90 182.8020 348.1432 212.8205 322.92 391.72 385.65 306.85 0.06756757
##       pctymle
## 2  0.08260694
## 68 0.07763254
## 90 0.07419893
```

```
df[df$pctmin80 >= 60, ] #county:15,131,155,185
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 8   8     15   87 0.0202814 0.392111 0.769231 0.507692  10.64 0.00103525
## 58 58    131   87 0.0189848 0.689024 0.495575 0.401786   9.97 0.00121549
## 70 70    155   87 0.0312279 0.408200 0.559823 0.386544   8.71 0.00145925
## 84 84    185   87 0.0108703 0.195266 2.121210 0.442857   5.38 0.00122210
##      density    taxpc west central urban pctmin80     wcon     wtuc
## 8  0.3009986 34.00304    0       0     0  61.0540 253.5926 353.2182
## 58 0.4126394 37.70006    0       0     0  61.9421 225.8647 375.2345
## 70 1.1296101 31.37446    0       0     0  61.4497 253.2447 407.0929
## 84 0.3887588 40.82454    0       1     0  64.3482 226.8245 331.5650
##        wtrd     wfir      wser   wmfg   wfed   wsta   wloc        mix
## 8  199.2377 356.1254  206.2816 235.05 416.49 370.62 297.13 0.23495702
## 58 220.9747 307.6923  172.6281 278.70 432.81 370.81 259.78 0.16725978
## 70 200.2213 337.9095  262.9849 278.82 441.49 381.46 304.73 0.12516961
```

```
## 84 167.3726 264.4231 2177.0681 247.72 381.33 367.25 300.13 0.04968944
##       pctymle
## 8  0.07430546
## 58 0.08356434
## 70 0.08183564
## 84 0.07008217
```

```
df[df$pctmin80 <= 3, ] #county:9,11,87,115,189
```

```
##     X county year    crmrte   prbarr   prbconv  prbpris avgsen      polpc
## 5   5      9   87 0.0106232 0.518219 0.4765630 0.442623   8.22 0.00086018
## 6   6     11   87 0.0146067 0.524664 0.0683761 0.500000  13.00 0.00288203
## 39 39     87   87 0.0286781 0.215108 0.5484950 0.341463  11.11 0.00169180
## 50 50    113   87 0.0142071 0.179878 0.2203390 0.461538   6.39 0.00151600
## 51 51    115   87 0.0055332 1.090910 1.5000000 0.500000  20.70 0.00905433
## 86 86    189   87 0.0313130 0.161381 0.3005780 0.288462  12.27 0.00227837
##      density    taxpc west central urban pctmin80     wcon     wtuc
## 5  0.5469484 28.05474    1       0     0  1.79619 292.3077 377.3126
## 6  0.6113361 35.22974    1       0     0  1.54070 250.4006 401.3378
## 39 0.8648649 32.82694    1       0     0  2.69921 250.7271 437.9284
## 50 0.4487427 40.80142    1       0     0  2.39865 244.7552 412.0879
## 51 0.3858093 28.19310    1       0     0  1.28365 204.2206 503.2351
## 86 1.1019108 31.33022    1       0     0  1.98320 238.3758 354.2510
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 5  206.8215 289.3125 215.1933 290.89 377.35 367.23 342.82 0.06008584
## 6  187.8255 258.5650 237.1507 258.60 391.48 325.71 275.22 0.31952664
## 39 196.5065 288.4615 243.4706 588.99 488.76 346.32 294.21 0.09794629
## 50 154.2090 256.4102 265.1301 291.10 337.09 374.11 246.65 0.05128205
## 51 217.4908 342.4658 245.2061 448.42 442.20 340.39 386.12 0.10000000
## 86 180.9359 369.4332 253.2281 304.72 427.84 451.79 297.19 0.05719921
##       pctymle
## 5  0.07069755
## 6  0.09891920
## 39 0.07600891
## 50 0.09171820
## 51 0.07253495
## 86 0.15092644
```

```
df[df$pctmin80 >=55 | df$pctmin80<= 10, ]
```

```
##     X county year    crmrte   prbarr   prbconv  prbpris avgsen      polpc
## 2   2      3   87 0.0152532 0.132029 1.4814800 0.450000   6.35 0.00074588
## 3   3      5   87 0.0129603 0.444444 0.2678570 0.600000   6.76 0.00123431
## 5   5      9   87 0.0106232 0.518219 0.4765630 0.442623   8.22 0.00086018
## 6   6     11   87 0.0146067 0.524664 0.0683761 0.500000  13.00 0.00288203
## 8   8     15   87 0.0202814 0.392111 0.7692310 0.507692  10.64 0.00103525
## 11 11     21   87 0.0437355 0.234760 0.3347010 0.429072  10.62 0.00182958
## 12 12     23   87 0.0269836 0.289121 0.4037800 0.365957   7.07 0.00146111
## 14 14     27   87 0.0382489 0.268018 0.3529410 0.321429  11.69 0.00145013
## 18 18     39   87 0.0119154 0.308333 0.9729730 0.291667  11.58 0.00119154
## 25 25     55   87 0.0790163 0.224628 0.2078310 0.304348  13.57 0.00400962
## 39 39     87   87 0.0286781 0.215108 0.5484950 0.341463  11.11 0.00169180
## 40 40     89   87 0.0283836 0.296646 0.3869260 0.415525   5.51 0.00126447
## 41 41     91   87 0.0384263 0.343074 0.5899050 0.454545   8.79 0.00162189
## 42 42     93   87 0.0362222 0.338902 0.5739440 0.484663   5.45 0.00142641
```

```
## 48 48    109   87 0.0230995 0.162769 0.7816090 0.411765   9.12 0.00108043
## 49 49    111   87 0.0183048 0.202112 0.5223880 0.542857  11.06 0.00118719
## 50 50    113   87 0.0142071 0.179878 0.2203390 0.461538   6.39 0.00151600
## 51 51    115   87 0.0055332 1.090910 1.5000000 0.500000  20.70 0.00905433
## 58 58    131   87 0.0189848 0.689024 0.4955750 0.401786   9.97 0.00121549
## 68 68    151   87 0.0264557 0.299198 0.3601530 0.340426  12.57 0.00132430
## 70 70    155   87 0.0312279 0.408200 0.5598230 0.386544   8.71 0.00145925
## 77 77    169   87 0.0121033 0.343387 0.7229730 0.448598  12.36 0.00109520
## 78 78    171   87 0.0243954 0.175649 0.9090910 0.458333   8.67 0.00157442
## 80 80    175   87 0.0164932 0.350348 0.4105960 0.387097   7.31 0.00164549
## 84 84    185   87 0.0108703 0.195266 2.1212101 0.442857   5.38 0.00122210
## 86 86    189   87 0.0313130 0.161381 0.3005780 0.288462  12.27 0.00227837
## 88 88    193   87 0.0235277 0.266055 0.5888590 0.423423   5.86 0.00117887
## 90 90    197   87 0.0141928 0.207595 1.1829300 0.360825  12.23 0.00118573
##      density     taxpc west central urban pctmin80     wcon     wtuc
## 2  1.0463320  26.89208    0       1     0  7.91632 255.1020 376.2542
## 3  0.4127659  34.81605    1       0     0  3.16053 226.9470 372.2084
## 5  0.5469484  28.05474    1       0     0  1.79619 292.3077 377.3126
## 6  0.6113361  35.22974    1       0     0  1.54070 250.4006 401.3378
## 8  0.3009986  34.00304    0       0     0 61.05400 253.5926 353.2182
## 11 2.6024280  52.62629    1       0     1  9.62444 313.4738 433.8580
## 12 1.5119047  29.08280    1       0     0  7.93198 284.9890 400.7398
## 14 1.4989384  43.06339    1       0     0  6.45795 292.7350 428.5023
## 18 0.4623894  27.27564    1       0     0  3.94549 277.5575 390.1895
## 25 0.5115089 119.76145    0       0     0  6.49622 309.5238 445.2762
## 39 0.8648649  32.82694    1       0     0  2.69921 250.7271 437.9284
## 40 1.8155080  32.48096    1       0     0  4.31205 293.8034 501.9174
## 41 0.6713483  31.85298    0       0     0 56.80850 289.2227 431.9210
## 42 0.6112532  27.47967    0       0     0 58.08270 231.1391 187.6173
## 48 1.5939597  27.32160    0       1     0  9.68564 270.0951 374.0296
## 49 0.8306636  29.58239    1       0     0  5.52725 245.1514 571.5438
## 50 0.4487427  40.80142    1       0     0  2.39865 244.7552 412.0879
## 51 0.3858093  28.19310    1       0     0  1.28365 204.2206 503.2351
## 58 0.4126394  37.70006    0       0     0 61.94210 225.8647 375.2345
## 68 1.2737643  25.69287    0       1     0  6.97606 340.4792 415.1317
## 70 1.1296101  31.37446    0       0     0 61.44970 253.2447 407.0929
## 77 0.8008850  37.70785    0       1     0  7.67092 345.6391 588.6970
## 78 1.1521336  31.15306    1       0     0  5.64349 385.3424 412.5212
## 80 0.6878307  46.41461    1       0     0  6.03408 253.3395 402.5045
## 84 0.3887588  40.82454    0       1     0 64.34820 226.8245 331.5650
## 86 1.1019108  31.33022    1       0     0  1.98320 238.3758 354.2510
## 88 0.8138298  28.51783    1       0     0  5.93109 285.8289 480.1948
## 90 0.8898810  25.95258    1       0     0  5.46081 314.1660 341.8803
##        wtrd     wfir      wser   wmfg   wfed   wsta   wloc        mix
## 2  196.0101 258.5650  192.3077 300.38 409.83 362.96 301.47 0.03022670
## 3  229.3209 305.9441  209.6972 237.65 358.98 331.53 281.37 0.46511629
## 5  206.8215 289.3125  215.1933 290.89 377.35 367.23 342.82 0.06008584
## 6  187.8255 258.5650  237.1507 258.60 391.48 325.71 275.22 0.31952664
## 8  199.2377 356.1254  206.2816 235.05 416.49 370.62 297.13 0.23495702
## 11 228.1740 363.7671  318.3635 378.90 496.13 381.30 335.36 0.06289308
## 12 213.1840 325.0271  315.0242 327.45 463.67 361.21 308.32 0.08400646
## 14 213.4620 316.9436  292.3517 309.27 450.28 283.60 310.85 0.08957055
## 18 180.0634 295.8580  246.0152 270.78 397.33 313.06 239.17 0.13744076
## 25 189.7436 284.5933  221.3903 319.21 338.91 361.68 326.08 0.08437271
```

```
## 39 196.5065 288.4615  243.4706 588.99 488.76 346.32 294.21 0.09794629
## 40 214.2170 334.1840  258.3238 443.70 496.28 308.01 305.71 0.09090909
## 41 198.0064 253.3395  266.4674 316.19 430.64 314.75 297.34 0.09869203
## 42 161.3771 254.5249  182.0196 298.78 471.09 400.11 292.98 0.18528996
## 48 226.4881 335.4204  230.3086 320.20 453.61 389.34 302.93 0.05424063
## 49 179.5039 327.9666  251.4270 260.35 384.15 354.41 304.91 0.06763285
## 50 154.2090 256.4102  265.1301 291.10 337.09 374.11 246.65 0.05128205
## 51 217.4908 342.4658  245.2061 448.42 442.20 340.39 386.12 0.10000000
## 58 220.9747 307.6923  172.6281 278.70 432.81 370.81 259.78 0.16725978
## 68 218.7198 322.4150  278.1124 294.37 474.26 298.66 294.72 0.07342084
## 70 200.2213 337.9095  262.9849 278.82 441.49 381.46 304.73 0.12516961
## 77 190.5555 331.5650  206.6858 306.42 406.62 348.37 306.68 0.13720317
## 78 224.7224 339.9547  253.6207 288.32 452.53 341.77 324.06 0.08207343
## 80 172.6453 317.3394  257.8734 627.02 344.06 357.69 298.33 0.10230179
## 84 167.3726 264.4231 2177.0681 247.72 381.33 367.25 300.13 0.04968944
## 86 180.9359 369.4332  253.2281 304.72 427.84 451.79 297.19 0.05719921
## 88 268.3836 365.0196  295.9352 295.63 468.26 337.88 348.74 0.11050157
## 90 182.8020 348.1432  212.8205 322.92 391.72 385.65 306.85 0.06756757
##       pctymle
## 2  0.08260694
## 3  0.07211538
## 5  0.07069755
## 6  0.09891920
## 8  0.07430546
## 11 0.07219726
## 12 0.08397806
## 14 0.08353864
## 18 0.06973287
## 25 0.07613807
## 39 0.07600891
## 40 0.06795343
## 41 0.08729226
## 42 0.08633697
## 48 0.08050946
## 49 0.06861899
## 50 0.09171820
## 51 0.07253495
## 58 0.08356434
## 68 0.07763254
## 70 0.08183564
## 77 0.08280677
## 78 0.07735254
## 80 0.08436658
## 84 0.07008217
## 86 0.15092644
## 88 0.07819394
## 90 0.07419893
```

```
df[df$urban ==1, ]  #county:21,51,63,67,81,119,129,183
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 11 11     21   87 0.0437355 0.234760 0.334701 0.429072  10.62 0.00182958
## 23 23     51   87 0.0883849 0.155248 0.259833 0.407628  11.93 0.00190802
## 29 29     63   87 0.0706599 0.133225 0.459216 0.363636  11.51 0.00237609
## 31 31     67   87 0.0614177 0.217215 0.248276 0.488426  10.57 0.00217747
```

```
## 36 36     81   87 0.0604498 0.300215 0.203725 0.431020  14.42 0.00243562
## 53 53    119   87 0.0989659 0.149094 0.347800 0.486183   7.13 0.00223135
## 57 57    129   87 0.0834982 0.236601 0.393413 0.415158   9.57 0.00255849
## 83 83    183   87 0.0568423 0.204216 0.381908 0.367347  12.15 0.00212751
##     density    taxpc west central urban pctmin80     wcon     wtuc
## 11 2.602428 52.62629    1       0     1  9.62444 313.4738 433.8580
## 23 3.934551 35.69936    0       0     1 37.77920 283.6695 412.4720
## 29 5.674497 50.19918    0       1     1 38.22300 349.3267 548.9865
## 31 6.427185 45.89987    0       1     1 25.65460 206.5527 379.5547
## 36 5.124424 44.21059    0       1     1 26.39410 404.8150 489.3144
## 53 8.827652 75.67243    0       1     1 28.54600 436.7666 548.3239
## 57 6.286487 67.67963    0       0     1 23.04410 315.5760 392.0999
## 83 4.388759 48.76492    0       1     1 23.44360 360.9549 528.5593
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 11 228.1740 363.7671 318.3635 378.90 496.13 381.30 335.36 0.06289308
## 23 213.7524 324.8357 257.3344 441.72 433.94 367.34 333.71 0.10474319
## 29 238.9154 435.1107 391.3081 646.85 563.77 415.51 362.58 0.07585382
## 31 189.1807 278.0352 230.4981 275.72 419.07 400.59 313.55 0.21999694
## 36 308.5762 420.8864 305.1543 448.86 563.72 426.47 333.64 0.10255422
## 53 354.6761 509.4655 354.3007 494.30 568.40 329.22 379.77 0.16869897
## 57 220.4530 363.2880 292.7027 464.49 548.49 421.36 319.08 0.07871422
## 83 306.0835 430.0697 348.2754 444.45 597.95 453.08 362.99 0.08527010
##       pctymle
## 11 0.07219726
## 23 0.14223780
## 29 0.09468981
## 31 0.07647973
## 36 0.08310476
## 53 0.07916495
## 57 0.08109921
## 83 0.09935585
```

```
df[df$west ==1 | df$urban ==1 | df$central ==1, ]  #57 total
```

```
##     X county year    crmrte   prbarr   prbconv  prbpris avgsen      polpc
## 1   1      1   87 0.0356036 0.298270 0.5275960 0.436170   6.71 0.00182786
## 2   2      3   87 0.0152532 0.132029 1.4814800 0.450000   6.35 0.00074588
## 3   3      5   87 0.0129603 0.444444 0.2678570 0.600000   6.76 0.00123431
## 4   4      7   87 0.0267532 0.364760 0.5254240 0.435484   7.14 0.00152994
## 5   5      9   87 0.0106232 0.518219 0.4765630 0.442623   8.22 0.00086018
## 6   6     11   87 0.0146067 0.524664 0.0683761 0.500000  13.00 0.00288203
## 11 11     21   87 0.0437355 0.234760 0.3347010 0.429072  10.62 0.00182958
## 12 12     23   87 0.0269836 0.289121 0.4037800 0.365957   7.07 0.00146111
## 13 13     25   87 0.0302542 0.323548 0.4067800 0.492647   8.01 0.00197140
## 14 14     27   87 0.0382489 0.268018 0.3529410 0.321429  11.69 0.00145013
## 15 15     33   87 0.0159189 0.270950 0.5154640 0.480000   7.32 0.00075593
## 16 16     35   87 0.0408569 0.266026 0.3253010 0.370370  10.06 0.00189444
## 17 17     37   87 0.0226017 0.321867 0.3854960 0.316832   8.69 0.00130501
## 18 18     39   87 0.0119154 0.308333 0.9729730 0.291667  11.58 0.00119154
## 20 20     45   87 0.0362807 0.202627 0.4505670 0.474820   8.96 0.00121531
## 23 23     51   87 0.0883849 0.155248 0.2598330 0.407628  11.93 0.00190802
## 26 26     57   87 0.0300216 0.222002 0.7369090 0.320624  10.47 0.00136191
## 27 27     59   87 0.0233327 0.227753 0.6225170 0.425532   6.50 0.00119655
## 29 29     63   87 0.0706599 0.133225 0.4592160 0.363636  11.51 0.00237609
## 31 31     67   87 0.0614177 0.217215 0.2482760 0.488426  10.57 0.00217747
```

```
## 32 32     69   87 0.0173158 0.283505 0.7393940 0.418033   9.10 0.00107108
## 33 33     71   87 0.0544061 0.243119 0.2295900 0.379175  11.29 0.00207028
## 34 34     77   87 0.0441957 0.190876 0.5283020 0.488095   9.60 0.00246711
## 36 36     81   87 0.0604498 0.300215 0.2037250 0.431020  14.42 0.00243562
## 39 39     87   87 0.0286781 0.215108 0.5484950 0.341463  11.11 0.00169180
## 40 40     89   87 0.0283836 0.296646 0.3869260 0.415525   5.51 0.00126447
## 43 43     97   87 0.0334506 0.302231 0.5950780 0.409774   6.62 0.00152665
## 44 44     99   87 0.0171865 0.153846 1.2343800 0.556962  14.75 0.00185912
## 46 46    105   87 0.0514152 0.381400 0.3842360 0.381410   8.81 0.00195614
## 48 48    109   87 0.0230995 0.162769 0.7816090 0.411765   9.12 0.00108043
## 49 49    111   87 0.0183048 0.202112 0.5223880 0.542857  11.06 0.00118719
## 50 50    113   87 0.0142071 0.179878 0.2203390 0.461538   6.39 0.00151600
## 51 51    115   87 0.0055332 1.090910 1.5000000 0.500000  20.70 0.00905433
## 53 53    119   87 0.0989659 0.149094 0.3478000 0.486183   7.13 0.00223135
## 54 54    123   87 0.0300184 0.487430 0.2263610 0.443038   6.49 0.00176086
## 55 55    125   87 0.0266287 0.269043 0.4389610 0.396450   7.36 0.00200971
## 57 57    129   87 0.0834982 0.236601 0.3934130 0.415158   9.57 0.00255849
## 60 60    135   87 0.0628972 0.092770 0.4777330 0.385593  11.92 0.00233871
## 65 65    145   87 0.0299856 0.354733 0.3404910 0.594595   8.47 0.00137040
## 67 67    149   87 0.0164987 0.271967 1.0153800 0.227273  14.62 0.00151871
## 68 68    151   87 0.0264557 0.299198 0.3601530 0.340426  12.57 0.00132430
## 69 69    153   87 0.0317563 0.345368 0.5207100 0.458333  11.33 0.00138447
## 71 71    157   87 0.0305908 0.278287 0.4436810 0.377709   7.48 0.00191777
## 72 72    159   87 0.0362330 0.243590 0.4929400 0.476563   8.64 0.00158619
## 73 73    161   87 0.0200070 0.482425 0.5081970 0.451613   7.98 0.00124824
## 76 76    167   87 0.0238285 0.362270 0.3225810 0.371429  10.48 0.00155144
## 77 77    169   87 0.0121033 0.343387 0.7229730 0.448598  12.36 0.00109520
## 78 78    171   87 0.0243954 0.175649 0.9090910 0.458333   8.67 0.00157442
## 79 79    173   87 0.0139937 0.530435 0.3278690 0.150000   6.64 0.00316379
## 80 80    175   87 0.0164932 0.350348 0.4105960 0.387097   7.31 0.00164549
## 81 81    179   87 0.0318720 0.377543 0.3286640 0.426230   9.90 0.00147820
## 82 82    181   87 0.0729479 0.182590 0.3430230 0.548023   7.06 0.00172948
## 83 83    183   87 0.0568423 0.204216 0.3819080 0.367347  12.15 0.00212751
## 84 84    185   87 0.0108703 0.195266 2.1212101 0.442857   5.38 0.00122210
## 86 86    189   87 0.0313130 0.161381 0.3005780 0.288462  12.27 0.00227837
## 88 88    193   87 0.0235277 0.266055 0.5888590 0.423423   5.86 0.00117887
## 90 90    197   87 0.0141928 0.207595 1.1829300 0.360825  12.23 0.00118573
##      density    taxpc west central urban pctmin80     wcon     wtuc
## 1  2.4226327 30.99368    0       1     0 20.21870 281.4259 408.7245
## 2  1.0463320 26.89208    0       1     0  7.91632 255.1020 376.2542
## 3  0.4127659 34.81605    1       0     0  3.16053 226.9470 372.2084
## 4  0.4915572 42.94759    0       1     0 47.91610 375.2345 397.6901
## 5  0.5469484 28.05474    1       0     0  1.79619 292.3077 377.3126
## 6  0.6113361 35.22974    1       0     0  1.54070 250.4006 401.3378
## 11 2.6024280 52.62629    1       0     1  9.62444 313.4738 433.8580
## 12 1.5119047 29.08280    1       0     0  7.93198 284.9890 400.7398
## 13 2.5741758 33.03621    0       1     0 15.09980 315.7290 384.6154
## 14 1.4989384 43.06339    1       0     0  6.45795 292.7350 428.5023
## 15 0.5257009 27.38110    0       1     0 43.91690 218.8868 286.4157
## 16 2.9242425 56.86211    0       1     0 10.08380 346.5888 469.2220
## 17 0.5127119 34.70248    0       1     0 27.80790 307.2780 462.4408
## 18 0.4623894 27.27564    1       0     0  3.94549 277.5575 390.1895
## 20 1.8440171 30.84900    0       1     0 21.74990 318.3808 403.0558
## 23 3.9345510 35.69936    0       0     1 37.77920 283.6695 412.4720
```

```
## 26 2.2518249 28.59199    0       1     0 10.99570 324.6088 418.6380
## 27 1.0262172 41.07194    0       1     0 10.87040 280.8989 335.4590
## 29 5.6744967 50.19918    0       1     1 38.22300 349.3267 548.9865
## 31 6.4271846 45.89987    0       1     1 25.65460 206.5527 379.5547
## 32 0.7125506 35.37642    0       1     0 42.32240 372.1622 508.2035
## 33 4.8347340 31.53658    0       1     0 13.31500 291.4508 595.3719
## 34 0.7172285 29.70588    0       1     0 45.45130 254.7925 391.7379
## 36 5.1244240 44.21059    0       1     1 26.39410 404.8150 489.3144
## 39 0.8648649 32.82694    1       0     0  2.69921 250.7271 437.9284
## 40 1.8155080 32.48096    1       0     0  4.31205 293.8034 501.9174
## 43 1.5662020 29.97040    0       1     0 18.40120 333.0927 421.6986
## 44 0.5478615 39.57348    1       0     0 14.28460 259.7841 417.2099
## 46 1.5984555 67.84798    0       1     0 23.54980 314.0595 401.1326
## 48 1.5939597 27.32160    0       1     0  9.68564 270.0951 374.0296
## 49 0.8306636 29.58239    1       0     0  5.52725 245.1514 571.5438
## 50 0.4487427 40.80142    1       0     0  2.39865 244.7552 412.0879
## 51 0.3858093 28.19310    1       0     0  1.28365 204.2206 503.2351
## 53 8.8276520 75.67243    0       1     1 28.54600 436.7666 548.3239
## 54 0.4938776 38.45734    0       1     0 25.96020 345.1677 396.2704
## 55 0.8202568 48.15414    0       1     0 22.58190 261.5648 457.5350
## 57 6.2864866 67.67963    0       0     1 23.04410 315.5760 392.0999
## 60 2.1575000 35.99248    0       1     0 19.52630 316.0858 420.8830
## 65 0.7788945 44.64758    0       1     0 32.95160 305.3435 538.8488
## 67 0.6092437 29.03402    1       0     0 10.00460 223.6136 437.0629
## 68 1.2737643 25.69287    0       1     0  6.97606 340.4792 415.1317
## 69 0.9622641 37.22833    0       1     0 28.52840 262.6642 294.6650
## 71 1.5096661 39.16965    0       1     0 21.60360 317.5345 409.7771
## 72 2.0192678 27.76489    0       1     0 16.99130 334.1035 475.3228
## 73 1.0052817 31.34530    1       0     0 13.03660 275.4970 402.5045
## 76 1.2752526 35.09686    0       1     0 12.57910 293.5538 419.0362
## 77 0.8008850 37.70785    0       1     0  7.67092 345.6391 588.6970
## 78 1.1521336 31.15306    1       0     0  5.64349 385.3424 412.5212
## 79 0.2034221 37.72702    1       0     0 25.39140 231.6960 213.6752
## 80 0.6878307 46.41461    1       0     0  6.03408 253.3395 402.5045
## 81 1.2816901 38.44067    0       1     0 17.88580 314.4250 361.1018
## 82 1.5702811 27.59179    0       1     0 44.62830 244.8362 365.4716
## 83 4.3887587 48.76492    0       1     1 23.44360 360.9549 528.5593
## 84 0.3887588 40.82454    0       1     0 64.34820 226.8245 331.5650
## 86 1.1019108 31.33022    1       0     0  1.98320 238.3758 354.2510
## 88 0.8138298 28.51783    1       0     0  5.93109 285.8289 480.1948
## 90 0.8898810 25.95258    1       0     0  5.46081 314.1660 341.8803
##        wtrd     wfir      wser   wmfg   wfed   wsta   wloc        mix
## 1  221.2701 453.1722  274.1775 334.54 477.58 292.09 311.91 0.08016878
## 2  196.0101 258.5650  192.3077 300.38 409.83 362.96 301.47 0.03022670
## 3  229.3209 305.9441  209.6972 237.65 358.98 331.53 281.37 0.46511629
## 4  191.1720 281.0651  256.7214 281.80 412.15 328.27 299.03 0.27362204
## 5  206.8215 289.3125  215.1933 290.89 377.35 367.23 342.82 0.06008584
## 6  187.8255 258.5650  237.1507 258.60 391.48 325.71 275.22 0.31952664
## 11 228.1740 363.7671  318.3635 378.90 496.13 381.30 335.36 0.06289308
## 12 213.1840 325.0271  315.0242 327.45 463.67 361.21 308.32 0.08400646
## 13 220.5897 358.6328  318.0335 355.59 486.36 411.08 357.44 0.08848315
## 14 213.4620 316.9436  292.3517 309.27 450.28 283.60 310.85 0.08957055
## 15 195.1995 368.2488  172.4733 324.45 357.16 407.54 268.44 0.15112540
## 16 277.2925 359.3117  296.8491 341.32 525.51 360.68 333.32 0.18122160
```

```
## 17 227.7858 305.6546  231.3615 321.90 460.62 393.29 321.53 0.08100930
## 18 180.0634 295.8580  246.0152 270.78 397.33 313.06 239.17 0.13744076
## 20 248.7759 301.8632  293.1148 367.42 463.37 352.35 320.82 0.08594864
## 23 213.7524 324.8357  257.3344 441.72 433.94 367.34 333.71 0.10474319
## 26 225.5296 338.5699  261.3512 324.67 496.07 325.15 314.01 0.07497714
## 27 210.3365 317.3077  316.6645 316.57 428.33 388.92 307.25 0.11616162
## 29 238.9154 435.1107  391.3081 646.85 563.77 415.51 362.58 0.07585382
## 31 189.1807 278.0352  230.4981 275.72 419.07 400.59 313.55 0.21999694
## 32 266.7794 466.0016  347.6609 560.78 516.05 381.03 388.09 0.07977737
## 33 240.3673 348.0254  295.2301 358.95 509.43 359.11 339.58 0.10186080
## 34 197.6995 311.3553  199.4458 360.21 512.30 369.75 329.34 0.17905165
## 36 308.5762 420.8864  305.1543 448.86 563.72 426.47 333.64 0.10255422
## 39 196.5065 288.4615  243.4706 588.99 488.76 346.32 294.21 0.09794629
## 40 214.2170 334.1840  258.3238 443.70 496.28 308.01 305.71 0.09090909
## 43 222.9622 338.7534  282.9701 346.51 480.14 351.17 330.93 0.08431085
## 44 168.2692 301.5734  247.6291 258.99 442.76 387.02 291.44 0.01960784
## 46 237.8523 323.9486  274.8686 352.08 463.11 267.78 343.13 0.10368066
## 48 226.4881 335.4204  230.3086 320.20 453.61 389.34 302.93 0.05424063
## 49 179.5039 327.9666  251.4270 260.35 384.15 354.41 304.91 0.06763285
## 50 154.2090 256.4102  265.1301 291.10 337.09 374.11 246.65 0.05128205
## 51 217.4908 342.4658  245.2061 448.42 442.20 340.39 386.12 0.10000000
## 53 354.6761 509.4655  354.3007 494.30 568.40 329.22 379.77 0.16869897
## 54 193.0723 272.2941  242.4605 277.34 345.09 328.00 325.77 0.31135532
## 55 199.5847 299.7388  320.1325 277.68 447.87 361.24 300.77 0.07110778
## 57 220.4530 363.2880  292.7027 464.49 548.49 421.36 319.08 0.07871422
## 60 179.1289 389.8522  292.2253 388.75 509.95 499.59 333.05 0.05091770
## 65 200.7432 302.1978  219.6343 334.65 414.63 298.78 295.00 0.22533333
## 67 188.7683 353.2182  210.4415 289.43 421.34 342.92 301.23 0.11682243
## 68 218.7198 322.4150  278.1124 294.37 474.26 298.66 294.72 0.07342084
## 69 192.8994 267.3797  237.1590 301.29 467.08 350.24 302.25 0.16323297
## 71 192.4181 302.6162  245.7938 418.48 478.48 342.13 318.07 0.12467756
## 72 260.2710 329.5464  265.4315 374.41 491.16 346.81 351.74 0.09146758
## 73 201.5675 279.2492  251.4202 334.92 450.28 277.60 302.83 0.11024390
## 76 221.0995 326.8283  253.0096 351.09 463.69 312.53 311.47 0.10925926
## 77 190.5555 331.5650  206.6858 306.42 406.62 348.37 306.68 0.13720317
## 78 224.7224 339.9547  253.6207 288.32 452.53 341.77 324.06 0.08207343
## 79 175.1604 267.0940  204.3792 193.01 334.44 414.68 304.32 0.41975310
## 80 172.6453 317.3394  257.8734 627.02 344.06 357.69 298.33 0.10230179
## 81 241.0034 342.6819  270.4866 349.63 459.32 387.16 376.45 0.13481072
## 82 279.2273 325.0271  213.5822 290.69 453.53 317.23 286.45 0.10003893
## 83 306.0835 430.0697  348.2754 444.45 597.95 453.08 362.99 0.08527010
## 84 167.3726 264.4231 2177.0681 247.72 381.33 367.25 300.13 0.04968944
## 86 180.9359 369.4332  253.2281 304.72 427.84 451.79 297.19 0.05719921
## 88 268.3836 365.0196  295.9352 295.63 468.26 337.88 348.74 0.11050157
## 90 182.8020 348.1432  212.8205 322.92 391.72 385.65 306.85 0.06756757
##       pctymle
## 1  0.07787097
## 2  0.08260694
## 3  0.07211538
## 4  0.07353726
## 5  0.07069755
## 6  0.09891920
## 11 0.07219726
## 12 0.08397806
```

```
## 13 0.07641540
## 14 0.08353864
## 15 0.08005202
## 16 0.07891140
## 17 0.07154077
## 18 0.06973287
## 20 0.08013537
## 23 0.14223780
## 26 0.07873024
## 27 0.07756928
## 29 0.09468981
## 31 0.07647973
## 32 0.08181948
## 33 0.07939028
## 34 0.08345764
## 36 0.08310476
## 39 0.07600891
## 40 0.06795343
## 43 0.07655433
## 44 0.12894706
## 46 0.07365920
## 48 0.08050946
## 49 0.06861899
## 50 0.09171820
## 51 0.07253495
## 53 0.07916495
## 54 0.08119376
## 55 0.07415335
## 57 0.08109921
## 60 0.13302912
## 65 0.07275662
## 67 0.06215772
## 68 0.07763254
## 69 0.07570874
## 71 0.07771273
## 72 0.07705218
## 73 0.07362188
## 76 0.07687439
## 77 0.08280677
## 78 0.07735254
## 79 0.07462687
## 80 0.08436658
## 81 0.08703093
## 82 0.07977433
## 83 0.09935585
## 84 0.07008217
## 86 0.15092644
## 88 0.07819394
## 90 0.07419893
```

```
df[df$west ==0 & df$urban ==0 & df$central ==0, ]  #county:13,15,17,19,41,47,49,53,55,61,65,79,83,85,91
```

```
##     X county year    crmrte   prbarr  prbconv  prbpris avgsen      polpc
## 7   7     13   87 0.0296409 0.365004 0.520607 0.420833  10.55 0.00133771
## 8   8     15   87 0.0202814 0.392111 0.769231 0.507692  10.64 0.00103525
```

```
## 9   9     17   87 0.0304289 0.251599 0.436441 0.436893   7.32 0.00129761
## 10 10     19   87 0.0221567 0.162860 1.225610 0.333333  10.34 0.00202425
## 19 19     41   87 0.0257713 0.307246 0.452830 0.520833  17.41 0.00149399
## 21 21     47   87 0.0313623 0.182927 0.763333 0.270742   7.79 0.00128127
## 22 22     49   87 0.0374979 0.264420 0.371879 0.356890   8.70 0.00148532
## 24 24     53   87 0.0140655 0.303191 0.140351 0.250000  11.96 0.00112225
## 25 25     55   87 0.0790163 0.224628 0.207831 0.304348  13.57 0.00400962
## 28 28     61   87 0.0233677 0.398119 0.493438 0.361702   8.77 0.00141622
## 30 30     65   87 0.0658801 0.287330 0.154452 0.403922   9.84 0.00185739
## 35 35     79   87 0.0156759 0.411538 0.308411 0.454545   6.19 0.00102496
## 37 37     83   87 0.0315752 0.456394 0.457210 0.410256   7.85 0.00138532
## 38 38     85   87 0.0490712 0.146132 0.549020 0.428571   8.78 0.00143730
## 41 41     91   87 0.0384263 0.343074 0.589905 0.454545   8.79 0.00162189
## 42 42     93   87 0.0362222 0.338902 0.573944 0.484663   5.45 0.00142641
## 45 45    101   87 0.0409403 0.149936 0.571429 0.473881   9.65 0.00140045
## 47 47    107   87 0.0497552 0.212895 0.364353 0.450216   8.47 0.00168747
## 52 52    117   87 0.0268723 0.370474 0.793233 0.236967  11.83 0.00119765
## 56 56    127   87 0.0291496 0.179616 1.358140 0.335616  15.99 0.00158289
## 58 58    131   87 0.0189848 0.689024 0.495575 0.401786   9.97 0.00121549
## 59 59    133   87 0.0551287 0.266960 0.271947 0.334951   8.99 0.00154457
## 61 61    137   87 0.0126662 0.207143 1.068970 0.322581   6.18 0.00081426
## 62 62    139   87 0.0243470 0.522696 0.289474 0.345455  14.22 0.00167448
## 63 63    141   87 0.0314610 0.238636 0.412698 0.487179  13.18 0.00127115
## 64 64    143   87 0.0265806 0.317857 0.314607 0.250000   9.36 0.00085438
## 66 66    147   87 0.0551686 0.221542 0.426778 0.443137   7.73 0.00218874
## 70 70    155   87 0.0312279 0.408200 0.559823 0.386544   8.71 0.00145925
## 74 74    163   87 0.0215728 0.310987 0.401198 0.455224  11.25 0.00136587
## 75 75    165   87 0.0508341 0.340679 0.468531 0.432836   7.42 0.00151382
## 85 85    187   87 0.0345231 0.332669 0.443114 0.432432   6.98 0.00116911
## 87 87    191   87 0.0458895 0.172257 0.450000 0.421053   9.59 0.00122733
## 89 89    195   87 0.0313973 0.201397 1.670520 0.470588  13.02 0.00445923
##      density     taxpc west central urban pctmin80     wcon     wtuc
## 7  0.5169492  30.69649    0       0     0 32.17940 238.3064 366.3004
## 8  0.3009986  34.00304    0       0     0 61.05400 253.5926 353.2182
## 9  0.3503982  34.96204    0       0     0 40.38900 193.6432 346.6011
## 10 0.5767442  61.15251    0       0     0 24.31170 260.1381 613.2261
## 19 0.7417582  41.76929    0       0     0 42.64210 256.4102 379.0005
## 21 0.5639659  32.66050    0       0     0 33.40320 367.8286 342.5724
## 22 1.1440799  39.23048    0       0     0 29.90720 292.8322 406.5041
## 24 0.5351562  50.38139    0       0     0 17.90960 266.4504 202.4292
## 25 0.5115089 119.76145    0       0     0  6.49622 309.5238 445.2762
## 28 0.5079365  32.59961    0       0     0 34.99950 244.2002 308.5150
## 30 1.1679842  30.62824    0       0     0 51.69320 362.1527 540.1061
## 35 0.6203008  37.50189    0       0     0 45.46750 223.9199 320.5128
## 37 0.7817680  41.08650    0       0     0 50.56250 269.1710 480.7692
## 38 1.0815308  27.16143    0       0     0 25.62870 245.8896 448.7180
## 41 0.6713483  31.85298    0       0     0 56.80850 289.2227 431.9210
## 42 0.6112532  27.47967    0       0     0 58.08270 231.1391 187.6173
## 45 0.9962264  34.87021    0       0     0 20.94790 245.6298 378.1590
## 47 1.5024875  53.17796    0       0     0 39.04780 279.4214 350.1326
## 52 0.5813449  38.81493    0       0     0 45.42550 242.3077 424.7286
## 56 1.3388889  32.02376    0       0     0 34.27990 290.9091 426.3901
## 58 0.4126394  37.70006    0       0     0 61.94210 225.8647 375.2345
## 59 1.6500655  27.46926    0       0     0 26.38140 264.0406 318.9644
```

```
## 61 0.3167155  44.29367    0       0     0 33.04480 299.4956 356.1254
## 62 1.3333334  29.49915    0       0     0 38.06130 278.0824 441.5954
## 63 0.3005714  35.97390    0       0     0 39.85150 257.9737 388.3136
## 64 0.4349594  31.22779    0       0     0 38.63590 250.8361 373.9316
## 66 1.5159818  36.18621    0       0     0 35.64110 295.1822 379.8962
## 70 1.1296101  31.37446    0       0     0 61.44970 253.2447 407.0929
## 74 0.5353749  34.01291    0       0     0 36.34950 217.1781 415.2824
## 75 1.0783699  38.74739    0       0     0 42.42560 309.1764 471.3424
## 85 0.4427711  34.71814    0       0     0 44.21320 264.4231 421.3483
## 87 1.7725632  32.74533    0       0     0 34.42830 318.0599 400.8570
## 89 1.7459893  53.66693    0       0     0 37.43110 315.1641 377.9356
##        wtrd     wfir     wser   wmfg   wfed   wsta   wloc        mix
## 7  205.5358 310.1737 259.3391 303.42 449.84 350.72 283.76 0.15237226
## 8  199.2377 356.1254 206.2816 235.05 416.49 370.62 297.13 0.23495702
## 9  202.9595 268.3363 208.2520 339.76 389.51 322.06 278.39 0.21818182
## 10 191.2452 290.5141 266.0934 567.06 403.15 258.33 299.44 0.05334728
## 19 238.5589 271.7391 232.5916 332.07 451.84 389.99 312.05 0.09872611
## 21 194.6777 352.6135 256.4102 355.83 426.56 313.71 313.84 0.12405757
## 22 212.4851 312.6954 304.3066 375.32 474.30 297.69 290.48 0.10692308
## 24 219.7802 305.9441 223.8502 250.42 371.79 383.72 296.64 0.08045977
## 25 189.7436 284.5933 221.3903 319.21 338.91 361.68 326.08 0.08437271
## 28 214.2203 327.1213 203.8864 266.58 414.84 333.46 308.05 0.16707318
## 30 209.0579 316.2955 216.4589 313.71 543.03 348.88 329.16 0.09364294
## 35 171.0329 334.4482 250.0000 218.30 353.31 385.19 323.08 0.28078818
## 37 200.3768 297.2437 239.2233 360.27 466.61 367.24 302.63 0.09106830
## 38 198.6254 248.1390 264.6729 310.86 437.03 397.54 327.37 0.14886613
## 41 198.0064 253.3395 266.4674 316.19 430.64 314.75 297.34 0.09869203
## 42 161.3771 254.5249 182.0196 298.78 471.09 400.11 292.98 0.18528996
## 45 203.1547 307.2585 232.1825 325.03 459.90 350.27 317.12 0.09447166
## 47 202.9344 333.9183 276.2629 350.63 496.75 332.12 324.97 0.11912815
## 52 167.0511 282.4099 229.0151 327.29 383.88 360.66 302.03 0.07485030
## 56 257.6008 441.1413 305.7612 329.87 508.61 380.30 329.71 0.06305506
## 58 220.9747 307.6923 172.6281 278.70 432.81 370.81 259.78 0.16725978
## 59 183.2609 265.1232 230.6581 258.25 326.10 329.43 301.64 0.12176319
## 61 170.8711 170.9402 250.8361 192.96 360.84 283.90 321.73 0.06870229
## 62 201.3569 302.6724 260.5459 264.25 452.59 348.05 285.47 0.34879407
## 63 179.7050 263.7363 196.1453 255.56 374.78 380.29 294.98 0.20000000
## 64 178.3723 234.5216 133.0431 157.41 380.97 388.43 253.66 0.21212120
## 66 205.4827 377.6978 274.6765 390.01 543.21 464.63 330.78 0.09345226
## 70 200.2213 337.9095 262.9849 278.82 441.49 381.46 304.73 0.12516961
## 74 196.5514 279.0347 238.6300 295.07 429.27 318.02 299.92 0.12108560
## 75 203.0162 294.4124 267.6852 374.25 442.38 381.14 285.50 0.09595300
## 85 170.5293 282.0513 183.1502 297.14 390.94 356.91 267.08 0.29048842
## 87 230.9888 320.0345 238.4958 295.26 334.55 375.45 327.62 0.08616445
## 89 246.0614 411.4330 296.8684 392.27 480.79 303.11 337.28 0.15612382
##       pctymle
## 7  0.07073344
## 8  0.07430546
## 9  0.07769163
## 10 0.07713232
## 19 0.06355526
## 21 0.07381025
## 22 0.12224479
## 24 0.08476309
```

```
## 25 0.07613807
## 28 0.07579902
## 30 0.07622346
## 35 0.08120255
## 37 0.07521905
## 38 0.10694169
## 41 0.08729226
## 42 0.08633697
## 45 0.07609449
## 47 0.07455523
## 52 0.07632116
## 56 0.07400288
## 58 0.08356434
## 59 0.24871162
## 61 0.07098370
## 62 0.09625563
## 63 0.07572646
## 64 0.06769374
## 66 0.11421655
## 70 0.08183564
## 74 0.07472797
## 75 0.08548180
## 85 0.07794872
## 87 0.08828809
## 89 0.07945071
```