DSC520_Pham_Week5Assignment

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```
# a. Using dplyr package

# import dplyr lib
library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union

# Load the ACS dataset
acs_df <- read.csv("C:\\R\\DSC520\\data\\acs-14-1yr-s0201.csv")
head(acs_df)

##               Id  Id2              County       State PopGroupID
## 1 0500000US01073 1073    Jefferson County     Alabama          1
## 2 0500000US04013 4013     Maricopa County     Arizona          1
## 3 0500000US04019 4019         Pima County     Arizona          1
## 4 0500000US06001 6001      Alameda County  California          1
## 5 0500000US06013 6013 Contra Costa County  California          1
## 6 0500000US06019 6019       Fresno County  California          1
##   POPGROUP.display.label RacesReported HSDegree BachDegree
## 1       Total population        660793     89.1       30.5
## 2       Total population       4087191     86.8       30.2
## 3       Total population       1004516     88.0       30.8
## 4       Total population       1610921     86.9       42.8
## 5       Total population       1111339     88.8       39.7
## 6       Total population        965974     73.6       19.7

# GroupBy: group the data by state and compute the mean
# and median of the HSDegree variable for each state
grouped_acs <- acs_df %>% group_by(State) %>%
  summarise(mean_HSDegree = mean(HSDegree, na.rm=T), median_HSDegree =
```

```
median(HSDegree, na.rm=T))
head(grouped_acs)
```

```
## # A tibble: 6 × 3
##   State          mean_HSDegree median_HSDegree
##   <chr>                  <dbl>           <dbl>
## 1 " Alabama"              89.1            89.1
## 2 " Arizona"              87.4            87.4
## 3 " California"           82.9            84.6
## 4 " Colorado"             91.1            92.4
## 5 " Connecticut"          89.5            89.5
## 6 " Delaware"             90.1            90.1
```

```
# Summarize: compute the mean and median of the HSDegree variable for the
entire dataset
summary_acs <- acs_df %>%
  summarise(mean_HSDegree = mean(HSDegree, na.rm=T), median_HSDegree =
median(HSDegree, na.rm=T))
summary_acs
```

```
##   mean_HSDegree median_HSDegree
## 1      87.63235            88.7
```

```
# Mutate: create a new variable that represents right-skewed or left-skewed
grouped_acs <- grouped_acs %>%
  mutate(Right.Skewed = mean_HSDegree > median_HSDegree,
         Left.Skewed = mean_HSDegree < median_HSDegree)
head(grouped_acs)
```

```
## # A tibble: 6 × 5
##   State          mean_HSDegree median_HSDegree Right.Skewed Left.Skewed
##   <chr>                  <dbl>           <dbl> <lgl>        <lgl>
## 1 " Alabama"              89.1            89.1 FALSE        FALSE
## 2 " Arizona"              87.4            87.4 FALSE        FALSE
## 3 " California"           82.9            84.6 FALSE        TRUE
## 4 " Colorado"             91.1            92.4 FALSE        TRUE
## 5 " Connecticut"          89.5            89.5 TRUE         FALSE
## 6 " Delaware"             90.1            90.1 FALSE        FALSE
```

```
# Filter: filter the data to include only rows where the racesreported is
greater than 1000000
filtered_acs <- acs_df %>%
  filter(RacesReported > 1000000)
head(filtered_acs)
```

```
##               Id  Id2              County       State PopGroupID
## 1 0500000US04013 4013     Maricopa County     Arizona          1
## 2 0500000US04019 4019         Pima County     Arizona          1
## 3 0500000US06001 6001      Alameda County  California          1
## 4 0500000US06013 6013 Contra Costa County  California          1
## 5 0500000US06037 6037  Los Angeles County  California          1
```

```
## 6 0500000US06059 6059       Orange County  California          1
##   POPGROUP.display.label RacesReported HSDegree BachDegree
## 1       Total population       4087191     86.8       30.2
## 2       Total population       1004516     88.0       30.8
## 3       Total population       1610921     86.9       42.8
## 4       Total population       1111339     88.8       39.7
## 5       Total population      10116705     77.5       30.3
## 6       Total population       3145515     84.6       38.0

# Select: select only the State and BachDegree variables
selected_acs <- acs_df %>%
  select(State, BachDegree)
head(selected_acs)

##         State BachDegree
## 1     Alabama       30.5
## 2     Arizona       30.2
## 3     Arizona       30.8
## 4  California       42.8
## 5  California       39.7
## 6  California       19.7

# Arrange: sort the data by the racesreported variable in descending order
arranged_acs <- acs_df %>%
  arrange(desc(RacesReported))
head(arranged_acs)

##               Id   Id2             County       State PopGroupID
## 1 0500000US06037  6037 Los Angeles County  California          1
## 2 0500000US17031 17031        Cook County    Illinois          1
## 3 0500000US48201 48201      Harris County       Texas          1
## 4 0500000US04013  4013    Maricopa County     Arizona          1
## 5 0500000US06073  6073   San Diego County  California          1
## 6 0500000US06059  6059      Orange County  California          1
##   POPGROUP.display.label RacesReported HSDegree BachDegree
## 1       Total population      10116705     77.5       30.3
## 2       Total population       5246456     85.5       36.2
## 3       Total population       4441370     79.8       29.7
## 4       Total population       4087191     86.8       30.2
## 5       Total population       3263431     86.6       37.1
## 6       Total population       3145515     84.6       38.0

# b. Using purrr package

library(purrr)

# Load the ACS dataset
acs_df <- read.csv("C:\\R\\DSC520\\data\\acs-14-1yr-s0201.csv")

# Keep the rows where the racesreported variable is greater than 500000 and
less than 1000000
```

```r
kept_acs <- keep(acs_df$RacesReported, ~ .x > 500000 & .x < 1000000)
kept_acs
```

```
##  [1] 660793 965974 874589 852469 715597 758581 500292 531997 846178 618821
## [11] 663862 663519 558503 945438 897985 861277 552778 658893 556885 897698
## [21] 679513 938098 634638 507531 730981 722161 996319 877922 991788 932708
## [31] 527306 705186 685419 934243 574272 508803 760026 560133 826925 904430
## [41] 622793 554194 769091 692254 507022 767254 813475 629237 860112 532655
## [51] 683191 543244 933572 511038 795723 669115 836297 629279 586301 508856
## [61] 552939 675551 922835 749857 972634 512119 998691 806631 533116 541943
## [71] 766215 629598 776712 562998 626685 512784 562960 533320 816857 631974
## [81] 668347 938803 885241 753363 833487 685345 831073 518947 560974 831928
## [91] 759583 516284 956406
```

```r
# Discard the rows where the county variable is missing
discarded_acs <- discard(acs_df$County, is.na)
discarded_acs
```

```
##   [1] "Jefferson County"       "Maricopa County"        "Pima County"
##   [4] "Alameda County"         "Contra Costa County"    "Fresno County"
##   [7] "Kern County"            "Los Angeles County"     "Orange County"
##  [10] "Riverside County"       "Sacramento County"      "San Bernardino
County"
##  [13] "San Diego County"       "San Francisco County"   "San Joaquin
County"
##  [16] "San Mateo County"       "Santa Clara County"     "Sonoma County"
##  [19] "Stanislaus County"      "Ventura County"         "Arapahoe County"
##  [22] "Denver County"          "El Paso County"         "Jefferson County"
##  [25] "Fairfield County"       "Hartford County"        "New Haven County"
##  [28] "New Castle County"      "District of Columbia"   "Brevard County"
##  [31] "Broward County"         "Duval County"           "Hillsborough
County"
##  [34] "Lee County"             "Miami-Dade County"      "Orange County"
##  [37] "Palm Beach County"      "Pinellas County"        "Polk County"
##  [40] "Volusia County"         "Cobb County"            "DeKalb County"
##  [43] "Fulton County"          "Gwinnett County"        "Honolulu County"
##  [46] "Cook County"            "DuPage County"          "Kane County"
##  [49] "Lake County"            "Will County"            "Marion County"
##  [52] "Johnson County"         "Sedgwick County"        "Jefferson County"
##  [55] "Anne Arundel County"    "Baltimore County"       "Montgomery
County"
##  [58] "Prince George's County" "Baltimore city"         "Bristol County"
##  [61] "Essex County"           "Middlesex County"       "Norfolk County"
##  [64] "Plymouth County"        "Suffolk County"         "Worcester County"
##  [67] "Kent County"            "Macomb County"          "Oakland County"
##  [70] "Wayne County"           "Hennepin County"        "Ramsey County"
##  [73] "Jackson County"         "St. Louis County"       "Douglas County"
##  [76] "Clark County"           "Bergen County"          "Camden County"
##  [79] "Essex County"           "Hudson County"          "Middlesex County"
##  [82] "Monmouth County"        "Ocean County"           "Passaic County"
```

```
##  [85] "Union County"           "Bernalillo County"      "Bronx County"
##  [88] "Erie County"            "Kings County"           "Monroe County"
##  [91] "Nassau County"          "New York County"        "Queens County"
##  [94] "Suffolk County"         "Westchester County"     "Guilford County"
##  [97] "Mecklenburg County"     "Wake County"            "Cuyahoga County"
## [100] "Franklin County"        "Hamilton County"        "Montgomery
County"
## [103] "Summit County"          "Oklahoma County"        "Tulsa County"
## [106] "Multnomah County"       "Washington County"      "Allegheny County"
## [109] "Bucks County"           "Chester County"         "Delaware County"
## [112] "Lancaster County"       "Montgomery County"      "Philadelphia
County"
## [115] "Providence County"      "Davidson County"        "Shelby County"
## [118] "Bexar County"           "Collin County"          "Dallas County"
## [121] "Denton County"          "El Paso County"         "Fort Bend County"
## [124] "Harris County"          "Hidalgo County"         "Montgomery
County"
## [127] "Tarrant County"         "Travis County"          "Salt Lake County"
## [130] "Utah County"            "Fairfax County"         "King County"
## [133] "Pierce County"          "Snohomish County"       "Dane County"
## [136] "Milwaukee County"
```

```
# c. Using cbind and rbind functions
library(plyr)
```

```
## ------------------------------------------------------------------------
----

## You have loaded plyr after dplyr - this is likely to cause problems.
## If you need functions from both plyr and dplyr, please load plyr first,
then dplyr:
## library(plyr); library(dplyr)

## ------------------------------------------------------------------------
----

##
## Attaching package: 'plyr'

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

## The following objects are masked from 'package:dplyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```
# Load the ACS dataset
acs_df <- read.csv("C:\\R\\DSC520\\data\\acs-14-1yr-s0201.csv")

# Create a subset of the dataset that includes only the State and
```

```r
RacesReported variables
subset1 <- acs_df[, c("State", "RacesReported")]

# Create a second subset of the dataset that includes only the County and
BachDegree variables
subset2 <- acs_df[, c("County", "BachDegree")]

subset3 <- summary_acs[,c("mean_HSDegree","median_HSDegree")]

# Combine the two subsets by column
combined_acs1 <- cbind(subset1, subset2, subset3)
combined_acs1
```

```
##                    State RacesReported                County BachDegree
## 1                Alabama        660793       Jefferson County       30.5
## 2                Arizona       4087191        Maricopa County       30.2
## 3                Arizona       1004516            Pima County       30.8
## 4             California       1610921         Alameda County       42.8
## 5             California       1111339    Contra Costa County       39.7
## 6             California        965974          Fresno County       19.7
## 7             California        874589            Kern County       15.4
## 8             California      10116705     Los Angeles County       30.3
## 9             California       3145515          Orange County       38.0
## 10            California       2329271       Riverside County       20.7
## 11            California       1482026      Sacramento County       28.9
## 12            California       2112619  San Bernardino County       18.9
## 13            California       3263431       San Diego County       37.1
## 14            California        852469   San Francisco County       54.2
## 15            California        715597     San Joaquin County       18.3
## 16            California        758581       San Mateo County       47.5
## 17            California       1894605     Santa Clara County       48.4
## 18            California        500292          Sonoma County       34.8
## 19            California        531997      Stanislaus County       17.0
## 20            California        846178         Ventura County       31.6
## 21              Colorado        618821        Arapahoe County       40.9
## 22              Colorado        663862          Denver County       44.3
## 23              Colorado        663519         El Paso County       36.5
## 24              Colorado        558503       Jefferson County       42.0
## 25           Connecticut        945438       Fairfield County       46.7
## 26           Connecticut        897985        Hartford County       36.8
## 27           Connecticut        861277       New Haven County       34.5
## 28              Delaware        552778      New Castle County       35.8
## 29  District of Columbia        658893   District of Columbia       55.0
## 30               Florida        556885         Brevard County       27.2
## 31               Florida       1869235         Broward County       30.5
## 32               Florida        897698           Duval County       26.1
## 33               Florida       1316298    Hillsborough County       29.8
## 34               Florida        679513             Lee County       26.5
## 35               Florida       2662874      Miami-Dade County       26.6
## 36               Florida       1253001          Orange County       31.4
```

```
## 37              Florida       1397710      Palm Beach County       33.0
## 38              Florida        938098        Pinellas County       29.5
## 39              Florida        634638            Polk County       19.7
## 40              Florida        507531          Volusia County       22.5
## 41              Georgia        730981            Cobb County       43.7
## 42              Georgia        722161          DeKalb County       41.7
## 43              Georgia        996319          Fulton County       49.2
## 44              Georgia        877922        Gwinnett County       35.4
## 45               Hawaii        991788        Honolulu County       32.6
## 46             Illinois       5246456            Cook County       36.2
## 47             Illinois        932708          DuPage County       48.0
## 48             Illinois        527306            Kane County       32.6
## 49             Illinois        705186            Lake County       44.0
## 50             Illinois        685419            Will County       33.1
## 51              Indiana        934243          Marion County       28.8
## 52               Kansas        574272         Johnson County       52.8
## 53               Kansas        508803        Sedgwick County       30.7
## 54             Kentucky        760026       Jefferson County       31.6
## 55             Maryland        560133    Anne Arundel County       38.8
## 56             Maryland        826925       Baltimore County       37.2
## 57             Maryland       1030447      Montgomery County       58.5
## 58             Maryland        904430 Prince George's County       31.0
## 59             Maryland        622793         Baltimore city       30.0
## 60        Massachusetts        554194         Bristol County       25.7
## 61        Massachusetts        769091           Essex County       38.9
## 62        Massachusetts       1570315       Middlesex County       52.3
## 63        Massachusetts        692254         Norfolk County       51.9
## 64        Massachusetts        507022        Plymouth County       34.1
## 65        Massachusetts        767254         Suffolk County       42.3
## 66        Massachusetts        813475       Worcester County       34.6
## 67             Michigan        629237            Kent County       33.7
## 68             Michigan        860112          Macomb County       23.9
## 69             Michigan       1237868         Oakland County       44.8
## 70             Michigan       1764804           Wayne County       22.1
## 71            Minnesota       1212064        Hennepin County       47.3
## 72            Minnesota        532655          Ramsey County       40.9
## 73             Missouri        683191         Jackson County       29.5
## 74             Missouri       1001876       St. Louis County       42.8
## 75             Nebraska        543244         Douglas County       36.3
## 76               Nevada       2069681           Clark County       22.7
## 77           New Jersey        933572          Bergen County       46.2
## 78           New Jersey        511038          Camden County       31.3
## 79           New Jersey        795723           Essex County       32.7
## 80           New Jersey        669115          Hudson County       38.2
## 81           New Jersey        836297       Middlesex County       41.0
## 82           New Jersey        629279        Monmouth County       43.7
## 83           New Jersey        586301           Ocean County       28.6
## 84           New Jersey        508856         Passaic County       28.6
## 85           New Jersey        552939           Union County       33.0
## 86           New Mexico        675551      Bernalillo County       32.7
```

```
## 87              New York       1438159          Bronx County       19.3
## 88              New York        922835          Erie County        31.3
## 89              New York       2621793          Kings County       34.3
## 90              New York        749857        Monroe County        35.9
## 91              New York       1358627         Nassau County       43.2
## 92              New York       1636268      New York County        59.9
## 93              New York       2321580        Queens County        29.8
## 94              New York       1502968       Suffolk County        34.0
## 95              New York        972634   Westchester County        47.1
## 96        North Carolina        512119      Guilford County        33.3
## 97        North Carolina       1012539   Mecklenburg County        43.0
## 98        North Carolina        998691           Wake County       49.2
## 99                  Ohio       1259828      Cuyahoga County        31.0
## 100                 Ohio       1231393      Franklin County        38.0
## 101                 Ohio        806631      Hamilton County        35.6
## 102                 Ohio        533116    Montgomery County        25.7
## 103                 Ohio        541943        Summit County        30.3
## 104             Oklahoma        766215      Oklahoma County        30.6
## 105             Oklahoma        629598          Tulsa County       30.7
## 106               Oregon        776712     Multnomah County        41.6
## 107               Oregon        562998    Washington County        39.7
## 108         Pennsylvania       1231255     Allegheny County        37.7
## 109         Pennsylvania        626685          Bucks County       37.7
## 110         Pennsylvania        512784       Chester County        49.3
## 111         Pennsylvania        562960      Delaware County        36.3
## 112         Pennsylvania        533320     Lancaster County        26.0
## 113         Pennsylvania        816857    Montgomery County        47.3
## 114         Pennsylvania       1560297   Philadelphia County        26.0
## 115         Rhode Island        631974     Providence County        25.2
## 116            Tennessee        668347      Davidson County        37.3
## 117            Tennessee        938803         Shelby County       29.9
## 118                Texas       1855866          Bexar County       26.3
## 119                Texas        885241         Collin County       50.0
## 120                Texas       2518638         Dallas County       29.1
## 121                Texas        753363         Denton County       41.5
## 122                Texas        833487        El Paso County       21.1
## 123                Texas        685345     Fort Bend County        44.1
## 124                Texas       4441370         Harris County       29.7
## 125                Texas        831073        Hidalgo County       17.9
## 126                Texas        518947    Montgomery County        34.1
## 127                Texas       1945360        Tarrant County       30.0
## 128                Texas       1151145          Travis County      45.6
## 129                 Utah       1091742     Salt Lake County        31.9
## 130                 Utah        560974          Utah County       37.5
## 131             Virginia       1137538        Fairfax County       60.3
## 132           Washington       2079967           King County       48.6
## 133           Washington        831928         Pierce County       24.6
## 134           Washington        759583      Snohomish County       29.1
## 135            Wisconsin        516284          Dane County       49.8
## 136            Wisconsin        956406     Milwaukee County       29.5
```

```
##     mean_HSDegree median_HSDegree
## 1        87.63235             88.7
## 2        87.63235             88.7
## 3        87.63235             88.7
## 4        87.63235             88.7
## 5        87.63235             88.7
## 6        87.63235             88.7
## 7        87.63235             88.7
## 8        87.63235             88.7
## 9        87.63235             88.7
## 10       87.63235             88.7
## 11       87.63235             88.7
## 12       87.63235             88.7
## 13       87.63235             88.7
## 14       87.63235             88.7
## 15       87.63235             88.7
## 16       87.63235             88.7
## 17       87.63235             88.7
## 18       87.63235             88.7
## 19       87.63235             88.7
## 20       87.63235             88.7
## 21       87.63235             88.7
## 22       87.63235             88.7
## 23       87.63235             88.7
## 24       87.63235             88.7
## 25       87.63235             88.7
## 26       87.63235             88.7
## 27       87.63235             88.7
## 28       87.63235             88.7
## 29       87.63235             88.7
## 30       87.63235             88.7
## 31       87.63235             88.7
## 32       87.63235             88.7
## 33       87.63235             88.7
## 34       87.63235             88.7
## 35       87.63235             88.7
## 36       87.63235             88.7
## 37       87.63235             88.7
## 38       87.63235             88.7
## 39       87.63235             88.7
## 40       87.63235             88.7
## 41       87.63235             88.7
## 42       87.63235             88.7
## 43       87.63235             88.7
## 44       87.63235             88.7
## 45       87.63235             88.7
## 46       87.63235             88.7
## 47       87.63235             88.7
## 48       87.63235             88.7
## 49       87.63235             88.7
```

```
## 50       87.63235            88.7
## 51       87.63235            88.7
## 52       87.63235            88.7
## 53       87.63235            88.7
## 54       87.63235            88.7
## 55       87.63235            88.7
## 56       87.63235            88.7
## 57       87.63235            88.7
## 58       87.63235            88.7
## 59       87.63235            88.7
## 60       87.63235            88.7
## 61       87.63235            88.7
## 62       87.63235            88.7
## 63       87.63235            88.7
## 64       87.63235            88.7
## 65       87.63235            88.7
## 66       87.63235            88.7
## 67       87.63235            88.7
## 68       87.63235            88.7
## 69       87.63235            88.7
## 70       87.63235            88.7
## 71       87.63235            88.7
## 72       87.63235            88.7
## 73       87.63235            88.7
## 74       87.63235            88.7
## 75       87.63235            88.7
## 76       87.63235            88.7
## 77       87.63235            88.7
## 78       87.63235            88.7
## 79       87.63235            88.7
## 80       87.63235            88.7
## 81       87.63235            88.7
## 82       87.63235            88.7
## 83       87.63235            88.7
## 84       87.63235            88.7
## 85       87.63235            88.7
## 86       87.63235            88.7
## 87       87.63235            88.7
## 88       87.63235            88.7
## 89       87.63235            88.7
## 90       87.63235            88.7
## 91       87.63235            88.7
## 92       87.63235            88.7
## 93       87.63235            88.7
## 94       87.63235            88.7
## 95       87.63235            88.7
## 96       87.63235            88.7
## 97       87.63235            88.7
## 98       87.63235            88.7
## 99       87.63235            88.7
```

```
## 100      87.63235            88.7
## 101      87.63235            88.7
## 102      87.63235            88.7
## 103      87.63235            88.7
## 104      87.63235            88.7
## 105      87.63235            88.7
## 106      87.63235            88.7
## 107      87.63235            88.7
## 108      87.63235            88.7
## 109      87.63235            88.7
## 110      87.63235            88.7
## 111      87.63235            88.7
## 112      87.63235            88.7
## 113      87.63235            88.7
## 114      87.63235            88.7
## 115      87.63235            88.7
## 116      87.63235            88.7
## 117      87.63235            88.7
## 118      87.63235            88.7
## 119      87.63235            88.7
## 120      87.63235            88.7
## 121      87.63235            88.7
## 122      87.63235            88.7
## 123      87.63235            88.7
## 124      87.63235            88.7
## 125      87.63235            88.7
## 126      87.63235            88.7
## 127      87.63235            88.7
## 128      87.63235            88.7
## 129      87.63235            88.7
## 130      87.63235            88.7
## 131      87.63235            88.7
## 132      87.63235            88.7
## 133      87.63235            88.7
## 134      87.63235            88.7
## 135      87.63235            88.7
## 136      87.63235            88.7
```

```
# Combine the two subsets by row
combined_acs2 <- rbind.fill(subset1, subset2, subset3)
combined_acs2
```

```
##                   State RacesReported                County BachDegree
## 1               Alabama        660793                  <NA>         NA
## 2               Arizona       4087191                  <NA>         NA
## 3               Arizona       1004516                  <NA>         NA
## 4            California       1610921                  <NA>         NA
## 5            California       1111339                  <NA>         NA
## 6            California        965974                  <NA>         NA
## 7            California        874589                  <NA>         NA
```

```
## 8              California      10116705                    <NA>          NA
## 9              California       3145515                    <NA>          NA
## 10             California       2329271                    <NA>          NA
## 11             California       1482026                    <NA>          NA
## 12             California       2112619                    <NA>          NA
## 13             California       3263431                    <NA>          NA
## 14             California        852469                    <NA>          NA
## 15             California        715597                    <NA>          NA
## 16             California        758581                    <NA>          NA
## 17             California       1894605                    <NA>          NA
## 18             California        500292                    <NA>          NA
## 19             California        531997                    <NA>          NA
## 20             California        846178                    <NA>          NA
## 21               Colorado        618821                    <NA>          NA
## 22               Colorado        663862                    <NA>          NA
## 23               Colorado        663519                    <NA>          NA
## 24               Colorado        558503                    <NA>          NA
## 25            Connecticut        945438                    <NA>          NA
## 26            Connecticut        897985                    <NA>          NA
## 27            Connecticut        861277                    <NA>          NA
## 28               Delaware        552778                    <NA>          NA
## 29   District of Columbia        658893                    <NA>          NA
## 30                Florida        556885                    <NA>          NA
## 31                Florida       1869235                    <NA>          NA
## 32                Florida        897698                    <NA>          NA
## 33                Florida       1316298                    <NA>          NA
## 34                Florida        679513                    <NA>          NA
## 35                Florida       2662874                    <NA>          NA
## 36                Florida       1253001                    <NA>          NA
## 37                Florida       1397710                    <NA>          NA
## 38                Florida        938098                    <NA>          NA
## 39                Florida        634638                    <NA>          NA
## 40                Florida        507531                    <NA>          NA
## 41                Georgia        730981                    <NA>          NA
## 42                Georgia        722161                    <NA>          NA
## 43                Georgia        996319                    <NA>          NA
## 44                Georgia        877922                    <NA>          NA
## 45                 Hawaii        991788                    <NA>          NA
## 46               Illinois       5246456                    <NA>          NA
## 47               Illinois        932708                    <NA>          NA
## 48               Illinois        527306                    <NA>          NA
## 49               Illinois        705186                    <NA>          NA
## 50               Illinois        685419                    <NA>          NA
## 51                Indiana        934243                    <NA>          NA
## 52                 Kansas        574272                    <NA>          NA
## 53                 Kansas        508803                    <NA>          NA
## 54               Kentucky        760026                    <NA>          NA
## 55               Maryland        560133                    <NA>          NA
## 56               Maryland        826925                    <NA>          NA
## 57               Maryland       1030447                    <NA>          NA
```

```
## 58              Maryland        904430                  <NA>          NA
## 59              Maryland        622793                  <NA>          NA
## 60         Massachusetts        554194                  <NA>          NA
## 61         Massachusetts        769091                  <NA>          NA
## 62         Massachusetts       1570315                  <NA>          NA
## 63         Massachusetts        692254                  <NA>          NA
## 64         Massachusetts        507022                  <NA>          NA
## 65         Massachusetts        767254                  <NA>          NA
## 66         Massachusetts        813475                  <NA>          NA
## 67              Michigan        629237                  <NA>          NA
## 68              Michigan        860112                  <NA>          NA
## 69              Michigan       1237868                  <NA>          NA
## 70              Michigan       1764804                  <NA>          NA
## 71             Minnesota       1212064                  <NA>          NA
## 72             Minnesota        532655                  <NA>          NA
## 73              Missouri        683191                  <NA>          NA
## 74              Missouri       1001876                  <NA>          NA
## 75              Nebraska        543244                  <NA>          NA
## 76                Nevada       2069681                  <NA>          NA
## 77            New Jersey        933572                  <NA>          NA
## 78            New Jersey        511038                  <NA>          NA
## 79            New Jersey        795723                  <NA>          NA
## 80            New Jersey        669115                  <NA>          NA
## 81            New Jersey        836297                  <NA>          NA
## 82            New Jersey        629279                  <NA>          NA
## 83            New Jersey        586301                  <NA>          NA
## 84            New Jersey        508856                  <NA>          NA
## 85            New Jersey        552939                  <NA>          NA
## 86            New Mexico        675551                  <NA>          NA
## 87              New York       1438159                  <NA>          NA
## 88              New York        922835                  <NA>          NA
## 89              New York       2621793                  <NA>          NA
## 90              New York        749857                  <NA>          NA
## 91              New York       1358627                  <NA>          NA
## 92              New York       1636268                  <NA>          NA
## 93              New York       2321580                  <NA>          NA
## 94              New York       1502968                  <NA>          NA
## 95              New York        972634                  <NA>          NA
## 96        North Carolina        512119                  <NA>          NA
## 97        North Carolina       1012539                  <NA>          NA
## 98        North Carolina        998691                  <NA>          NA
## 99                  Ohio       1259828                  <NA>          NA
## 100                 Ohio       1231393                  <NA>          NA
## 101                 Ohio        806631                  <NA>          NA
## 102                 Ohio        533116                  <NA>          NA
## 103                 Ohio        541943                  <NA>          NA
## 104             Oklahoma        766215                  <NA>          NA
## 105             Oklahoma        629598                  <NA>          NA
## 106               Oregon        776712                  <NA>          NA
## 107               Oregon        562998                  <NA>          NA
```

```
## 108          Pennsylvania       1231255                  <NA>         NA
## 109          Pennsylvania        626685                  <NA>         NA
## 110          Pennsylvania        512784                  <NA>         NA
## 111          Pennsylvania        562960                  <NA>         NA
## 112          Pennsylvania        533320                  <NA>         NA
## 113          Pennsylvania        816857                  <NA>         NA
## 114          Pennsylvania       1560297                  <NA>         NA
## 115          Rhode Island        631974                  <NA>         NA
## 116             Tennessee        668347                  <NA>         NA
## 117             Tennessee        938803                  <NA>         NA
## 118                 Texas       1855866                  <NA>         NA
## 119                 Texas        885241                  <NA>         NA
## 120                 Texas       2518638                  <NA>         NA
## 121                 Texas        753363                  <NA>         NA
## 122                 Texas        833487                  <NA>         NA
## 123                 Texas        685345                  <NA>         NA
## 124                 Texas       4441370                  <NA>         NA
## 125                 Texas        831073                  <NA>         NA
## 126                 Texas        518947                  <NA>         NA
## 127                 Texas       1945360                  <NA>         NA
## 128                 Texas       1151145                  <NA>         NA
## 129                  Utah       1091742                  <NA>         NA
## 130                  Utah        560974                  <NA>         NA
## 131              Virginia       1137538                  <NA>         NA
## 132            Washington       2079967                  <NA>         NA
## 133            Washington        831928                  <NA>         NA
## 134            Washington        759583                  <NA>         NA
## 135             Wisconsin        516284                  <NA>         NA
## 136             Wisconsin        956406                  <NA>         NA
## 137                  <NA>            NA       Jefferson County       30.5
## 138                  <NA>            NA        Maricopa County       30.2
## 139                  <NA>            NA             Pima County       30.8
## 140                  <NA>            NA         Alameda County       42.8
## 141                  <NA>            NA    Contra Costa County       39.7
## 142                  <NA>            NA           Fresno County       19.7
## 143                  <NA>            NA             Kern County       15.4
## 144                  <NA>            NA     Los Angeles County       30.3
## 145                  <NA>            NA          Orange County       38.0
## 146                  <NA>            NA       Riverside County       20.7
## 147                  <NA>            NA      Sacramento County       28.9
## 148                  <NA>            NA  San Bernardino County       18.9
## 149                  <NA>            NA       San Diego County       37.1
## 150                  <NA>            NA   San Francisco County       54.2
## 151                  <NA>            NA     San Joaquin County       18.3
## 152                  <NA>            NA       San Mateo County       47.5
## 153                  <NA>            NA     Santa Clara County       48.4
## 154                  <NA>            NA          Sonoma County       34.8
## 155                  <NA>            NA      Stanislaus County       17.0
## 156                  <NA>            NA         Ventura County       31.6
## 157                  <NA>            NA        Arapahoe County       40.9
```

```
## 158                  <NA>           NA          Denver County       44.3
## 159                  <NA>           NA         El Paso County       36.5
## 160                  <NA>           NA       Jefferson County       42.0
## 161                  <NA>           NA       Fairfield County       46.7
## 162                  <NA>           NA        Hartford County       36.8
## 163                  <NA>           NA       New Haven County       34.5
## 164                  <NA>           NA      New Castle County       35.8
## 165                  <NA>           NA   District of Columbia       55.0
## 166                  <NA>           NA         Brevard County       27.2
## 167                  <NA>           NA         Broward County       30.5
## 168                  <NA>           NA           Duval County       26.1
## 169                  <NA>           NA    Hillsborough County       29.8
## 170                  <NA>           NA              Lee County       26.5
## 171                  <NA>           NA      Miami-Dade County       26.6
## 172                  <NA>           NA          Orange County       31.4
## 173                  <NA>           NA      Palm Beach County       33.0
## 174                  <NA>           NA        Pinellas County       29.5
## 175                  <NA>           NA             Polk County       19.7
## 176                  <NA>           NA         Volusia County       22.5
## 177                  <NA>           NA             Cobb County       43.7
## 178                  <NA>           NA           DeKalb County       41.7
## 179                  <NA>           NA           Fulton County       49.2
## 180                  <NA>           NA         Gwinnett County       35.4
## 181                  <NA>           NA         Honolulu County       32.6
## 182                  <NA>           NA             Cook County       36.2
## 183                  <NA>           NA          DuPage County       48.0
## 184                  <NA>           NA             Kane County       32.6
## 185                  <NA>           NA             Lake County       44.0
## 186                  <NA>           NA             Will County       33.1
## 187                  <NA>           NA           Marion County       28.8
## 188                  <NA>           NA          Johnson County       52.8
## 189                  <NA>           NA         Sedgwick County       30.7
## 190                  <NA>           NA       Jefferson County       31.6
## 191                  <NA>           NA    Anne Arundel County       38.8
## 192                  <NA>           NA       Baltimore County       37.2
## 193                  <NA>           NA      Montgomery County       58.5
## 194                  <NA>           NA Prince George's County       31.0
## 195                  <NA>           NA          Baltimore city       30.0
## 196                  <NA>           NA           Bristol County       25.7
## 197                  <NA>           NA             Essex County       38.9
## 198                  <NA>           NA       Middlesex County       52.3
## 199                  <NA>           NA           Norfolk County       51.9
## 200                  <NA>           NA         Plymouth County       34.1
## 201                  <NA>           NA           Suffolk County       42.3
## 202                  <NA>           NA       Worcester County       34.6
## 203                  <NA>           NA             Kent County       33.7
## 204                  <NA>           NA           Macomb County       23.9
## 205                  <NA>           NA          Oakland County       44.8
## 206                  <NA>           NA             Wayne County       22.1
## 207                  <NA>           NA         Hennepin County       47.3
```

```
## 208                  <NA>           NA          Ramsey County       40.9
## 209                  <NA>           NA         Jackson County       29.5
## 210                  <NA>           NA       St. Louis County       42.8
## 211                  <NA>           NA         Douglas County       36.3
## 212                  <NA>           NA           Clark County       22.7
## 213                  <NA>           NA          Bergen County       46.2
## 214                  <NA>           NA          Camden County       31.3
## 215                  <NA>           NA           Essex County       32.7
## 216                  <NA>           NA          Hudson County       38.2
## 217                  <NA>           NA       Middlesex County       41.0
## 218                  <NA>           NA        Monmouth County       43.7
## 219                  <NA>           NA           Ocean County       28.6
## 220                  <NA>           NA         Passaic County       28.6
## 221                  <NA>           NA           Union County       33.0
## 222                  <NA>           NA      Bernalillo County       32.7
## 223                  <NA>           NA           Bronx County       19.3
## 224                  <NA>           NA            Erie County       31.3
## 225                  <NA>           NA           Kings County       34.3
## 226                  <NA>           NA          Monroe County       35.9
## 227                  <NA>           NA          Nassau County       43.2
## 228                  <NA>           NA        New York County       59.9
## 229                  <NA>           NA          Queens County       29.8
## 230                  <NA>           NA         Suffolk County       34.0
## 231                  <NA>           NA     Westchester County       47.1
## 232                  <NA>           NA        Guilford County       33.3
## 233                  <NA>           NA     Mecklenburg County       43.0
## 234                  <NA>           NA            Wake County       49.2
## 235                  <NA>           NA         Cuyahoga County       31.0
## 236                  <NA>           NA         Franklin County       38.0
## 237                  <NA>           NA         Hamilton County       35.6
## 238                  <NA>           NA      Montgomery County       25.7
## 239                  <NA>           NA          Summit County       30.3
## 240                  <NA>           NA         Oklahoma County       30.6
## 241                  <NA>           NA           Tulsa County       30.7
## 242                  <NA>           NA       Multnomah County       41.6
## 243                  <NA>           NA      Washington County       39.7
## 244                  <NA>           NA       Allegheny County       37.7
## 245                  <NA>           NA           Bucks County       37.7
## 246                  <NA>           NA         Chester County       49.3
## 247                  <NA>           NA        Delaware County       36.3
## 248                  <NA>           NA       Lancaster County       26.0
## 249                  <NA>           NA      Montgomery County       47.3
## 250                  <NA>           NA    Philadelphia County       26.0
## 251                  <NA>           NA      Providence County       25.2
## 252                  <NA>           NA         Davidson County       37.3
## 253                  <NA>           NA          Shelby County       29.9
## 254                  <NA>           NA           Bexar County       26.3
## 255                  <NA>           NA          Collin County       50.0
## 256                  <NA>           NA          Dallas County       29.1
## 257                  <NA>           NA          Denton County       41.5
```

```
## 258                  <NA>            NA         El Paso County       21.1
## 259                  <NA>            NA       Fort Bend County       44.1
## 260                  <NA>            NA          Harris County       29.7
## 261                  <NA>            NA         Hidalgo County       17.9
## 262                  <NA>            NA      Montgomery County       34.1
## 263                  <NA>            NA         Tarrant County       30.0
## 264                  <NA>            NA          Travis County       45.6
## 265                  <NA>            NA       Salt Lake County       31.9
## 266                  <NA>            NA            Utah County       37.5
## 267                  <NA>            NA         Fairfax County       60.3
## 268                  <NA>            NA            King County       48.6
## 269                  <NA>            NA          Pierce County       24.6
## 270                  <NA>            NA       Snohomish County       29.1
## 271                  <NA>            NA            Dane County       49.8
## 272                  <NA>            NA       Milwaukee County       29.5
## 273                  <NA>            NA                   <NA>         NA
##     mean_HSDegree median_HSDegree
## 1              NA               NA
## 2              NA               NA
## 3              NA               NA
## 4              NA               NA
## 5              NA               NA
## 6              NA               NA
## 7              NA               NA
## 8              NA               NA
## 9              NA               NA
## 10             NA               NA
## 11             NA               NA
## 12             NA               NA
## 13             NA               NA
## 14             NA               NA
## 15             NA               NA
## 16             NA               NA
## 17             NA               NA
## 18             NA               NA
## 19             NA               NA
## 20             NA               NA
## 21             NA               NA
## 22             NA               NA
## 23             NA               NA
## 24             NA               NA
## 25             NA               NA
## 26             NA               NA
## 27             NA               NA
## 28             NA               NA
## 29             NA               NA
## 30             NA               NA
## 31             NA               NA
## 32             NA               NA
## 33             NA               NA
```

```
## 34              NA              NA
## 35              NA              NA
## 36              NA              NA
## 37              NA              NA
## 38              NA              NA
## 39              NA              NA
## 40              NA              NA
## 41              NA              NA
## 42              NA              NA
## 43              NA              NA
## 44              NA              NA
## 45              NA              NA
## 46              NA              NA
## 47              NA              NA
## 48              NA              NA
## 49              NA              NA
## 50              NA              NA
## 51              NA              NA
## 52              NA              NA
## 53              NA              NA
## 54              NA              NA
## 55              NA              NA
## 56              NA              NA
## 57              NA              NA
## 58              NA              NA
## 59              NA              NA
## 60              NA              NA
## 61              NA              NA
## 62              NA              NA
## 63              NA              NA
## 64              NA              NA
## 65              NA              NA
## 66              NA              NA
## 67              NA              NA
## 68              NA              NA
## 69              NA              NA
## 70              NA              NA
## 71              NA              NA
## 72              NA              NA
## 73              NA              NA
## 74              NA              NA
## 75              NA              NA
## 76              NA              NA
## 77              NA              NA
## 78              NA              NA
## 79              NA              NA
## 80              NA              NA
## 81              NA              NA
## 82              NA              NA
## 83              NA              NA
```

```
## 84              NA              NA
## 85              NA              NA
## 86              NA              NA
## 87              NA              NA
## 88              NA              NA
## 89              NA              NA
## 90              NA              NA
## 91              NA              NA
## 92              NA              NA
## 93              NA              NA
## 94              NA              NA
## 95              NA              NA
## 96              NA              NA
## 97              NA              NA
## 98              NA              NA
## 99              NA              NA
## 100             NA              NA
## 101             NA              NA
## 102             NA              NA
## 103             NA              NA
## 104             NA              NA
## 105             NA              NA
## 106             NA              NA
## 107             NA              NA
## 108             NA              NA
## 109             NA              NA
## 110             NA              NA
## 111             NA              NA
## 112             NA              NA
## 113             NA              NA
## 114             NA              NA
## 115             NA              NA
## 116             NA              NA
## 117             NA              NA
## 118             NA              NA
## 119             NA              NA
## 120             NA              NA
## 121             NA              NA
## 122             NA              NA
## 123             NA              NA
## 124             NA              NA
## 125             NA              NA
## 126             NA              NA
## 127             NA              NA
## 128             NA              NA
## 129             NA              NA
## 130             NA              NA
## 131             NA              NA
## 132             NA              NA
## 133             NA              NA
```

```
## 134              NA              NA
## 135              NA              NA
## 136              NA              NA
## 137              NA              NA
## 138              NA              NA
## 139              NA              NA
## 140              NA              NA
## 141              NA              NA
## 142              NA              NA
## 143              NA              NA
## 144              NA              NA
## 145              NA              NA
## 146              NA              NA
## 147              NA              NA
## 148              NA              NA
## 149              NA              NA
## 150              NA              NA
## 151              NA              NA
## 152              NA              NA
## 153              NA              NA
## 154              NA              NA
## 155              NA              NA
## 156              NA              NA
## 157              NA              NA
## 158              NA              NA
## 159              NA              NA
## 160              NA              NA
## 161              NA              NA
## 162              NA              NA
## 163              NA              NA
## 164              NA              NA
## 165              NA              NA
## 166              NA              NA
## 167              NA              NA
## 168              NA              NA
## 169              NA              NA
## 170              NA              NA
## 171              NA              NA
## 172              NA              NA
## 173              NA              NA
## 174              NA              NA
## 175              NA              NA
## 176              NA              NA
## 177              NA              NA
## 178              NA              NA
## 179              NA              NA
## 180              NA              NA
## 181              NA              NA
## 182              NA              NA
## 183              NA              NA
```

```
## 184             NA              NA
## 185             NA              NA
## 186             NA              NA
## 187             NA              NA
## 188             NA              NA
## 189             NA              NA
## 190             NA              NA
## 191             NA              NA
## 192             NA              NA
## 193             NA              NA
## 194             NA              NA
## 195             NA              NA
## 196             NA              NA
## 197             NA              NA
## 198             NA              NA
## 199             NA              NA
## 200             NA              NA
## 201             NA              NA
## 202             NA              NA
## 203             NA              NA
## 204             NA              NA
## 205             NA              NA
## 206             NA              NA
## 207             NA              NA
## 208             NA              NA
## 209             NA              NA
## 210             NA              NA
## 211             NA              NA
## 212             NA              NA
## 213             NA              NA
## 214             NA              NA
## 215             NA              NA
## 216             NA              NA
## 217             NA              NA
## 218             NA              NA
## 219             NA              NA
## 220             NA              NA
## 221             NA              NA
## 222             NA              NA
## 223             NA              NA
## 224             NA              NA
## 225             NA              NA
## 226             NA              NA
## 227             NA              NA
## 228             NA              NA
## 229             NA              NA
## 230             NA              NA
## 231             NA              NA
## 232             NA              NA
## 233             NA              NA
```

```
## 234            NA               NA
## 235            NA               NA
## 236            NA               NA
## 237            NA               NA
## 238            NA               NA
## 239            NA               NA
## 240            NA               NA
## 241            NA               NA
## 242            NA               NA
## 243            NA               NA
## 244            NA               NA
## 245            NA               NA
## 246            NA               NA
## 247            NA               NA
## 248            NA               NA
## 249            NA               NA
## 250            NA               NA
## 251            NA               NA
## 252            NA               NA
## 253            NA               NA
## 254            NA               NA
## 255            NA               NA
## 256            NA               NA
## 257            NA               NA
## 258            NA               NA
## 259            NA               NA
## 260            NA               NA
## 261            NA               NA
## 262            NA               NA
## 263            NA               NA
## 264            NA               NA
## 265            NA               NA
## 266            NA               NA
## 267            NA               NA
## 268            NA               NA
## 269            NA               NA
## 270            NA               NA
## 271            NA               NA
## 272            NA               NA
## 273      87.63235             88.7
```

```
# d. Split a string, then concatenate the results back together

string <- "New York, NY"
split_string <- strsplit(string, ", ")[[1]]
concatenated_string <- paste0(split_string[2], "_", split_string[1])
concatenated_string
```

```
## [1] "NY_New York"
```