Lab 2

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More Basic R Skills

- Create a function `my_reverse` which takes as required input a vector and returns the vector in reverse where the first entry is the last entry, etc. No function calls are allowed inside your function otherwise that would defeat the purpose of the exercise! (Yes, there is a base R function that does this called `rev`). Use `head` on `v` and `tail` on `my_reverse(v)` to verify it works.

```
my_reverse = function(v) {
  v_rev = rep(NA, times = length(v))
  for (i in length(v):1) {
    v_rev[length(v) - i + 1] = v[i]
  }
  v_rev
}
v = 1:10
my_reverse(v)
```

```
##  [1] 10  9  8  7  6  5  4  3  2  1
```

- Create a function `flip_matrix` which takes as required input a matrix, an argument `dim_to_rev` that returns the matrix with the rows in reverse order or the columns in reverse order depending on the `dim_to_rev` argument. Let the default be the dimension of the matrix that is greater.

```
flip_matrix = function(X, dim_to_rev = NULL) {
  if (is.null(dim_to_rev)) {
    dim_to_rev = ifelse(nrow(X) >= ncol(X), "rows", "cols")
  }
  if(dim_to_rev == "rows"){
    X[my_reverse(1:nrow(X)), ]
  }else if(dim_to_rev == "cols"){
    X[,my_reverse(1:ncol(X))]
  } else{
    stop ("Illegal arg")
  }
}
X = matrix(rnorm(100), nrow=25)
X
```

```
##            [,1]        [,2]        [,3]        [,4]
```

```
##  [1,]   0.84905141 -1.20616623   0.268384782 -0.890649826
##  [2,]   0.80130082 -1.60410518   0.478961468 -0.201458968
##  [3,]  -1.36964624 -0.71785091  -0.394434995  0.750136935
##  [4,]  -0.06806837 -0.11589250   0.053220488  0.686323836
##  [5,]   0.93179753 -1.40803858  -1.113690552  1.113581374
##  [6,]  -0.84160098 -1.30922095  -0.347615811  0.660145598
##  [7,]  -0.78521834  0.76783681  -0.854618795 -0.280356554
##  [8,]  -1.32073287  0.11601304  -0.605258997  1.209115555
##  [9,]   0.67244707 -1.35885175   0.737071347 -0.196342144
## [10,]   1.06830084  0.64053819   0.177598982  0.347192927
## [11,]   0.38136458 -0.04645609   0.080861799 -0.007425261
## [12,]  -1.04931095 -0.29601246  -0.801684590  0.754243951
## [13,]   0.18386285 -0.73807084   0.125574009  0.147838330
## [14,]  -1.69873585 -0.18380951   0.375310811 -0.273431481
## [15,]   1.28072170 -0.22945978  -0.744042469 -0.727248007
## [16,]  -0.18481134  1.61676294   0.084691745 -0.208631556
## [17,]  -0.40706590 -2.91277965  -0.006109542 -0.276474397
## [18,]   0.09019010 -0.23895174  -0.744241252  0.185607685
## [19,]  -1.48082815 -1.31604848   0.442998165  0.199307488
## [20,]   0.64430720  0.73586329   1.639045688 -0.412707931
## [21,]   1.08679774  1.22036045  -0.687570037 -1.788180864
## [22,]  -0.68601607  0.71767439  -0.356324648 -0.517809250
## [23,]   1.69550184  0.51010504   1.463451894  1.128488461
## [24,]  -2.43967574  1.21454488   0.568470440  1.539334882
## [25,]   0.74762865 -0.29260084  -0.358692401 -0.760914844
```

```
flip_matrix(X, dim_to_rev = "cols")
```

```
##               [,1]          [,2]         [,3]         [,4]
##  [1,] -0.890649826   0.268384782 -1.20616623   0.84905141
##  [2,] -0.201458968   0.478961468 -1.60410518   0.80130082
##  [3,]  0.750136935  -0.394434995 -0.71785091  -1.36964624
##  [4,]  0.686323836   0.053220488 -0.11589250  -0.06806837
##  [5,]  1.113581374  -1.113690552 -1.40803858   0.93179753
##  [6,]  0.660145598  -0.347615811 -1.30922095  -0.84160098
##  [7,] -0.280356554  -0.854618795  0.76783681  -0.78521834
##  [8,]  1.209115555  -0.605258997  0.11601304  -1.32073287
##  [9,] -0.196342144   0.737071347 -1.35885175   0.67244707
## [10,]  0.347192927   0.177598982  0.64053819   1.06830084
## [11,] -0.007425261   0.080861799 -0.04645609   0.38136458
## [12,]  0.754243951  -0.801684590 -0.29601246  -1.04931095
## [13,]  0.147838330   0.125574009 -0.73807084   0.18386285
## [14,] -0.273431481   0.375310811 -0.18380951  -1.69873585
## [15,] -0.727248007  -0.744042469 -0.22945978   1.28072170
## [16,] -0.208631556   0.084691745  1.61676294  -0.18481134
## [17,] -0.276474397  -0.006109542 -2.91277965  -0.40706590
## [18,]  0.185607685  -0.744241252 -0.23895174   0.09019010
## [19,]  0.199307488   0.442998165 -1.31604848  -1.48082815
## [20,] -0.412707931   1.639045688  0.73586329   0.64430720
## [21,] -1.788180864  -0.687570037  1.22036045   1.08679774
## [22,] -0.517809250  -0.356324648  0.71767439  -0.68601607
## [23,]  1.128488461   1.463451894  0.51010504   1.69550184
## [24,]  1.539334882   0.568470440  1.21454488  -2.43967574
## [25,] -0.760914844  -0.358692401 -0.29260084   0.74762865
```

- Create a list named `my_list` with keys "A", "B", … where the entries are arrays of size 1, 2 x 2, 3 x 3 x 3, etc. Fill the array with the numbers 1, 2, 3, etc. Make 8 entries according to this sequence.

```
arrays = list()
LETTERS
```

```
##  [1] "A" "B" "C" "D" "E" "F" "G" "H" "I" "J" "K" "L" "M" "N" "O" "P" "Q" "R" "S"
## [20] "T" "U" "V" "W" "X" "Y" "Z"
```

```
i = 1
for (i in 1:8) {
  arrays[[LETTERS[i]]] = array(data = 1:i^i, dim = c(rep(i, times = i)))
}

my_list = arrays
#my_list
# for () 1 to 8
```

Run the following code:

```
lapply(my_list, object.size)
```

```
## $A
## 224 bytes
##
## $B
## 232 bytes
##
## $C
## 352 bytes
##
## $D
## 1248 bytes
##
## $E
## 12744 bytes
##
## $F
## 186864 bytes
##
## $G
## 3294416 bytes
##
## $H
## 67109104 bytes
```

Use `?object.size` to read about what these functions do. Then explain the output you see above. For the later arrays, does it make sense given the dimensions of the arrays?

The bytes are increasing exponentially. This makes sense because there is an entirely new dimension being added for each key/array.

Now cleanup the namespace by deleting all stored objects and functions:

```
rm(my_list,arrays)
#rm(list = ls())
# NOTE I COMMENTED ABOVE BECAUSE IT WILL REMOVE my_reverse which is needed later
```

A little about strings

- Use the `strsplit` function and `sample` to put the sentences in the string `lorem` below in random order. You will also need to manipulate the output of `strsplit` which is a list. You may need to learn basic concepts of regular expressions.

```
lorem = "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Morbi posuere varius volutpat. Morbi

?sample
```

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

```
?strsplit
```

```
split = strsplit(lorem, split = ". ", fixed = TRUE)
lorem = unlist(split)
lorem = sample(lorem)

lorem = paste(c(lorem, ""), collapse = ". ")

lorem
```

```
## [1] "Donec at tempor erat. Curabitur est augue, congue eget quam in, scelerisque semper magna. Donec
```

You have a set of names divided by gender (M / F) and generation (Boomer / GenX / Millenial):

- M / Boomer "Theodore, Bernard, Gene, Herbert, Ray, Tom, Lee, Alfred, Leroy, Eddie"
- M / GenX "Marc, Jamie, Greg, Darryl, Tim, Dean, Jon, Chris, Troy, Jeff"
- M / Millennial "Zachary, Dylan, Christian, Wesley, Seth, Austin, Gabriel, Evan, Casey, Luis"
- F / Boomer "Gloria, Joan, Dorothy, Shirley, Betty, Dianne, Kay, Marjorie, Lorraine, Mildred"
- F / GenX "Tracy, Dawn, Tina, Tammy, Melinda, Tamara, Tracey, Colleen, Sherri, Heidi"
- F / Millennial "Samantha, Alexis, Brittany, Lauren, Taylor, Bethany, Latoya, Candice, Brittney, Cheyenne"

Create a list-within-a-list that will intelligently store this data.

```
#HINT:
#strsplit("Theodore, Bernard, Gene, Herbert, Ray, Tom, Lee, Alfred, Leroy, Eddie", split = ", ")[[1]]

men = list()
women = list()

men$boomers = strsplit("Theodore, Bernard, Gene, Herbert, Ray, Tom, Lee, Alfred, Leroy, Eddie", split =
men$genx = strsplit("Marc, Jamie, Greg, Darryl, Tim, Dean, Jon, Chris, Troy, Jeff", split = ", ")[[1]]
men$millennial = strsplit("Zachary, Dylan, Christian, Wesley, Seth, Austin, Gabriel, Evan, Casey, Luis"
```

```
women$boomers = strsplit("Gloria, Joan, Dorothy, Shirley, Betty, Dianne, Kay, Marjorie, Lorraine, Mildr
women$genx = strsplit("Tracy, Dawn, Tina, Tammy, Melinda, Tamara, Tracey, Colleen, Sherri, Heidi", spli
women$millennial = strsplit("Samantha, Alexis, Brittany, Lauren, Taylor, Bethany, Latoya, Candice, Britt

name_list = list(m = men, w = women)
name_list
```

```
## $m
## $m$boomers
##  [1] "Theodore" "Bernard"  "Gene"      "Herbert"  "Ray"       "Tom"
##  [7] "Lee"      "Alfred"   "Leroy"     "Eddie"
##
## $m$genx
##  [1] "Marc"   "Jamie" "Greg"   "Darryl" "Tim"     "Dean"   "Jon"     "Chris"
##  [9] "Troy"   "Jeff"
##
## $m$millennial
##  [1] "Zachary"   "Dylan"      "Christian" "Wesley"     "Seth"       "Austin"
##  [7] "Gabriel"   "Evan"       "Casey"     "Luis"
##
##
## $w
## $w$boomers
##  [1] "Gloria"    "Joan"      "Dorothy" "Shirley" "Betty"     "Dianne"
##  [7] "Kay"       "Marjorie" "Lorraine" "Mildred"
##
## $w$genx
##  [1] "Tracy"   "Dawn"     "Tina"     "Tammy"   "Melinda" "Tamara"  "Tracey"
##  [8] "Colleen" "Sherri"  "Heidi"
##
## $w$millennial
##  [1] "Samantha" "Alexis"    "Brittany" "Lauren"   "Taylor"   "Bethany"
##  [7] "Latoya"   "Candice"  "Brittney" "Cheyenne"
```

Dataframe creation

Imagine you are running an experiment with many manipulations. You have 14 levels in the variable "treatment" with levels a, b, c, etc. For each of those manipulations you have 3 submanipulations in a variable named "variation" with levels A, B, C. Then you have "gender" with levels M / F. Then you have "generation" with levels Boomer, GenX, Millenial. Then you will have 6 runs per each of these groups. In each set of 6 you will need to select a name without duplication from the appropriate set of names (from the last question). Create a data frame with columns treatment, variation, gender, generation, name and y that will store all the unique unit information in this experiment. Leave y empty because it will be measured as the experiment is executed.

```
n = 14 * 3 * 2 * 3 * 10
X = data.frame(treatment = rep(NA,n), variation = rep(NA,n), gender = rep(NA,n), generation = rep(NA,n)
                name = rep(NA,n), y = rep(NA,n))

X$treatment = rep(letters[1:14], each = n/14)
X$variation = rep(rep(LETTERS[1:3], each = n/14/3))
X$gender = rep(rep(c("M","F"), each = n/14/3/2))
```

```r
X$generation = rep(c("Boomer", "GenX", "Millennial"), each = n/14/3/2/3)
X$name = rep(unlist(name_list))

table(X$treatment)
```

```
##
##   a   b   c   d   e   f   g   h   i   j   k   l   m   n
## 180 180 180 180 180 180 180 180 180 180 180 180 180 180
```

```r
table(X$variation)
```

```
##
##   A   B   C
## 840 840 840
```

```r
table(X$gender)
```

```
##
##    F    M
## 1260 1260
```

```r
table(X$generation)
```

```
##
##      Boomer       GenX Millennial
##         840        840        840
```

```r
table(X$name)
```

```
##
##     Alexis     Alfred     Austin    Bernard    Bethany      Betty   Brittany   Brittney
##         42         42         42         42         42         42         42         42
##    Candice      Casey   Cheyenne      Chris  Christian    Colleen     Darryl       Dawn
##         42         42         42         42         42         42         42         42
##       Dean     Dianne    Dorothy      Dylan      Eddie       Evan    Gabriel       Gene
##         42         42         42         42         42         42         42         42
##      Gloria       Greg      Heidi    Herbert      Jamie       Jeff       Joan        Jon
##         42         42         42         42         42         42         42         42
##        Kay     Latoya     Lauren        Lee     Leroy    Lorraine       Luis       Marc
##         42         42         42         42         42         42         42         42
##    Marjorie    Melinda    Mildred        Ray   Samantha       Seth     Sherri    Shirley
##         42         42         42         42         42         42         42         42
##     Tamara      Tammy     Taylor   Theodore        Tim       Tina        Tom     Tracey
##         42         42         42         42         42         42         42         42
##      Tracy       Troy     Wesley    Zachary
##         42         42         42         42
```

```r
X
```

```
##    treatment variation gender generation      name  y
## 1          a         A      M     Boomer  Theodore NA
## 2          a         A      M     Boomer   Bernard NA
## 3          a         A      M     Boomer      Gene NA
## 4          a         A      M     Boomer   Herbert NA
## 5          a         A      M     Boomer       Ray NA
## 6          a         A      M     Boomer       Tom NA
## 7          a         A      M     Boomer       Lee NA
## 8          a         A      M     Boomer    Alfred NA
## 9          a         A      M     Boomer     Leroy NA
## 10         a         A      M     Boomer     Eddie NA
## 11         a         A      M       GenX      Marc NA
## 12         a         A      M       GenX     Jamie NA
## 13         a         A      M       GenX      Greg NA
## 14         a         A      M       GenX    Darryl NA
## 15         a         A      M       GenX       Tim NA
## 16         a         A      M       GenX      Dean NA
## 17         a         A      M       GenX       Jon NA
## 18         a         A      M       GenX     Chris NA
## 19         a         A      M       GenX      Troy NA
## 20         a         A      M       GenX      Jeff NA
## 21         a         A      M Millennial   Zachary NA
## 22         a         A      M Millennial     Dylan NA
## 23         a         A      M Millennial Christian NA
## 24         a         A      M Millennial    Wesley NA
## 25         a         A      M Millennial      Seth NA
## 26         a         A      M Millennial    Austin NA
## 27         a         A      M Millennial   Gabriel NA
## 28         a         A      M Millennial      Evan NA
## 29         a         A      M Millennial     Casey NA
## 30         a         A      M Millennial      Luis NA
## 31         a         A      F     Boomer    Gloria NA
## 32         a         A      F     Boomer      Joan NA
## 33         a         A      F     Boomer   Dorothy NA
## 34         a         A      F     Boomer   Shirley NA
## 35         a         A      F     Boomer     Betty NA
## 36         a         A      F     Boomer    Dianne NA
## 37         a         A      F     Boomer       Kay NA
## 38         a         A      F     Boomer  Marjorie NA
## 39         a         A      F     Boomer  Lorraine NA
## 40         a         A      F     Boomer   Mildred NA
## 41         a         A      F       GenX     Tracy NA
## 42         a         A      F       GenX      Dawn NA
## 43         a         A      F       GenX      Tina NA
## 44         a         A      F       GenX     Tammy NA
## 45         a         A      F       GenX   Melinda NA
## 46         a         A      F       GenX    Tamara NA
## 47         a         A      F       GenX    Tracey NA
## 48         a         A      F       GenX   Colleen NA
## 49         a         A      F       GenX    Sherri NA
## 50         a         A      F       GenX     Heidi NA
## 51         a         A      F Millennial  Samantha NA
## 52         a         A      F Millennial    Alexis NA
## 53         a         A      F Millennial   Brittany NA
```

```
## 54          a          A          F Millennial      Lauren NA
## 55          a          A          F Millennial      Taylor NA
## 56          a          A          F Millennial     Bethany NA
## 57          a          A          F Millennial      Latoya NA
## 58          a          A          F Millennial     Candice NA
## 59          a          A          F Millennial    Brittney NA
## 60          a          A          F Millennial    Cheyenne NA
## 61          a          B          M     Boomer    Theodore NA
## 62          a          B          M     Boomer     Bernard NA
## 63          a          B          M     Boomer        Gene NA
## 64          a          B          M     Boomer     Herbert NA
## 65          a          B          M     Boomer         Ray NA
## 66          a          B          M     Boomer         Tom NA
## 67          a          B          M     Boomer         Lee NA
## 68          a          B          M     Boomer      Alfred NA
## 69          a          B          M     Boomer       Leroy NA
## 70          a          B          M     Boomer       Eddie NA
## 71          a          B          M       GenX        Marc NA
## 72          a          B          M       GenX       Jamie NA
## 73          a          B          M       GenX        Greg NA
## 74          a          B          M       GenX      Darryl NA
## 75          a          B          M       GenX         Tim NA
## 76          a          B          M       GenX        Dean NA
## 77          a          B          M       GenX         Jon NA
## 78          a          B          M       GenX       Chris NA
## 79          a          B          M       GenX        Troy NA
## 80          a          B          M       GenX        Jeff NA
## 81          a          B          M Millennial     Zachary NA
## 82          a          B          M Millennial       Dylan NA
## 83          a          B          M Millennial   Christian NA
## 84          a          B          M Millennial      Wesley NA
## 85          a          B          M Millennial        Seth NA
## 86          a          B          M Millennial      Austin NA
## 87          a          B          M Millennial     Gabriel NA
## 88          a          B          M Millennial        Evan NA
## 89          a          B          M Millennial       Casey NA
## 90          a          B          M Millennial        Luis NA
## 91          a          B          F     Boomer      Gloria NA
## 92          a          B          F     Boomer        Joan NA
## 93          a          B          F     Boomer     Dorothy NA
## 94          a          B          F     Boomer     Shirley NA
## 95          a          B          F     Boomer       Betty NA
## 96          a          B          F     Boomer      Dianne NA
## 97          a          B          F     Boomer         Kay NA
## 98          a          B          F     Boomer    Marjorie NA
## 99          a          B          F     Boomer    Lorraine NA
## 100         a          B          F     Boomer     Mildred NA
## 101         a          B          F       GenX       Tracy NA
## 102         a          B          F       GenX        Dawn NA
## 103         a          B          F       GenX        Tina NA
## 104         a          B          F       GenX       Tammy NA
## 105         a          B          F       GenX     Melinda NA
## 106         a          B          F       GenX      Tamara NA
## 107         a          B          F       GenX      Tracey NA
```

```
## 108          a         B        F       GenX     Colleen NA
## 109          a         B        F       GenX      Sherri NA
## 110          a         B        F       GenX       Heidi NA
## 111          a         B        F Millennial  Samantha NA
## 112          a         B        F Millennial    Alexis NA
## 113          a         B        F Millennial  Brittany NA
## 114          a         B        F Millennial    Lauren NA
## 115          a         B        F Millennial    Taylor NA
## 116          a         B        F Millennial   Bethany NA
## 117          a         B        F Millennial    Latoya NA
## 118          a         B        F Millennial   Candice NA
## 119          a         B        F Millennial  Brittney NA
## 120          a         B        F Millennial  Cheyenne NA
## 121          a         C        M     Boomer  Theodore NA
## 122          a         C        M     Boomer   Bernard NA
## 123          a         C        M     Boomer      Gene NA
## 124          a         C        M     Boomer   Herbert NA
## 125          a         C        M     Boomer       Ray NA
## 126          a         C        M     Boomer       Tom NA
## 127          a         C        M     Boomer       Lee NA
## 128          a         C        M     Boomer    Alfred NA
## 129          a         C        M     Boomer     Leroy NA
## 130          a         C        M     Boomer     Eddie NA
## 131          a         C        M       GenX      Marc NA
## 132          a         C        M       GenX     Jamie NA
## 133          a         C        M       GenX      Greg NA
## 134          a         C        M       GenX    Darryl NA
## 135          a         C        M       GenX       Tim NA
## 136          a         C        M       GenX      Dean NA
## 137          a         C        M       GenX       Jon NA
## 138          a         C        M       GenX     Chris NA
## 139          a         C        M       GenX      Troy NA
## 140          a         C        M       GenX      Jeff NA
## 141          a         C        M Millennial   Zachary NA
## 142          a         C        M Millennial     Dylan NA
## 143          a         C        M Millennial Christian NA
## 144          a         C        M Millennial    Wesley NA
## 145          a         C        M Millennial      Seth NA
## 146          a         C        M Millennial    Austin NA
## 147          a         C        M Millennial   Gabriel NA
## 148          a         C        M Millennial      Evan NA
## 149          a         C        M Millennial     Casey NA
## 150          a         C        M Millennial      Luis NA
## 151          a         C        F     Boomer    Gloria NA
## 152          a         C        F     Boomer      Joan NA
## 153          a         C        F     Boomer    Dorothy NA
## 154          a         C        F     Boomer   Shirley NA
## 155          a         C        F     Boomer     Betty NA
## 156          a         C        F     Boomer    Dianne NA
## 157          a         C        F     Boomer       Kay NA
## 158          a         C        F     Boomer  Marjorie NA
## 159          a         C        F     Boomer  Lorraine NA
## 160          a         C        F     Boomer   Mildred NA
## 161          a         C        F       GenX     Tracy NA
```

```
## 162          a          C          F          GenX          Dawn NA
## 163          a          C          F          GenX          Tina NA
## 164          a          C          F          GenX         Tammy NA
## 165          a          C          F          GenX       Melinda NA
## 166          a          C          F          GenX        Tamara NA
## 167          a          C          F          GenX        Tracey NA
## 168          a          C          F          GenX       Colleen NA
## 169          a          C          F          GenX        Sherri NA
## 170          a          C          F          GenX         Heidi NA
## 171          a          C          F Millennial      Samantha NA
## 172          a          C          F Millennial        Alexis NA
## 173          a          C          F Millennial      Brittany NA
## 174          a          C          F Millennial        Lauren NA
## 175          a          C          F Millennial        Taylor NA
## 176          a          C          F Millennial       Bethany NA
## 177          a          C          F Millennial        Latoya NA
## 178          a          C          F Millennial       Candice NA
## 179          a          C          F Millennial      Brittney NA
## 180          a          C          F Millennial      Cheyenne NA
## 181          b          A          M          Boomer      Theodore NA
## 182          b          A          M          Boomer       Bernard NA
## 183          b          A          M          Boomer          Gene NA
## 184          b          A          M          Boomer       Herbert NA
## 185          b          A          M          Boomer           Ray NA
## 186          b          A          M          Boomer           Tom NA
## 187          b          A          M          Boomer           Lee NA
## 188          b          A          M          Boomer        Alfred NA
## 189          b          A          M          Boomer         Leroy NA
## 190          b          A          M          Boomer         Eddie NA
## 191          b          A          M          GenX          Marc NA
## 192          b          A          M          GenX         Jamie NA
## 193          b          A          M          GenX          Greg NA
## 194          b          A          M          GenX        Darryl NA
## 195          b          A          M          GenX           Tim NA
## 196          b          A          M          GenX          Dean NA
## 197          b          A          M          GenX           Jon NA
## 198          b          A          M          GenX         Chris NA
## 199          b          A          M          GenX          Troy NA
## 200          b          A          M          GenX          Jeff NA
## 201          b          A          M Millennial       Zachary NA
## 202          b          A          M Millennial         Dylan NA
## 203          b          A          M Millennial     Christian NA
## 204          b          A          M Millennial        Wesley NA
## 205          b          A          M Millennial          Seth NA
## 206          b          A          M Millennial        Austin NA
## 207          b          A          M Millennial       Gabriel NA
## 208          b          A          M Millennial          Evan NA
## 209          b          A          M Millennial         Casey NA
## 210          b          A          M Millennial          Luis NA
## 211          b          A          F          Boomer        Gloria NA
## 212          b          A          F          Boomer          Joan NA
## 213          b          A          F          Boomer       Dorothy NA
## 214          b          A          F          Boomer       Shirley NA
## 215          b          A          F          Boomer         Betty NA
```

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## 216          b          A          F       Boomer       Dianne NA
## 217          b          A          F       Boomer          Kay NA
## 218          b          A          F       Boomer     Marjorie NA
## 219          b          A          F       Boomer     Lorraine NA
## 220          b          A          F       Boomer      Mildred NA
## 221          b          A          F         GenX        Tracy NA
## 222          b          A          F         GenX         Dawn NA
## 223          b          A          F         GenX         Tina NA
## 224          b          A          F         GenX        Tammy NA
## 225          b          A          F         GenX      Melinda NA
## 226          b          A          F         GenX       Tamara NA
## 227          b          A          F         GenX       Tracey NA
## 228          b          A          F         GenX      Colleen NA
## 229          b          A          F         GenX       Sherri NA
## 230          b          A          F         GenX        Heidi NA
## 231          b          A          F Millennial     Samantha NA
## 232          b          A          F Millennial       Alexis NA
## 233          b          A          F Millennial     Brittany NA
## 234          b          A          F Millennial       Lauren NA
## 235          b          A          F Millennial       Taylor NA
## 236          b          A          F Millennial      Bethany NA
## 237          b          A          F Millennial       Latoya NA
## 238          b          A          F Millennial      Candice NA
## 239          b          A          F Millennial     Brittney NA
## 240          b          A          F Millennial     Cheyenne NA
## 241          b          B          M       Boomer     Theodore NA
## 242          b          B          M       Boomer      Bernard NA
## 243          b          B          M       Boomer         Gene NA
## 244          b          B          M       Boomer      Herbert NA
## 245          b          B          M       Boomer          Ray NA
## 246          b          B          M       Boomer          Tom NA
## 247          b          B          M       Boomer          Lee NA
## 248          b          B          M       Boomer       Alfred NA
## 249          b          B          M       Boomer        Leroy NA
## 250          b          B          M       Boomer        Eddie NA
## 251          b          B          M         GenX         Marc NA
## 252          b          B          M         GenX        Jamie NA
## 253          b          B          M         GenX         Greg NA
## 254          b          B          M         GenX       Darryl NA
## 255          b          B          M         GenX          Tim NA
## 256          b          B          M         GenX         Dean NA
## 257          b          B          M         GenX          Jon NA
## 258          b          B          M         GenX        Chris NA
## 259          b          B          M         GenX         Troy NA
## 260          b          B          M         GenX         Jeff NA
## 261          b          B          M Millennial     Zachary NA
## 262          b          B          M Millennial        Dylan NA
## 263          b          B          M Millennial    Christian NA
## 264          b          B          M Millennial       Wesley NA
## 265          b          B          M Millennial         Seth NA
## 266          b          B          M Millennial       Austin NA
## 267          b          B          M Millennial      Gabriel NA
## 268          b          B          M Millennial         Evan NA
## 269          b          B          M Millennial        Casey NA
```

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## 270           b           B         M Millennial       Luis NA
## 271           b           B         F     Boomer     Gloria NA
## 272           b           B         F     Boomer       Joan NA
## 273           b           B         F     Boomer    Dorothy NA
## 274           b           B         F     Boomer    Shirley NA
## 275           b           B         F     Boomer      Betty NA
## 276           b           B         F     Boomer     Dianne NA
## 277           b           B         F     Boomer        Kay NA
## 278           b           B         F     Boomer   Marjorie NA
## 279           b           B         F     Boomer   Lorraine NA
## 280           b           B         F     Boomer    Mildred NA
## 281           b           B         F       GenX      Tracy NA
## 282           b           B         F       GenX       Dawn NA
## 283           b           B         F       GenX       Tina NA
## 284           b           B         F       GenX      Tammy NA
## 285           b           B         F       GenX    Melinda NA
## 286           b           B         F       GenX     Tamara NA
## 287           b           B         F       GenX     Tracey NA
## 288           b           B         F       GenX    Colleen NA
## 289           b           B         F       GenX     Sherri NA
## 290           b           B         F       GenX       Heidi NA
## 291           b           B         F Millennial   Samantha NA
## 292           b           B         F Millennial     Alexis NA
## 293           b           B         F Millennial   Brittany NA
## 294           b           B         F Millennial     Lauren NA
## 295           b           B         F Millennial      Taylor NA
## 296           b           B         F Millennial    Bethany NA
## 297           b           B         F Millennial     Latoya NA
## 298           b           B         F Millennial    Candice NA
## 299           b           B         F Millennial   Brittney NA
## 300           b           B         F Millennial   Cheyenne NA
## 301           b           C         M     Boomer   Theodore NA
## 302           b           C         M     Boomer    Bernard NA
## 303           b           C         M     Boomer       Gene NA
## 304           b           C         M     Boomer    Herbert NA
## 305           b           C         M     Boomer        Ray NA
## 306           b           C         M     Boomer        Tom NA
## 307           b           C         M     Boomer        Lee NA
## 308           b           C         M     Boomer     Alfred NA
## 309           b           C         M     Boomer      Leroy NA
## 310           b           C         M     Boomer      Eddie NA
## 311           b           C         M       GenX       Marc NA
## 312           b           C         M       GenX      Jamie NA
## 313           b           C         M       GenX       Greg NA
## 314           b           C         M       GenX     Darryl NA
## 315           b           C         M       GenX        Tim NA
## 316           b           C         M       GenX       Dean NA
## 317           b           C         M       GenX        Jon NA
## 318           b           C         M       GenX      Chris NA
## 319           b           C         M       GenX       Troy NA
## 320           b           C         M       GenX       Jeff NA
## 321           b           C         M Millennial    Zachary NA
## 322           b           C         M Millennial      Dylan NA
## 323           b           C         M Millennial  Christian NA
```

```
## 324          b          C          M Millennial    Wesley NA
## 325          b          C          M Millennial      Seth NA
## 326          b          C          M Millennial    Austin NA
## 327          b          C          M Millennial   Gabriel NA
## 328          b          C          M Millennial      Evan NA
## 329          b          C          M Millennial     Casey NA
## 330          b          C          M Millennial      Luis NA
## 331          b          C          F    Boomer    Gloria NA
## 332          b          C          F    Boomer      Joan NA
## 333          b          C          F    Boomer    Dorothy NA
## 334          b          C          F    Boomer    Shirley NA
## 335          b          C          F    Boomer     Betty NA
## 336          b          C          F    Boomer    Dianne NA
## 337          b          C          F    Boomer       Kay NA
## 338          b          C          F    Boomer   Marjorie NA
## 339          b          C          F    Boomer   Lorraine NA
## 340          b          C          F    Boomer    Mildred NA
## 341          b          C          F      GenX     Tracy NA
## 342          b          C          F      GenX      Dawn NA
## 343          b          C          F      GenX      Tina NA
## 344          b          C          F      GenX     Tammy NA
## 345          b          C          F      GenX   Melinda NA
## 346          b          C          F      GenX    Tamara NA
## 347          b          C          F      GenX    Tracey NA
## 348          b          C          F      GenX    Colleen NA
## 349          b          C          F      GenX     Sherri NA
## 350          b          C          F      GenX      Heidi NA
## 351          b          C          F Millennial  Samantha NA
## 352          b          C          F Millennial    Alexis NA
## 353          b          C          F Millennial   Brittany NA
## 354          b          C          F Millennial    Lauren NA
## 355          b          C          F Millennial    Taylor NA
## 356          b          C          F Millennial   Bethany NA
## 357          b          C          F Millennial    Latoya NA
## 358          b          C          F Millennial    Candice NA
## 359          b          C          F Millennial   Brittney NA
## 360          b          C          F Millennial   Cheyenne NA
## 361          c          A          M    Boomer   Theodore NA
## 362          c          A          M    Boomer    Bernard NA
## 363          c          A          M    Boomer      Gene NA
## 364          c          A          M    Boomer    Herbert NA
## 365          c          A          M    Boomer       Ray NA
## 366          c          A          M    Boomer       Tom NA
## 367          c          A          M    Boomer       Lee NA
## 368          c          A          M    Boomer    Alfred NA
## 369          c          A          M    Boomer     Leroy NA
## 370          c          A          M    Boomer     Eddie NA
## 371          c          A          M      GenX      Marc NA
## 372          c          A          M      GenX     Jamie NA
## 373          c          A          M      GenX      Greg NA
## 374          c          A          M      GenX    Darryl NA
## 375          c          A          M      GenX       Tim NA
## 376          c          A          M      GenX      Dean NA
## 377          c          A          M      GenX       Jon NA
```

```
## 378           c         A    M         GenX      Chris NA
## 379           c         A    M         GenX       Troy NA
## 380           c         A    M         GenX       Jeff NA
## 381           c         A    M Millennial    Zachary NA
## 382           c         A    M Millennial      Dylan NA
## 383           c         A    M Millennial  Christian NA
## 384           c         A    M Millennial     Wesley NA
## 385           c         A    M Millennial       Seth NA
## 386           c         A    M Millennial     Austin NA
## 387           c         A    M Millennial    Gabriel NA
## 388           c         A    M Millennial       Evan NA
## 389           c         A    M Millennial      Casey NA
## 390           c         A    M Millennial       Luis NA
## 391           c         A    F     Boomer     Gloria NA
## 392           c         A    F     Boomer       Joan NA
## 393           c         A    F     Boomer    Dorothy NA
## 394           c         A    F     Boomer    Shirley NA
## 395           c         A    F     Boomer      Betty NA
## 396           c         A    F     Boomer     Dianne NA
## 397           c         A    F     Boomer        Kay NA
## 398           c         A    F     Boomer   Marjorie NA
## 399           c         A    F     Boomer   Lorraine NA
## 400           c         A    F     Boomer    Mildred NA
## 401           c         A    F       GenX      Tracy NA
## 402           c         A    F       GenX       Dawn NA
## 403           c         A    F       GenX       Tina NA
## 404           c         A    F       GenX      Tammy NA
## 405           c         A    F       GenX    Melinda NA
## 406           c         A    F       GenX     Tamara NA
## 407           c         A    F       GenX     Tracey NA
## 408           c         A    F       GenX    Colleen NA
## 409           c         A    F       GenX     Sherri NA
## 410           c         A    F       GenX      Heidi NA
## 411           c         A    F Millennial   Samantha NA
## 412           c         A    F Millennial     Alexis NA
## 413           c         A    F Millennial    Brittany NA
## 414           c         A    F Millennial     Lauren NA
## 415           c         A    F Millennial     Taylor NA
## 416           c         A    F Millennial    Bethany NA
## 417           c         A    F Millennial     Latoya NA
## 418           c         A    F Millennial    Candice NA
## 419           c         A    F Millennial    Brittney NA
## 420           c         A    F Millennial   Cheyenne NA
## 421           c         B    M     Boomer   Theodore NA
## 422           c         B    M     Boomer    Bernard NA
## 423           c         B    M     Boomer       Gene NA
## 424           c         B    M     Boomer    Herbert NA
## 425           c         B    M     Boomer        Ray NA
## 426           c         B    M     Boomer        Tom NA
## 427           c         B    M     Boomer        Lee NA
## 428           c         B    M     Boomer     Alfred NA
## 429           c         B    M     Boomer      Leroy NA
## 430           c         B    M     Boomer      Eddie NA
## 431           c         B    M       GenX       Marc NA
```

```
## 432            c          B      M         GenX        Jamie NA
## 433            c          B      M         GenX         Greg NA
## 434            c          B      M         GenX       Darryl NA
## 435            c          B      M         GenX          Tim NA
## 436            c          B      M         GenX         Dean NA
## 437            c          B      M         GenX          Jon NA
## 438            c          B      M         GenX        Chris NA
## 439            c          B      M         GenX         Troy NA
## 440            c          B      M         GenX         Jeff NA
## 441            c          B      M Millennial      Zachary NA
## 442            c          B      M Millennial        Dylan NA
## 443            c          B      M Millennial    Christian NA
## 444            c          B      M Millennial       Wesley NA
## 445            c          B      M Millennial         Seth NA
## 446            c          B      M Millennial       Austin NA
## 447            c          B      M Millennial      Gabriel NA
## 448            c          B      M Millennial         Evan NA
## 449            c          B      M Millennial        Casey NA
## 450            c          B      M Millennial         Luis NA
## 451            c          B      F       Boomer       Gloria NA
## 452            c          B      F       Boomer         Joan NA
## 453            c          B      F       Boomer      Dorothy NA
## 454            c          B      F       Boomer      Shirley NA
## 455            c          B      F       Boomer        Betty NA
## 456            c          B      F       Boomer       Dianne NA
## 457            c          B      F       Boomer          Kay NA
## 458            c          B      F       Boomer     Marjorie NA
## 459            c          B      F       Boomer      Lorraine NA
## 460            c          B      F       Boomer      Mildred NA
## 461            c          B      F         GenX        Tracy NA
## 462            c          B      F         GenX         Dawn NA
## 463            c          B      F         GenX         Tina NA
## 464            c          B      F         GenX        Tammy NA
## 465            c          B      F         GenX      Melinda NA
## 466            c          B      F         GenX       Tamara NA
## 467            c          B      F         GenX       Tracey NA
## 468            c          B      F         GenX      Colleen NA
## 469            c          B      F         GenX       Sherri NA
## 470            c          B      F         GenX        Heidi NA
## 471            c          B      F Millennial     Samantha NA
## 472            c          B      F Millennial       Alexis NA
## 473            c          B      F Millennial      Brittany NA
## 474            c          B      F Millennial       Lauren NA
## 475            c          B      F Millennial       Taylor NA
## 476            c          B      F Millennial      Bethany NA
## 477            c          B      F Millennial       Latoya NA
## 478            c          B      F Millennial      Candice NA
## 479            c          B      F Millennial     Brittney NA
## 480            c          B      F Millennial      Cheyenne NA
## 481            c          C      M       Boomer     Theodore NA
## 482            c          C      M       Boomer      Bernard NA
## 483            c          C      M       Boomer         Gene NA
## 484            c          C      M       Boomer      Herbert NA
## 485            c          C      M       Boomer          Ray NA
```

```
## 486           c           C         M       Boomer       Tom NA
## 487           c           C         M       Boomer       Lee NA
## 488           c           C         M       Boomer    Alfred NA
## 489           c           C         M       Boomer     Leroy NA
## 490           c           C         M       Boomer     Eddie NA
## 491           c           C         M         GenX      Marc NA
## 492           c           C         M         GenX     Jamie NA
## 493           c           C         M         GenX      Greg NA
## 494           c           C         M         GenX    Darryl NA
## 495           c           C         M         GenX       Tim NA
## 496           c           C         M         GenX      Dean NA
## 497           c           C         M         GenX       Jon NA
## 498           c           C         M         GenX     Chris NA
## 499           c           C         M         GenX      Troy NA
## 500           c           C         M         GenX      Jeff NA
## 501           c           C         M Millennial   Zachary NA
## 502           c           C         M Millennial     Dylan NA
## 503           c           C         M Millennial Christian NA
## 504           c           C         M Millennial    Wesley NA
## 505           c           C         M Millennial      Seth NA
## 506           c           C         M Millennial    Austin NA
## 507           c           C         M Millennial    Gabriel NA
## 508           c           C         M Millennial      Evan NA
## 509           c           C         M Millennial     Casey NA
## 510           c           C         M Millennial      Luis NA
## 511           c           C         F       Boomer    Gloria NA
## 512           c           C         F       Boomer      Joan NA
## 513           c           C         F       Boomer   Dorothy NA
## 514           c           C         F       Boomer   Shirley NA
## 515           c           C         F       Boomer     Betty NA
## 516           c           C         F       Boomer    Dianne NA
## 517           c           C         F       Boomer       Kay NA
## 518           c           C         F       Boomer  Marjorie NA
## 519           c           C         F       Boomer   Lorraine NA
## 520           c           C         F       Boomer   Mildred NA
## 521           c           C         F         GenX     Tracy NA
## 522           c           C         F         GenX      Dawn NA
## 523           c           C         F         GenX      Tina NA
## 524           c           C         F         GenX     Tammy NA
## 525           c           C         F         GenX   Melinda NA
## 526           c           C         F         GenX    Tamara NA
## 527           c           C         F         GenX    Tracey NA
## 528           c           C         F         GenX   Colleen NA
## 529           c           C         F         GenX    Sherri NA
## 530           c           C         F         GenX     Heidi NA
## 531           c           C         F Millennial  Samantha NA
## 532           c           C         F Millennial    Alexis NA
## 533           c           C         F Millennial   Brittany NA
## 534           c           C         F Millennial    Lauren NA
## 535           c           C         F Millennial    Taylor NA
## 536           c           C         F Millennial   Bethany NA
## 537           c           C         F Millennial    Latoya NA
## 538           c           C         F Millennial    Candice NA
## 539           c           C         F Millennial   Brittney NA
```

```
## 540   c   C   F Millennial   Cheyenne NA
## 541   d   A   M     Boomer    Theodore NA
## 542   d   A   M     Boomer     Bernard NA
## 543   d   A   M     Boomer        Gene NA
## 544   d   A   M     Boomer     Herbert NA
## 545   d   A   M     Boomer         Ray NA
## 546   d   A   M     Boomer         Tom NA
## 547   d   A   M     Boomer         Lee NA
## 548   d   A   M     Boomer      Alfred NA
## 549   d   A   M     Boomer       Leroy NA
## 550   d   A   M     Boomer       Eddie NA
## 551   d   A   M       GenX        Marc NA
## 552   d   A   M       GenX       Jamie NA
## 553   d   A   M       GenX        Greg NA
## 554   d   A   M       GenX      Darryl NA
## 555   d   A   M       GenX         Tim NA
## 556   d   A   M       GenX        Dean NA
## 557   d   A   M       GenX         Jon NA
## 558   d   A   M       GenX       Chris NA
## 559   d   A   M       GenX        Troy NA
## 560   d   A   M       GenX        Jeff NA
## 561   d   A   M Millennial    Zachary NA
## 562   d   A   M Millennial      Dylan NA
## 563   d   A   M Millennial  Christian NA
## 564   d   A   M Millennial     Wesley NA
## 565   d   A   M Millennial       Seth NA
## 566   d   A   M Millennial     Austin NA
## 567   d   A   M Millennial    Gabriel NA
## 568   d   A   M Millennial       Evan NA
## 569   d   A   M Millennial      Casey NA
## 570   d   A   M Millennial       Luis NA
## 571   d   A   F     Boomer      Gloria NA
## 572   d   A   F     Boomer        Joan NA
## 573   d   A   F     Boomer     Dorothy NA
## 574   d   A   F     Boomer     Shirley NA
## 575   d   A   F     Boomer       Betty NA
## 576   d   A   F     Boomer      Dianne NA
## 577   d   A   F     Boomer         Kay NA
## 578   d   A   F     Boomer    Marjorie NA
## 579   d   A   F     Boomer    Lorraine NA
## 580   d   A   F     Boomer     Mildred NA
## 581   d   A   F       GenX       Tracy NA
## 582   d   A   F       GenX        Dawn NA
## 583   d   A   F       GenX        Tina NA
## 584   d   A   F       GenX       Tammy NA
## 585   d   A   F       GenX     Melinda NA
## 586   d   A   F       GenX      Tamara NA
## 587   d   A   F       GenX      Tracey NA
## 588   d   A   F       GenX     Colleen NA
## 589   d   A   F       GenX      Sherri NA
## 590   d   A   F       GenX       Heidi NA
## 591   d   A   F Millennial   Samantha NA
## 592   d   A   F Millennial     Alexis NA
## 593   d   A   F Millennial    Brittany NA
```

```
## 594            d            A            F Millennial      Lauren NA
## 595            d            A            F Millennial      Taylor NA
## 596            d            A            F Millennial     Bethany NA
## 597            d            A            F Millennial      Latoya NA
## 598            d            A            F Millennial     Candice NA
## 599            d            A            F Millennial    Brittney NA
## 600            d            A            F Millennial    Cheyenne NA
## 601            d            B            M    Boomer    Theodore NA
## 602            d            B            M    Boomer     Bernard NA
## 603            d            B            M    Boomer        Gene NA
## 604            d            B            M    Boomer     Herbert NA
## 605            d            B            M    Boomer         Ray NA
## 606            d            B            M    Boomer         Tom NA
## 607            d            B            M    Boomer         Lee NA
## 608            d            B            M    Boomer      Alfred NA
## 609            d            B            M    Boomer       Leroy NA
## 610            d            B            M    Boomer       Eddie NA
## 611            d            B            M      GenX        Marc NA
## 612            d            B            M      GenX       Jamie NA
## 613            d            B            M      GenX        Greg NA
## 614            d            B            M      GenX      Darryl NA
## 615            d            B            M      GenX         Tim NA
## 616            d            B            M      GenX        Dean NA
## 617            d            B            M      GenX         Jon NA
## 618            d            B            M      GenX       Chris NA
## 619            d            B            M      GenX        Troy NA
## 620            d            B            M      GenX        Jeff NA
## 621            d            B            M Millennial     Zachary NA
## 622            d            B            M Millennial       Dylan NA
## 623            d            B            M Millennial   Christian NA
## 624            d            B            M Millennial      Wesley NA
## 625            d            B            M Millennial        Seth NA
## 626            d            B            M Millennial      Austin NA
## 627            d            B            M Millennial     Gabriel NA
## 628            d            B            M Millennial        Evan NA
## 629            d            B            M Millennial       Casey NA
## 630            d            B            M Millennial        Luis NA
## 631            d            B            F    Boomer      Gloria NA
## 632            d            B            F    Boomer        Joan NA
## 633            d            B            F    Boomer     Dorothy NA
## 634            d            B            F    Boomer     Shirley NA
## 635            d            B            F    Boomer       Betty NA
## 636            d            B            F    Boomer      Dianne NA
## 637            d            B            F    Boomer         Kay NA
## 638            d            B            F    Boomer    Marjorie NA
## 639            d            B            F    Boomer     Lorraine NA
## 640            d            B            F    Boomer     Mildred NA
## 641            d            B            F      GenX       Tracy NA
## 642            d            B            F      GenX        Dawn NA
## 643            d            B            F      GenX        Tina NA
## 644            d            B            F      GenX       Tammy NA
## 645            d            B            F      GenX     Melinda NA
## 646            d            B            F      GenX      Tamara NA
## 647            d            B            F      GenX      Tracey NA
```

```
## 648            d           B         F        GenX      Colleen NA
## 649            d           B         F        GenX       Sherri NA
## 650            d           B         F        GenX        Heidi NA
## 651            d           B         F Millennial     Samantha NA
## 652            d           B         F Millennial       Alexis NA
## 653            d           B         F Millennial     Brittany NA
## 654            d           B         F Millennial       Lauren NA
## 655            d           B         F Millennial       Taylor NA
## 656            d           B         F Millennial      Bethany NA
## 657            d           B         F Millennial       Latoya NA
## 658            d           B         F Millennial      Candice NA
## 659            d           B         F Millennial     Brittney NA
## 660            d           B         F Millennial     Cheyenne NA
## 661            d           C         M     Boomer     Theodore NA
## 662            d           C         M     Boomer      Bernard NA
## 663            d           C         M     Boomer         Gene NA
## 664            d           C         M     Boomer      Herbert NA
## 665            d           C         M     Boomer          Ray NA
## 666            d           C         M     Boomer          Tom NA
## 667            d           C         M     Boomer          Lee NA
## 668            d           C         M     Boomer       Alfred NA
## 669            d           C         M     Boomer        Leroy NA
## 670            d           C         M     Boomer        Eddie NA
## 671            d           C         M       GenX         Marc NA
## 672            d           C         M       GenX        Jamie NA
## 673            d           C         M       GenX         Greg NA
## 674            d           C         M       GenX       Darryl NA
## 675            d           C         M       GenX          Tim NA
## 676            d           C         M       GenX         Dean NA
## 677            d           C         M       GenX          Jon NA
## 678            d           C         M       GenX        Chris NA
## 679            d           C         M       GenX         Troy NA
## 680            d           C         M       GenX         Jeff NA
## 681            d           C         M Millennial      Zachary NA
## 682            d           C         M Millennial        Dylan NA
## 683            d           C         M Millennial    Christian NA
## 684            d           C         M Millennial       Wesley NA
## 685            d           C         M Millennial         Seth NA
## 686            d           C         M Millennial       Austin NA
## 687            d           C         M Millennial      Gabriel NA
## 688            d           C         M Millennial         Evan NA
## 689            d           C         M Millennial        Casey NA
## 690            d           C         M Millennial         Luis NA
## 691            d           C         F     Boomer       Gloria NA
## 692            d           C         F     Boomer         Joan NA
## 693            d           C         F     Boomer      Dorothy NA
## 694            d           C         F     Boomer      Shirley NA
## 695            d           C         F     Boomer        Betty NA
## 696            d           C         F     Boomer       Dianne NA
## 697            d           C         F     Boomer          Kay NA
## 698            d           C         F     Boomer     Marjorie NA
## 699            d           C         F     Boomer     Lorraine NA
## 700            d           C         F     Boomer      Mildred NA
## 701            d           C         F       GenX        Tracy NA
```

```
## 702   d         C      F          GenX       Dawn NA
## 703   d         C      F          GenX       Tina NA
## 704   d         C      F          GenX      Tammy NA
## 705   d         C      F          GenX    Melinda NA
## 706   d         C      F          GenX     Tamara NA
## 707   d         C      F          GenX     Tracey NA
## 708   d         C      F          GenX    Colleen NA
## 709   d         C      F          GenX      Sherri NA
## 710   d         C      F          GenX       Heidi NA
## 711   d         C      F Millennial   Samantha NA
## 712   d         C      F Millennial     Alexis NA
## 713   d         C      F Millennial    Brittany NA
## 714   d         C      F Millennial     Lauren NA
## 715   d         C      F Millennial      Taylor NA
## 716   d         C      F Millennial     Bethany NA
## 717   d         C      F Millennial      Latoya NA
## 718   d         C      F Millennial     Candice NA
## 719   d         C      F Millennial    Brittney NA
## 720   d         C      F Millennial    Cheyenne NA
## 721   e         A      M        Boomer    Theodore NA
## 722   e         A      M        Boomer     Bernard NA
## 723   e         A      M        Boomer        Gene NA
## 724   e         A      M        Boomer     Herbert NA
## 725   e         A      M        Boomer         Ray NA
## 726   e         A      M        Boomer         Tom NA
## 727   e         A      M        Boomer         Lee NA
## 728   e         A      M        Boomer      Alfred NA
## 729   e         A      M        Boomer       Leroy NA
## 730   e         A      M        Boomer       Eddie NA
## 731   e         A      M          GenX        Marc NA
## 732   e         A      M          GenX       Jamie NA
## 733   e         A      M          GenX        Greg NA
## 734   e         A      M          GenX      Darryl NA
## 735   e         A      M          GenX         Tim NA
## 736   e         A      M          GenX        Dean NA
## 737   e         A      M          GenX         Jon NA
## 738   e         A      M          GenX       Chris NA
## 739   e         A      M          GenX        Troy NA
## 740   e         A      M          GenX        Jeff NA
## 741   e         A      M Millennial    Zachary NA
## 742   e         A      M Millennial      Dylan NA
## 743   e         A      M Millennial  Christian NA
## 744   e         A      M Millennial     Wesley NA
## 745   e         A      M Millennial        Seth NA
## 746   e         A      M Millennial      Austin NA
## 747   e         A      M Millennial     Gabriel NA
## 748   e         A      M Millennial        Evan NA
## 749   e         A      M Millennial       Casey NA
## 750   e         A      M Millennial        Luis NA
## 751   e         A      F        Boomer      Gloria NA
## 752   e         A      F        Boomer        Joan NA
## 753   e         A      F        Boomer     Dorothy NA
## 754   e         A      F        Boomer     Shirley NA
## 755   e         A      F        Boomer       Betty NA
```

```
## 756         e         A         F       Boomer     Dianne NA
## 757         e         A         F       Boomer        Kay NA
## 758         e         A         F       Boomer   Marjorie NA
## 759         e         A         F       Boomer   Lorraine NA
## 760         e         A         F       Boomer    Mildred NA
## 761         e         A         F         GenX      Tracy NA
## 762         e         A         F         GenX       Dawn NA
## 763         e         A         F         GenX       Tina NA
## 764         e         A         F         GenX      Tammy NA
## 765         e         A         F         GenX    Melinda NA
## 766         e         A         F         GenX     Tamara NA
## 767         e         A         F         GenX     Tracey NA
## 768         e         A         F         GenX    Colleen NA
## 769         e         A         F         GenX     Sherri NA
## 770         e         A         F         GenX      Heidi NA
## 771         e         A         F Millennial   Samantha NA
## 772         e         A         F Millennial     Alexis NA
## 773         e         A         F Millennial   Brittany NA
## 774         e         A         F Millennial     Lauren NA
## 775         e         A         F Millennial     Taylor NA
## 776         e         A         F Millennial    Bethany NA
## 777         e         A         F Millennial     Latoya NA
## 778         e         A         F Millennial    Candice NA
## 779         e         A         F Millennial   Brittney NA
## 780         e         A         F Millennial   Cheyenne NA
## 781         e         B         M       Boomer   Theodore NA
## 782         e         B         M       Boomer    Bernard NA
## 783         e         B         M       Boomer       Gene NA
## 784         e         B         M       Boomer    Herbert NA
## 785         e         B         M       Boomer        Ray NA
## 786         e         B         M       Boomer        Tom NA
## 787         e         B         M       Boomer        Lee NA
## 788         e         B         M       Boomer     Alfred NA
## 789         e         B         M       Boomer      Leroy NA
## 790         e         B         M       Boomer      Eddie NA
## 791         e         B         M         GenX       Marc NA
## 792         e         B         M         GenX      Jamie NA
## 793         e         B         M         GenX       Greg NA
## 794         e         B         M         GenX     Darryl NA
## 795         e         B         M         GenX        Tim NA
## 796         e         B         M         GenX       Dean NA
## 797         e         B         M         GenX        Jon NA
## 798         e         B         M         GenX      Chris NA
## 799         e         B         M         GenX       Troy NA
## 800         e         B         M         GenX       Jeff NA
## 801         e         B         M Millennial    Zachary NA
## 802         e         B         M Millennial      Dylan NA
## 803         e         B         M Millennial  Christian NA
## 804         e         B         M Millennial     Wesley NA
## 805         e         B         M Millennial       Seth NA
## 806         e         B         M Millennial     Austin NA
## 807         e         B         M Millennial    Gabriel NA
## 808         e         B         M Millennial       Evan NA
## 809         e         B         M Millennial      Casey NA
```

```
## 810             e          B          M Millennial       Luis NA
## 811             e          B          F    Boomer      Gloria NA
## 812             e          B          F    Boomer        Joan NA
## 813             e          B          F    Boomer     Dorothy NA
## 814             e          B          F    Boomer     Shirley NA
## 815             e          B          F    Boomer       Betty NA
## 816             e          B          F    Boomer      Dianne NA
## 817             e          B          F    Boomer         Kay NA
## 818             e          B          F    Boomer    Marjorie NA
## 819             e          B          F    Boomer    Lorraine NA
## 820             e          B          F    Boomer     Mildred NA
## 821             e          B          F      GenX       Tracy NA
## 822             e          B          F      GenX        Dawn NA
## 823             e          B          F      GenX        Tina NA
## 824             e          B          F      GenX       Tammy NA
## 825             e          B          F      GenX     Melinda NA
## 826             e          B          F      GenX      Tamara NA
## 827             e          B          F      GenX      Tracey NA
## 828             e          B          F      GenX     Colleen NA
## 829             e          B          F      GenX      Sherri NA
## 830             e          B          F      GenX       Heidi NA
## 831             e          B          F Millennial    Samantha NA
## 832             e          B          F Millennial      Alexis NA
## 833             e          B          F Millennial    Brittany NA
## 834             e          B          F Millennial      Lauren NA
## 835             e          B          F Millennial      Taylor NA
## 836             e          B          F Millennial     Bethany NA
## 837             e          B          F Millennial      Latoya NA
## 838             e          B          F Millennial     Candice NA
## 839             e          B          F Millennial     Brittney NA
## 840             e          B          F Millennial    Cheyenne NA
## 841             e          C          M    Boomer    Theodore NA
## 842             e          C          M    Boomer     Bernard NA
## 843             e          C          M    Boomer        Gene NA
## 844             e          C          M    Boomer     Herbert NA
## 845             e          C          M    Boomer         Ray NA
## 846             e          C          M    Boomer         Tom NA
## 847             e          C          M    Boomer         Lee NA
## 848             e          C          M    Boomer      Alfred NA
## 849             e          C          M    Boomer       Leroy NA
## 850             e          C          M    Boomer       Eddie NA
## 851             e          C          M      GenX        Marc NA
## 852             e          C          M      GenX       Jamie NA
## 853             e          C          M      GenX        Greg NA
## 854             e          C          M      GenX      Darryl NA
## 855             e          C          M      GenX         Tim NA
## 856             e          C          M      GenX        Dean NA
## 857             e          C          M      GenX         Jon NA
## 858             e          C          M      GenX       Chris NA
## 859             e          C          M      GenX        Troy NA
## 860             e          C          M      GenX        Jeff NA
## 861             e          C          M Millennial     Zachary NA
## 862             e          C          M Millennial       Dylan NA
## 863             e          C          M Millennial   Christian NA
```

```
## 864          e          C          M Millennial    Wesley NA
## 865          e          C          M Millennial      Seth NA
## 866          e          C          M Millennial    Austin NA
## 867          e          C          M Millennial   Gabriel NA
## 868          e          C          M Millennial      Evan NA
## 869          e          C          M Millennial     Casey NA
## 870          e          C          M Millennial      Luis NA
## 871          e          C          F     Boomer    Gloria NA
## 872          e          C          F     Boomer      Joan NA
## 873          e          C          F     Boomer    Dorothy NA
## 874          e          C          F     Boomer    Shirley NA
## 875          e          C          F     Boomer     Betty NA
## 876          e          C          F     Boomer    Dianne NA
## 877          e          C          F     Boomer       Kay NA
## 878          e          C          F     Boomer   Marjorie NA
## 879          e          C          F     Boomer   Lorraine NA
## 880          e          C          F     Boomer    Mildred NA
## 881          e          C          F       GenX     Tracy NA
## 882          e          C          F       GenX      Dawn NA
## 883          e          C          F       GenX      Tina NA
## 884          e          C          F       GenX     Tammy NA
## 885          e          C          F       GenX   Melinda NA
## 886          e          C          F       GenX    Tamara NA
## 887          e          C          F       GenX    Tracey NA
## 888          e          C          F       GenX    Colleen NA
## 889          e          C          F       GenX    Sherri NA
## 890          e          C          F       GenX     Heidi NA
## 891          e          C          F Millennial  Samantha NA
## 892          e          C          F Millennial    Alexis NA
## 893          e          C          F Millennial   Brittany NA
## 894          e          C          F Millennial    Lauren NA
## 895          e          C          F Millennial    Taylor NA
## 896          e          C          F Millennial   Bethany NA
## 897          e          C          F Millennial    Latoya NA
## 898          e          C          F Millennial    Candice NA
## 899          e          C          F Millennial   Brittney NA
## 900          e          C          F Millennial   Cheyenne NA
## 901          f          A          M     Boomer   Theodore NA
## 902          f          A          M     Boomer    Bernard NA
## 903          f          A          M     Boomer      Gene NA
## 904          f          A          M     Boomer    Herbert NA
## 905          f          A          M     Boomer       Ray NA
## 906          f          A          M     Boomer       Tom NA
## 907          f          A          M     Boomer       Lee NA
## 908          f          A          M     Boomer    Alfred NA
## 909          f          A          M     Boomer     Leroy NA
## 910          f          A          M     Boomer     Eddie NA
## 911          f          A          M       GenX      Marc NA
## 912          f          A          M       GenX     Jamie NA
## 913          f          A          M       GenX      Greg NA
## 914          f          A          M       GenX    Darryl NA
## 915          f          A          M       GenX       Tim NA
## 916          f          A          M       GenX      Dean NA
## 917          f          A          M       GenX       Jon NA
```

```
## 918            f          A         M        GenX       Chris NA
## 919            f          A         M        GenX        Troy NA
## 920            f          A         M        GenX        Jeff NA
## 921            f          A         M Millennial     Zachary NA
## 922            f          A         M Millennial       Dylan NA
## 923            f          A         M Millennial   Christian NA
## 924            f          A         M Millennial      Wesley NA
## 925            f          A         M Millennial        Seth NA
## 926            f          A         M Millennial      Austin NA
## 927            f          A         M Millennial     Gabriel NA
## 928            f          A         M Millennial        Evan NA
## 929            f          A         M Millennial       Casey NA
## 930            f          A         M Millennial        Luis NA
## 931            f          A         F     Boomer      Gloria NA
## 932            f          A         F     Boomer        Joan NA
## 933            f          A         F     Boomer     Dorothy NA
## 934            f          A         F     Boomer     Shirley NA
## 935            f          A         F     Boomer       Betty NA
## 936            f          A         F     Boomer      Dianne NA
## 937            f          A         F     Boomer         Kay NA
## 938            f          A         F     Boomer    Marjorie NA
## 939            f          A         F     Boomer    Lorraine NA
## 940            f          A         F     Boomer     Mildred NA
## 941            f          A         F       GenX       Tracy NA
## 942            f          A         F       GenX        Dawn NA
## 943            f          A         F       GenX        Tina NA
## 944            f          A         F       GenX       Tammy NA
## 945            f          A         F       GenX     Melinda NA
## 946            f          A         F       GenX      Tamara NA
## 947            f          A         F       GenX      Tracey NA
## 948            f          A         F       GenX     Colleen NA
## 949            f          A         F       GenX      Sherri NA
## 950            f          A         F       GenX       Heidi NA
## 951            f          A         F Millennial    Samantha NA
## 952            f          A         F Millennial      Alexis NA
## 953            f          A         F Millennial     Brittany NA
## 954            f          A         F Millennial      Lauren NA
## 955            f          A         F Millennial      Taylor NA
## 956            f          A         F Millennial     Bethany NA
## 957            f          A         F Millennial      Latoya NA
## 958            f          A         F Millennial     Candice NA
## 959            f          A         F Millennial     Brittney NA
## 960            f          A         F Millennial     Cheyenne NA
## 961            f          B         M     Boomer    Theodore NA
## 962            f          B         M     Boomer     Bernard NA
## 963            f          B         M     Boomer        Gene NA
## 964            f          B         M     Boomer     Herbert NA
## 965            f          B         M     Boomer         Ray NA
## 966            f          B         M     Boomer         Tom NA
## 967            f          B         M     Boomer         Lee NA
## 968            f          B         M     Boomer      Alfred NA
## 969            f          B         M     Boomer       Leroy NA
## 970            f          B         M     Boomer       Eddie NA
## 971            f          B         M       GenX        Marc NA
```

```
## 972         f        B        M        GenX       Jamie NA
## 973         f        B        M        GenX        Greg NA
## 974         f        B        M        GenX      Darryl NA
## 975         f        B        M        GenX         Tim NA
## 976         f        B        M        GenX        Dean NA
## 977         f        B        M        GenX         Jon NA
## 978         f        B        M        GenX       Chris NA
## 979         f        B        M        GenX        Troy NA
## 980         f        B        M        GenX        Jeff NA
## 981         f        B        M Millennial   Zachary NA
## 982         f        B        M Millennial     Dylan NA
## 983         f        B        M Millennial Christian NA
## 984         f        B        M Millennial    Wesley NA
## 985         f        B        M Millennial      Seth NA
## 986         f        B        M Millennial    Austin NA
## 987         f        B        M Millennial   Gabriel NA
## 988         f        B        M Millennial      Evan NA
## 989         f        B        M Millennial     Casey NA
## 990         f        B        M Millennial      Luis NA
## 991         f        B        F     Boomer    Gloria NA
## 992         f        B        F     Boomer      Joan NA
## 993         f        B        F     Boomer   Dorothy NA
## 994         f        B        F     Boomer   Shirley NA
## 995         f        B        F     Boomer     Betty NA
## 996         f        B        F     Boomer    Dianne NA
## 997         f        B        F     Boomer       Kay NA
## 998         f        B        F     Boomer  Marjorie NA
## 999         f        B        F     Boomer   Lorraine NA
## 1000        f        B        F     Boomer   Mildred NA
## 1001        f        B        F       GenX     Tracy NA
## 1002        f        B        F       GenX      Dawn NA
## 1003        f        B        F       GenX      Tina NA
## 1004        f        B        F       GenX     Tammy NA
## 1005        f        B        F       GenX   Melinda NA
## 1006        f        B        F       GenX    Tamara NA
## 1007        f        B        F       GenX    Tracey NA
## 1008        f        B        F       GenX   Colleen NA
## 1009        f        B        F       GenX    Sherri NA
## 1010        f        B        F       GenX     Heidi NA
## 1011        f        B        F Millennial  Samantha NA
## 1012        f        B        F Millennial    Alexis NA
## 1013        f        B        F Millennial   Brittany NA
## 1014        f        B        F Millennial    Lauren NA
## 1015        f        B        F Millennial    Taylor NA
## 1016        f        B        F Millennial   Bethany NA
## 1017        f        B        F Millennial    Latoya NA
## 1018        f        B        F Millennial   Candice NA
## 1019        f        B        F Millennial   Brittney NA
## 1020        f        B        F Millennial   Cheyenne NA
## 1021        f        C        M     Boomer   Theodore NA
## 1022        f        C        M     Boomer    Bernard NA
## 1023        f        C        M     Boomer      Gene NA
## 1024        f        C        M     Boomer    Herbert NA
## 1025        f        C        M     Boomer       Ray NA
```

```
## 1026           f          C          M       Boomer       Tom NA
## 1027           f          C          M       Boomer       Lee NA
## 1028           f          C          M       Boomer    Alfred NA
## 1029           f          C          M       Boomer     Leroy NA
## 1030           f          C          M       Boomer     Eddie NA
## 1031           f          C          M         GenX      Marc NA
## 1032           f          C          M         GenX     Jamie NA
## 1033           f          C          M         GenX      Greg NA
## 1034           f          C          M         GenX    Darryl NA
## 1035           f          C          M         GenX       Tim NA
## 1036           f          C          M         GenX      Dean NA
## 1037           f          C          M         GenX       Jon NA
## 1038           f          C          M         GenX     Chris NA
## 1039           f          C          M         GenX      Troy NA
## 1040           f          C          M         GenX      Jeff NA
## 1041           f          C          M Millennial   Zachary NA
## 1042           f          C          M Millennial     Dylan NA
## 1043           f          C          M Millennial Christian NA
## 1044           f          C          M Millennial    Wesley NA
## 1045           f          C          M Millennial      Seth NA
## 1046           f          C          M Millennial    Austin NA
## 1047           f          C          M Millennial   Gabriel NA
## 1048           f          C          M Millennial      Evan NA
## 1049           f          C          M Millennial     Casey NA
## 1050           f          C          M Millennial      Luis NA
## 1051           f          C          F       Boomer    Gloria NA
## 1052           f          C          F       Boomer      Joan NA
## 1053           f          C          F       Boomer   Dorothy NA
## 1054           f          C          F       Boomer   Shirley NA
## 1055           f          C          F       Boomer     Betty NA
## 1056           f          C          F       Boomer    Dianne NA
## 1057           f          C          F       Boomer       Kay NA
## 1058           f          C          F       Boomer  Marjorie NA
## 1059           f          C          F       Boomer  Lorraine NA
## 1060           f          C          F       Boomer   Mildred NA
## 1061           f          C          F         GenX     Tracy NA
## 1062           f          C          F         GenX      Dawn NA
## 1063           f          C          F         GenX      Tina NA
## 1064           f          C          F         GenX     Tammy NA
## 1065           f          C          F         GenX   Melinda NA
## 1066           f          C          F         GenX    Tamara NA
## 1067           f          C          F         GenX    Tracey NA
## 1068           f          C          F         GenX   Colleen NA
## 1069           f          C          F         GenX    Sherri NA
## 1070           f          C          F         GenX     Heidi NA
## 1071           f          C          F Millennial  Samantha NA
## 1072           f          C          F Millennial    Alexis NA
## 1073           f          C          F Millennial   Brittany NA
## 1074           f          C          F Millennial    Lauren NA
## 1075           f          C          F Millennial    Taylor NA
## 1076           f          C          F Millennial   Bethany NA
## 1077           f          C          F Millennial    Latoya NA
## 1078           f          C          F Millennial   Candice NA
## 1079           f          C          F Millennial  Brittney NA
```

```
## 1080          f          C     F Millennial    Cheyenne NA
## 1081          g          A     M    Boomer     Theodore NA
## 1082          g          A     M    Boomer      Bernard NA
## 1083          g          A     M    Boomer         Gene NA
## 1084          g          A     M    Boomer      Herbert NA
## 1085          g          A     M    Boomer          Ray NA
## 1086          g          A     M    Boomer          Tom NA
## 1087          g          A     M    Boomer          Lee NA
## 1088          g          A     M    Boomer       Alfred NA
## 1089          g          A     M    Boomer        Leroy NA
## 1090          g          A     M    Boomer        Eddie NA
## 1091          g          A     M      GenX         Marc NA
## 1092          g          A     M      GenX        Jamie NA
## 1093          g          A     M      GenX         Greg NA
## 1094          g          A     M      GenX       Darryl NA
## 1095          g          A     M      GenX          Tim NA
## 1096          g          A     M      GenX         Dean NA
## 1097          g          A     M      GenX          Jon NA
## 1098          g          A     M      GenX        Chris NA
## 1099          g          A     M      GenX         Troy NA
## 1100          g          A     M      GenX         Jeff NA
## 1101          g          A     M Millennial     Zachary NA
## 1102          g          A     M Millennial       Dylan NA
## 1103          g          A     M Millennial   Christian NA
## 1104          g          A     M Millennial      Wesley NA
## 1105          g          A     M Millennial        Seth NA
## 1106          g          A     M Millennial      Austin NA
## 1107          g          A     M Millennial     Gabriel NA
## 1108          g          A     M Millennial        Evan NA
## 1109          g          A     M Millennial       Casey NA
## 1110          g          A     M Millennial        Luis NA
## 1111          g          A     F    Boomer       Gloria NA
## 1112          g          A     F    Boomer         Joan NA
## 1113          g          A     F    Boomer      Dorothy NA
## 1114          g          A     F    Boomer      Shirley NA
## 1115          g          A     F    Boomer        Betty NA
## 1116          g          A     F    Boomer       Dianne NA
## 1117          g          A     F    Boomer          Kay NA
## 1118          g          A     F    Boomer     Marjorie NA
## 1119          g          A     F    Boomer      Lorraine NA
## 1120          g          A     F    Boomer      Mildred NA
## 1121          g          A     F      GenX        Tracy NA
## 1122          g          A     F      GenX         Dawn NA
## 1123          g          A     F      GenX         Tina NA
## 1124          g          A     F      GenX        Tammy NA
## 1125          g          A     F      GenX      Melinda NA
## 1126          g          A     F      GenX       Tamara NA
## 1127          g          A     F      GenX       Tracey NA
## 1128          g          A     F      GenX      Colleen NA
## 1129          g          A     F      GenX       Sherri NA
## 1130          g          A     F      GenX        Heidi NA
## 1131          g          A     F Millennial    Samantha NA
## 1132          g          A     F Millennial      Alexis NA
## 1133          g          A     F Millennial     Brittany NA
```

```
## 1134          g        A      F Millennial     Lauren NA
## 1135          g        A      F Millennial     Taylor NA
## 1136          g        A      F Millennial    Bethany NA
## 1137          g        A      F Millennial     Latoya NA
## 1138          g        A      F Millennial    Candice NA
## 1139          g        A      F Millennial   Brittney NA
## 1140          g        A      F Millennial   Cheyenne NA
## 1141          g        B      M     Boomer   Theodore NA
## 1142          g        B      M     Boomer    Bernard NA
## 1143          g        B      M     Boomer       Gene NA
## 1144          g        B      M     Boomer    Herbert NA
## 1145          g        B      M     Boomer        Ray NA
## 1146          g        B      M     Boomer        Tom NA
## 1147          g        B      M     Boomer        Lee NA
## 1148          g        B      M     Boomer     Alfred NA
## 1149          g        B      M     Boomer      Leroy NA
## 1150          g        B      M     Boomer      Eddie NA
## 1151          g        B      M       GenX       Marc NA
## 1152          g        B      M       GenX      Jamie NA
## 1153          g        B      M       GenX       Greg NA
## 1154          g        B      M       GenX     Darryl NA
## 1155          g        B      M       GenX        Tim NA
## 1156          g        B      M       GenX       Dean NA
## 1157          g        B      M       GenX        Jon NA
## 1158          g        B      M       GenX      Chris NA
## 1159          g        B      M       GenX       Troy NA
## 1160          g        B      M       GenX       Jeff NA
## 1161          g        B      M Millennial    Zachary NA
## 1162          g        B      M Millennial      Dylan NA
## 1163          g        B      M Millennial  Christian NA
## 1164          g        B      M Millennial     Wesley NA
## 1165          g        B      M Millennial       Seth NA
## 1166          g        B      M Millennial     Austin NA
## 1167          g        B      M Millennial    Gabriel NA
## 1168          g        B      M Millennial       Evan NA
## 1169          g        B      M Millennial      Casey NA
## 1170          g        B      M Millennial       Luis NA
## 1171          g        B      F     Boomer     Gloria NA
## 1172          g        B      F     Boomer       Joan NA
## 1173          g        B      F     Boomer    Dorothy NA
## 1174          g        B      F     Boomer    Shirley NA
## 1175          g        B      F     Boomer      Betty NA
## 1176          g        B      F     Boomer     Dianne NA
## 1177          g        B      F     Boomer        Kay NA
## 1178          g        B      F     Boomer   Marjorie NA
## 1179          g        B      F     Boomer   Lorraine NA
## 1180          g        B      F     Boomer    Mildred NA
## 1181          g        B      F       GenX      Tracy NA
## 1182          g        B      F       GenX       Dawn NA
## 1183          g        B      F       GenX       Tina NA
## 1184          g        B      F       GenX      Tammy NA
## 1185          g        B      F       GenX    Melinda NA
## 1186          g        B      F       GenX     Tamara NA
## 1187          g        B      F       GenX     Tracey NA
```

```
## 1188         g          B     F        GenX    Colleen NA
## 1189         g          B     F        GenX     Sherri NA
## 1190         g          B     F        GenX      Heidi NA
## 1191         g          B     F Millennial   Samantha NA
## 1192         g          B     F Millennial     Alexis NA
## 1193         g          B     F Millennial   Brittany NA
## 1194         g          B     F Millennial     Lauren NA
## 1195         g          B     F Millennial     Taylor NA
## 1196         g          B     F Millennial    Bethany NA
## 1197         g          B     F Millennial     Latoya NA
## 1198         g          B     F Millennial    Candice NA
## 1199         g          B     F Millennial   Brittney NA
## 1200         g          B     F Millennial   Cheyenne NA
## 1201         g          C     M     Boomer   Theodore NA
## 1202         g          C     M     Boomer    Bernard NA
## 1203         g          C     M     Boomer       Gene NA
## 1204         g          C     M     Boomer    Herbert NA
## 1205         g          C     M     Boomer        Ray NA
## 1206         g          C     M     Boomer        Tom NA
## 1207         g          C     M     Boomer        Lee NA
## 1208         g          C     M     Boomer     Alfred NA
## 1209         g          C     M     Boomer      Leroy NA
## 1210         g          C     M     Boomer      Eddie NA
## 1211         g          C     M       GenX       Marc NA
## 1212         g          C     M       GenX      Jamie NA
## 1213         g          C     M       GenX       Greg NA
## 1214         g          C     M       GenX     Darryl NA
## 1215         g          C     M       GenX        Tim NA
## 1216         g          C     M       GenX       Dean NA
## 1217         g          C     M       GenX        Jon NA
## 1218         g          C     M       GenX      Chris NA
## 1219         g          C     M       GenX       Troy NA
## 1220         g          C     M       GenX       Jeff NA
## 1221         g          C     M Millennial    Zachary NA
## 1222         g          C     M Millennial      Dylan NA
## 1223         g          C     M Millennial  Christian NA
## 1224         g          C     M Millennial     Wesley NA
## 1225         g          C     M Millennial       Seth NA
## 1226         g          C     M Millennial     Austin NA
## 1227         g          C     M Millennial    Gabriel NA
## 1228         g          C     M Millennial       Evan NA
## 1229         g          C     M Millennial      Casey NA
## 1230         g          C     M Millennial       Luis NA
## 1231         g          C     F     Boomer     Gloria NA
## 1232         g          C     F     Boomer       Joan NA
## 1233         g          C     F     Boomer    Dorothy NA
## 1234         g          C     F     Boomer    Shirley NA
## 1235         g          C     F     Boomer      Betty NA
## 1236         g          C     F     Boomer     Dianne NA
## 1237         g          C     F     Boomer        Kay NA
## 1238         g          C     F     Boomer   Marjorie NA
## 1239         g          C     F     Boomer   Lorraine NA
## 1240         g          C     F     Boomer    Mildred NA
## 1241         g          C     F       GenX      Tracy NA
```

```
## 1242        g         C       F      GenX       Dawn NA
## 1243        g         C       F      GenX       Tina NA
## 1244        g         C       F      GenX      Tammy NA
## 1245        g         C       F      GenX    Melinda NA
## 1246        g         C       F      GenX     Tamara NA
## 1247        g         C       F      GenX     Tracey NA
## 1248        g         C       F      GenX    Colleen NA
## 1249        g         C       F      GenX     Sherri NA
## 1250        g         C       F      GenX      Heidi NA
## 1251        g         C       F Millennial  Samantha NA
## 1252        g         C       F Millennial    Alexis NA
## 1253        g         C       F Millennial   Brittany NA
## 1254        g         C       F Millennial    Lauren NA
## 1255        g         C       F Millennial    Taylor NA
## 1256        g         C       F Millennial   Bethany NA
## 1257        g         C       F Millennial    Latoya NA
## 1258        g         C       F Millennial    Candice NA
## 1259        g         C       F Millennial   Brittney NA
## 1260        g         C       F Millennial   Cheyenne NA
## 1261        h         A       M    Boomer    Theodore NA
## 1262        h         A       M    Boomer     Bernard NA
## 1263        h         A       M    Boomer        Gene NA
## 1264        h         A       M    Boomer     Herbert NA
## 1265        h         A       M    Boomer         Ray NA
## 1266        h         A       M    Boomer         Tom NA
## 1267        h         A       M    Boomer         Lee NA
## 1268        h         A       M    Boomer      Alfred NA
## 1269        h         A       M    Boomer       Leroy NA
## 1270        h         A       M    Boomer       Eddie NA
## 1271        h         A       M      GenX        Marc NA
## 1272        h         A       M      GenX       Jamie NA
## 1273        h         A       M      GenX        Greg NA
## 1274        h         A       M      GenX      Darryl NA
## 1275        h         A       M      GenX         Tim NA
## 1276        h         A       M      GenX        Dean NA
## 1277        h         A       M      GenX         Jon NA
## 1278        h         A       M      GenX       Chris NA
## 1279        h         A       M      GenX        Troy NA
## 1280        h         A       M      GenX        Jeff NA
## 1281        h         A       M Millennial   Zachary NA
## 1282        h         A       M Millennial     Dylan NA
## 1283        h         A       M Millennial Christian NA
## 1284        h         A       M Millennial    Wesley NA
## 1285        h         A       M Millennial      Seth NA
## 1286        h         A       M Millennial    Austin NA
## 1287        h         A       M Millennial   Gabriel NA
## 1288        h         A       M Millennial      Evan NA
## 1289        h         A       M Millennial     Casey NA
## 1290        h         A       M Millennial      Luis NA
## 1291        h         A       F    Boomer      Gloria NA
## 1292        h         A       F    Boomer        Joan NA
## 1293        h         A       F    Boomer     Dorothy NA
## 1294        h         A       F    Boomer     Shirley NA
## 1295        h         A       F    Boomer       Betty NA
```

```
## 1296          h          A          F       Boomer      Dianne NA
## 1297          h          A          F       Boomer         Kay NA
## 1298          h          A          F       Boomer    Marjorie NA
## 1299          h          A          F       Boomer    Lorraine NA
## 1300          h          A          F       Boomer     Mildred NA
## 1301          h          A          F         GenX       Tracy NA
## 1302          h          A          F         GenX        Dawn NA
## 1303          h          A          F         GenX        Tina NA
## 1304          h          A          F         GenX       Tammy NA
## 1305          h          A          F         GenX     Melinda NA
## 1306          h          A          F         GenX      Tamara NA
## 1307          h          A          F         GenX      Tracey NA
## 1308          h          A          F         GenX     Colleen NA
## 1309          h          A          F         GenX      Sherri NA
## 1310          h          A          F         GenX       Heidi NA
## 1311          h          A          F Millennial    Samantha NA
## 1312          h          A          F Millennial      Alexis NA
## 1313          h          A          F Millennial     Brittany NA
## 1314          h          A          F Millennial       Lauren NA
## 1315          h          A          F Millennial       Taylor NA
## 1316          h          A          F Millennial      Bethany NA
## 1317          h          A          F Millennial       Latoya NA
## 1318          h          A          F Millennial      Candice NA
## 1319          h          A          F Millennial     Brittney NA
## 1320          h          A          F Millennial     Cheyenne NA
## 1321          h          B          M       Boomer    Theodore NA
## 1322          h          B          M       Boomer     Bernard NA
## 1323          h          B          M       Boomer        Gene NA
## 1324          h          B          M       Boomer     Herbert NA
## 1325          h          B          M       Boomer         Ray NA
## 1326          h          B          M       Boomer         Tom NA
## 1327          h          B          M       Boomer         Lee NA
## 1328          h          B          M       Boomer      Alfred NA
## 1329          h          B          M       Boomer       Leroy NA
## 1330          h          B          M       Boomer       Eddie NA
## 1331          h          B          M         GenX        Marc NA
## 1332          h          B          M         GenX       Jamie NA
## 1333          h          B          M         GenX        Greg NA
## 1334          h          B          M         GenX      Darryl NA
## 1335          h          B          M         GenX         Tim NA
## 1336          h          B          M         GenX        Dean NA
## 1337          h          B          M         GenX         Jon NA
## 1338          h          B          M         GenX       Chris NA
## 1339          h          B          M         GenX        Troy NA
## 1340          h          B          M         GenX        Jeff NA
## 1341          h          B          M Millennial     Zachary NA
## 1342          h          B          M Millennial       Dylan NA
## 1343          h          B          M Millennial   Christian NA
## 1344          h          B          M Millennial      Wesley NA
## 1345          h          B          M Millennial        Seth NA
## 1346          h          B          M Millennial      Austin NA
## 1347          h          B          M Millennial     Gabriel NA
## 1348          h          B          M Millennial        Evan NA
## 1349          h          B          M Millennial       Casey NA
```

```
## 1350        h         B       M Millennial      Luis NA
## 1351        h         B       F      Boomer    Gloria NA
## 1352        h         B       F      Boomer      Joan NA
## 1353        h         B       F      Boomer   Dorothy NA
## 1354        h         B       F      Boomer   Shirley NA
## 1355        h         B       F      Boomer     Betty NA
## 1356        h         B       F      Boomer    Dianne NA
## 1357        h         B       F      Boomer       Kay NA
## 1358        h         B       F      Boomer  Marjorie NA
## 1359        h         B       F      Boomer  Lorraine NA
## 1360        h         B       F      Boomer   Mildred NA
## 1361        h         B       F        GenX     Tracy NA
## 1362        h         B       F        GenX      Dawn NA
## 1363        h         B       F        GenX      Tina NA
## 1364        h         B       F        GenX     Tammy NA
## 1365        h         B       F        GenX   Melinda NA
## 1366        h         B       F        GenX    Tamara NA
## 1367        h         B       F        GenX    Tracey NA
## 1368        h         B       F        GenX   Colleen NA
## 1369        h         B       F        GenX    Sherri NA
## 1370        h         B       F        GenX     Heidi NA
## 1371        h         B       F Millennial  Samantha NA
## 1372        h         B       F Millennial    Alexis NA
## 1373        h         B       F Millennial  Brittany NA
## 1374        h         B       F Millennial    Lauren NA
## 1375        h         B       F Millennial    Taylor NA
## 1376        h         B       F Millennial   Bethany NA
## 1377        h         B       F Millennial    Latoya NA
## 1378        h         B       F Millennial   Candice NA
## 1379        h         B       F Millennial  Brittney NA
## 1380        h         B       F Millennial  Cheyenne NA
## 1381        h         C       M      Boomer  Theodore NA
## 1382        h         C       M      Boomer   Bernard NA
## 1383        h         C       M      Boomer      Gene NA
## 1384        h         C       M      Boomer   Herbert NA
## 1385        h         C       M      Boomer       Ray NA
## 1386        h         C       M      Boomer       Tom NA
## 1387        h         C       M      Boomer       Lee NA
## 1388        h         C       M      Boomer    Alfred NA
## 1389        h         C       M      Boomer     Leroy NA
## 1390        h         C       M      Boomer     Eddie NA
## 1391        h         C       M        GenX      Marc NA
## 1392        h         C       M        GenX     Jamie NA
## 1393        h         C       M        GenX      Greg NA
## 1394        h         C       M        GenX    Darryl NA
## 1395        h         C       M        GenX       Tim NA
## 1396        h         C       M        GenX      Dean NA
## 1397        h         C       M        GenX       Jon NA
## 1398        h         C       M        GenX     Chris NA
## 1399        h         C       M        GenX      Troy NA
## 1400        h         C       M        GenX      Jeff NA
## 1401        h         C       M Millennial   Zachary NA
## 1402        h         C       M Millennial     Dylan NA
## 1403        h         C       M Millennial Christian NA
```

```
## 1404        h         C         M Millennial     Wesley NA
## 1405        h         C         M Millennial       Seth NA
## 1406        h         C         M Millennial     Austin NA
## 1407        h         C         M Millennial    Gabriel NA
## 1408        h         C         M Millennial       Evan NA
## 1409        h         C         M Millennial      Casey NA
## 1410        h         C         M Millennial       Luis NA
## 1411        h         C         F     Boomer     Gloria NA
## 1412        h         C         F     Boomer       Joan NA
## 1413        h         C         F     Boomer    Dorothy NA
## 1414        h         C         F     Boomer    Shirley NA
## 1415        h         C         F     Boomer      Betty NA
## 1416        h         C         F     Boomer     Dianne NA
## 1417        h         C         F     Boomer        Kay NA
## 1418        h         C         F     Boomer   Marjorie NA
## 1419        h         C         F     Boomer   Lorraine NA
## 1420        h         C         F     Boomer    Mildred NA
## 1421        h         C         F       GenX      Tracy NA
## 1422        h         C         F       GenX       Dawn NA
## 1423        h         C         F       GenX       Tina NA
## 1424        h         C         F       GenX      Tammy NA
## 1425        h         C         F       GenX    Melinda NA
## 1426        h         C         F       GenX     Tamara NA
## 1427        h         C         F       GenX     Tracey NA
## 1428        h         C         F       GenX    Colleen NA
## 1429        h         C         F       GenX     Sherri NA
## 1430        h         C         F       GenX      Heidi NA
## 1431        h         C         F Millennial   Samantha NA
## 1432        h         C         F Millennial     Alexis NA
## 1433        h         C         F Millennial    Brittany NA
## 1434        h         C         F Millennial     Lauren NA
## 1435        h         C         F Millennial      Taylor NA
## 1436        h         C         F Millennial    Bethany NA
## 1437        h         C         F Millennial     Latoya NA
## 1438        h         C         F Millennial     Candice NA
## 1439        h         C         F Millennial    Brittney NA
## 1440        h         C         F Millennial    Cheyenne NA
## 1441        i         A         M     Boomer    Theodore NA
## 1442        i         A         M     Boomer     Bernard NA
## 1443        i         A         M     Boomer        Gene NA
## 1444        i         A         M     Boomer     Herbert NA
## 1445        i         A         M     Boomer         Ray NA
## 1446        i         A         M     Boomer         Tom NA
## 1447        i         A         M     Boomer         Lee NA
## 1448        i         A         M     Boomer      Alfred NA
## 1449        i         A         M     Boomer       Leroy NA
## 1450        i         A         M     Boomer       Eddie NA
## 1451        i         A         M       GenX        Marc NA
## 1452        i         A         M       GenX       Jamie NA
## 1453        i         A         M       GenX        Greg NA
## 1454        i         A         M       GenX      Darryl NA
## 1455        i         A         M       GenX         Tim NA
## 1456        i         A         M       GenX        Dean NA
## 1457        i         A         M       GenX         Jon NA
```

```
## 1458          i          A          M          GenX          Chris NA
## 1459          i          A          M          GenX          Troy NA
## 1460          i          A          M          GenX          Jeff NA
## 1461          i          A          M Millennial       Zachary NA
## 1462          i          A          M Millennial        Dylan NA
## 1463          i          A          M Millennial    Christian NA
## 1464          i          A          M Millennial       Wesley NA
## 1465          i          A          M Millennial         Seth NA
## 1466          i          A          M Millennial       Austin NA
## 1467          i          A          M Millennial      Gabriel NA
## 1468          i          A          M Millennial         Evan NA
## 1469          i          A          M Millennial        Casey NA
## 1470          i          A          M Millennial         Luis NA
## 1471          i          A          F       Boomer       Gloria NA
## 1472          i          A          F       Boomer         Joan NA
## 1473          i          A          F       Boomer      Dorothy NA
## 1474          i          A          F       Boomer      Shirley NA
## 1475          i          A          F       Boomer        Betty NA
## 1476          i          A          F       Boomer       Dianne NA
## 1477          i          A          F       Boomer          Kay NA
## 1478          i          A          F       Boomer     Marjorie NA
## 1479          i          A          F       Boomer     Lorraine NA
## 1480          i          A          F       Boomer      Mildred NA
## 1481          i          A          F         GenX        Tracy NA
## 1482          i          A          F         GenX         Dawn NA
## 1483          i          A          F         GenX         Tina NA
## 1484          i          A          F         GenX        Tammy NA
## 1485          i          A          F         GenX      Melinda NA
## 1486          i          A          F         GenX       Tamara NA
## 1487          i          A          F         GenX       Tracey NA
## 1488          i          A          F         GenX      Colleen NA
## 1489          i          A          F         GenX       Sherri NA
## 1490          i          A          F         GenX        Heidi NA
## 1491          i          A          F Millennial     Samantha NA
## 1492          i          A          F Millennial        Alexis NA
## 1493          i          A          F Millennial      Brittany NA
## 1494          i          A          F Millennial        Lauren NA
## 1495          i          A          F Millennial        Taylor NA
## 1496          i          A          F Millennial       Bethany NA
## 1497          i          A          F Millennial        Latoya NA
## 1498          i          A          F Millennial       Candice NA
## 1499          i          A          F Millennial      Brittney NA
## 1500          i          A          F Millennial      Cheyenne NA
## 1501          i          B          M       Boomer     Theodore NA
## 1502          i          B          M       Boomer      Bernard NA
## 1503          i          B          M       Boomer         Gene NA
## 1504          i          B          M       Boomer      Herbert NA
## 1505          i          B          M       Boomer          Ray NA
## 1506          i          B          M       Boomer          Tom NA
## 1507          i          B          M       Boomer          Lee NA
## 1508          i          B          M       Boomer       Alfred NA
## 1509          i          B          M       Boomer        Leroy NA
## 1510          i          B          M       Boomer        Eddie NA
## 1511          i          B          M         GenX         Marc NA
```

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## 1512            i            B            M            GenX            Jamie NA
## 1513            i            B            M            GenX             Greg NA
## 1514            i            B            M            GenX           Darryl NA
## 1515            i            B            M            GenX              Tim NA
## 1516            i            B            M            GenX             Dean NA
## 1517            i            B            M            GenX              Jon NA
## 1518            i            B            M            GenX            Chris NA
## 1519            i            B            M            GenX             Troy NA
## 1520            i            B            M            GenX             Jeff NA
## 1521            i            B            M Millennial    Zachary NA
## 1522            i            B            M Millennial      Dylan NA
## 1523            i            B            M Millennial  Christian NA
## 1524            i            B            M Millennial     Wesley NA
## 1525            i            B            M Millennial       Seth NA
## 1526            i            B            M Millennial     Austin NA
## 1527            i            B            M Millennial    Gabriel NA
## 1528            i            B            M Millennial       Evan NA
## 1529            i            B            M Millennial       Casey NA
## 1530            i            B            M Millennial       Luis NA
## 1531            i            B            F      Boomer     Gloria NA
## 1532            i            B            F      Boomer       Joan NA
## 1533            i            B            F      Boomer    Dorothy NA
## 1534            i            B            F      Boomer    Shirley NA
## 1535            i            B            F      Boomer      Betty NA
## 1536            i            B            F      Boomer     Dianne NA
## 1537            i            B            F      Boomer        Kay NA
## 1538            i            B            F      Boomer   Marjorie NA
## 1539            i            B            F      Boomer   Lorraine NA
## 1540            i            B            F      Boomer    Mildred NA
## 1541            i            B            F        GenX      Tracy NA
## 1542            i            B            F        GenX       Dawn NA
## 1543            i            B            F        GenX       Tina NA
## 1544            i            B            F        GenX      Tammy NA
## 1545            i            B            F        GenX    Melinda NA
## 1546            i            B            F        GenX     Tamara NA
## 1547            i            B            F        GenX     Tracey NA
## 1548            i            B            F        GenX    Colleen NA
## 1549            i            B            F        GenX     Sherri NA
## 1550            i            B            F        GenX      Heidi NA
## 1551            i            B            F Millennial   Samantha NA
## 1552            i            B            F Millennial     Alexis NA
## 1553            i            B            F Millennial    Brittany NA
## 1554            i            B            F Millennial     Lauren NA
## 1555            i            B            F Millennial     Taylor NA
## 1556            i            B            F Millennial    Bethany NA
## 1557            i            B            F Millennial     Latoya NA
## 1558            i            B            F Millennial    Candice NA
## 1559            i            B            F Millennial   Brittney NA
## 1560            i            B            F Millennial   Cheyenne NA
## 1561            i            C            M      Boomer   Theodore NA
## 1562            i            C            M      Boomer    Bernard NA
## 1563            i            C            M      Boomer       Gene NA
## 1564            i            C            M      Boomer    Herbert NA
## 1565            i            C            M      Boomer        Ray NA
```

```
## 1566        i        C        M        Boomer        Tom NA
## 1567        i        C        M        Boomer        Lee NA
## 1568        i        C        M        Boomer     Alfred NA
## 1569        i        C        M        Boomer      Leroy NA
## 1570        i        C        M        Boomer      Eddie NA
## 1571        i        C        M          GenX       Marc NA
## 1572        i        C        M          GenX      Jamie NA
## 1573        i        C        M          GenX       Greg NA
## 1574        i        C        M          GenX     Darryl NA
## 1575        i        C        M          GenX        Tim NA
## 1576        i        C        M          GenX       Dean NA
## 1577        i        C        M          GenX        Jon NA
## 1578        i        C        M          GenX      Chris NA
## 1579        i        C        M          GenX       Troy NA
## 1580        i        C        M          GenX       Jeff NA
## 1581        i        C        M Millennial    Zachary NA
## 1582        i        C        M Millennial      Dylan NA
## 1583        i        C        M Millennial  Christian NA
## 1584        i        C        M Millennial     Wesley NA
## 1585        i        C        M Millennial       Seth NA
## 1586        i        C        M Millennial     Austin NA
## 1587        i        C        M Millennial    Gabriel NA
## 1588        i        C        M Millennial       Evan NA
## 1589        i        C        M Millennial      Casey NA
## 1590        i        C        M Millennial       Luis NA
## 1591        i        C        F        Boomer     Gloria NA
## 1592        i        C        F        Boomer       Joan NA
## 1593        i        C        F        Boomer    Dorothy NA
## 1594        i        C        F        Boomer    Shirley NA
## 1595        i        C        F        Boomer      Betty NA
## 1596        i        C        F        Boomer     Dianne NA
## 1597        i        C        F        Boomer        Kay NA
## 1598        i        C        F        Boomer   Marjorie NA
## 1599        i        C        F        Boomer   Lorraine NA
## 1600        i        C        F        Boomer    Mildred NA
## 1601        i        C        F          GenX      Tracy NA
## 1602        i        C        F          GenX       Dawn NA
## 1603        i        C        F          GenX       Tina NA
## 1604        i        C        F          GenX      Tammy NA
## 1605        i        C        F          GenX    Melinda NA
## 1606        i        C        F          GenX     Tamara NA
## 1607        i        C        F          GenX     Tracey NA
## 1608        i        C        F          GenX    Colleen NA
## 1609        i        C        F          GenX      Sherri NA
## 1610        i        C        F          GenX      Heidi NA
## 1611        i        C        F Millennial   Samantha NA
## 1612        i        C        F Millennial     Alexis NA
## 1613        i        C        F Millennial    Brittany NA
## 1614        i        C        F Millennial     Lauren NA
## 1615        i        C        F Millennial     Taylor NA
## 1616        i        C        F Millennial    Bethany NA
## 1617        i        C        F Millennial     Latoya NA
## 1618        i        C        F Millennial    Candice NA
## 1619        i        C        F Millennial    Brittney NA
```

```
## 1620        i        C        F Millennial   Cheyenne NA
## 1621        j        A        M    Boomer     Theodore NA
## 1622        j        A        M    Boomer      Bernard NA
## 1623        j        A        M    Boomer         Gene NA
## 1624        j        A        M    Boomer      Herbert NA
## 1625        j        A        M    Boomer          Ray NA
## 1626        j        A        M    Boomer          Tom NA
## 1627        j        A        M    Boomer          Lee NA
## 1628        j        A        M    Boomer       Alfred NA
## 1629        j        A        M    Boomer        Leroy NA
## 1630        j        A        M    Boomer        Eddie NA
## 1631        j        A        M      GenX         Marc NA
## 1632        j        A        M      GenX        Jamie NA
## 1633        j        A        M      GenX         Greg NA
## 1634        j        A        M      GenX       Darryl NA
## 1635        j        A        M      GenX          Tim NA
## 1636        j        A        M      GenX         Dean NA
## 1637        j        A        M      GenX          Jon NA
## 1638        j        A        M      GenX        Chris NA
## 1639        j        A        M      GenX         Troy NA
## 1640        j        A        M      GenX         Jeff NA
## 1641        j        A        M Millennial    Zachary NA
## 1642        j        A        M Millennial      Dylan NA
## 1643        j        A        M Millennial  Christian NA
## 1644        j        A        M Millennial     Wesley NA
## 1645        j        A        M Millennial       Seth NA
## 1646        j        A        M Millennial     Austin NA
## 1647        j        A        M Millennial    Gabriel NA
## 1648        j        A        M Millennial       Evan NA
## 1649        j        A        M Millennial      Casey NA
## 1650        j        A        M Millennial       Luis NA
## 1651        j        A        F    Boomer       Gloria NA
## 1652        j        A        F    Boomer         Joan NA
## 1653        j        A        F    Boomer      Dorothy NA
## 1654        j        A        F    Boomer      Shirley NA
## 1655        j        A        F    Boomer        Betty NA
## 1656        j        A        F    Boomer       Dianne NA
## 1657        j        A        F    Boomer          Kay NA
## 1658        j        A        F    Boomer      Marjorie NA
## 1659        j        A        F    Boomer      Lorraine NA
## 1660        j        A        F    Boomer      Mildred NA
## 1661        j        A        F      GenX        Tracy NA
## 1662        j        A        F      GenX         Dawn NA
## 1663        j        A        F      GenX         Tina NA
## 1664        j        A        F      GenX        Tammy NA
## 1665        j        A        F      GenX      Melinda NA
## 1666        j        A        F      GenX       Tamara NA
## 1667        j        A        F      GenX       Tracey NA
## 1668        j        A        F      GenX      Colleen NA
## 1669        j        A        F      GenX       Sherri NA
## 1670        j        A        F      GenX        Heidi NA
## 1671        j        A        F Millennial   Samantha NA
## 1672        j        A        F Millennial     Alexis NA
## 1673        j        A        F Millennial    Brittany NA
```

```
## 1674          j           A        F Millennial     Lauren NA
## 1675          j           A        F Millennial     Taylor NA
## 1676          j           A        F Millennial    Bethany NA
## 1677          j           A        F Millennial     Latoya NA
## 1678          j           A        F Millennial    Candice NA
## 1679          j           A        F Millennial   Brittney NA
## 1680          j           A        F Millennial   Cheyenne NA
## 1681          j           B        M     Boomer   Theodore NA
## 1682          j           B        M     Boomer    Bernard NA
## 1683          j           B        M     Boomer       Gene NA
## 1684          j           B        M     Boomer    Herbert NA
## 1685          j           B        M     Boomer        Ray NA
## 1686          j           B        M     Boomer        Tom NA
## 1687          j           B        M     Boomer        Lee NA
## 1688          j           B        M     Boomer     Alfred NA
## 1689          j           B        M     Boomer      Leroy NA
## 1690          j           B        M     Boomer      Eddie NA
## 1691          j           B        M       GenX       Marc NA
## 1692          j           B        M       GenX      Jamie NA
## 1693          j           B        M       GenX       Greg NA
## 1694          j           B        M       GenX     Darryl NA
## 1695          j           B        M       GenX        Tim NA
## 1696          j           B        M       GenX       Dean NA
## 1697          j           B        M       GenX        Jon NA
## 1698          j           B        M       GenX      Chris NA
## 1699          j           B        M       GenX       Troy NA
## 1700          j           B        M       GenX       Jeff NA
## 1701          j           B        M Millennial    Zachary NA
## 1702          j           B        M Millennial      Dylan NA
## 1703          j           B        M Millennial  Christian NA
## 1704          j           B        M Millennial     Wesley NA
## 1705          j           B        M Millennial       Seth NA
## 1706          j           B        M Millennial     Austin NA
## 1707          j           B        M Millennial    Gabriel NA
## 1708          j           B        M Millennial       Evan NA
## 1709          j           B        M Millennial      Casey NA
## 1710          j           B        M Millennial       Luis NA
## 1711          j           B        F     Boomer     Gloria NA
## 1712          j           B        F     Boomer       Joan NA
## 1713          j           B        F     Boomer    Dorothy NA
## 1714          j           B        F     Boomer    Shirley NA
## 1715          j           B        F     Boomer      Betty NA
## 1716          j           B        F     Boomer     Dianne NA
## 1717          j           B        F     Boomer        Kay NA
## 1718          j           B        F     Boomer   Marjorie NA
## 1719          j           B        F     Boomer   Lorraine NA
## 1720          j           B        F     Boomer    Mildred NA
## 1721          j           B        F       GenX      Tracy NA
## 1722          j           B        F       GenX       Dawn NA
## 1723          j           B        F       GenX       Tina NA
## 1724          j           B        F       GenX      Tammy NA
## 1725          j           B        F       GenX    Melinda NA
## 1726          j           B        F       GenX     Tamara NA
## 1727          j           B        F       GenX     Tracey NA
```

```
## 1728           j         B        F         GenX     Colleen NA
## 1729           j         B        F         GenX      Sherri NA
## 1730           j         B        F         GenX       Heidi NA
## 1731           j         B        F Millennial    Samantha NA
## 1732           j         B        F Millennial      Alexis NA
## 1733           j         B        F Millennial    Brittany NA
## 1734           j         B        F Millennial      Lauren NA
## 1735           j         B        F Millennial      Taylor NA
## 1736           j         B        F Millennial     Bethany NA
## 1737           j         B        F Millennial      Latoya NA
## 1738           j         B        F Millennial     Candice NA
## 1739           j         B        F Millennial    Brittney NA
## 1740           j         B        F Millennial    Cheyenne NA
## 1741           j         C        M     Boomer    Theodore NA
## 1742           j         C        M     Boomer     Bernard NA
## 1743           j         C        M     Boomer        Gene NA
## 1744           j         C        M     Boomer     Herbert NA
## 1745           j         C        M     Boomer         Ray NA
## 1746           j         C        M     Boomer         Tom NA
## 1747           j         C        M     Boomer         Lee NA
## 1748           j         C        M     Boomer      Alfred NA
## 1749           j         C        M     Boomer       Leroy NA
## 1750           j         C        M     Boomer       Eddie NA
## 1751           j         C        M       GenX        Marc NA
## 1752           j         C        M       GenX       Jamie NA
## 1753           j         C        M       GenX        Greg NA
## 1754           j         C        M       GenX      Darryl NA
## 1755           j         C        M       GenX         Tim NA
## 1756           j         C        M       GenX        Dean NA
## 1757           j         C        M       GenX         Jon NA
## 1758           j         C        M       GenX       Chris NA
## 1759           j         C        M       GenX        Troy NA
## 1760           j         C        M       GenX        Jeff NA
## 1761           j         C        M Millennial     Zachary NA
## 1762           j         C        M Millennial       Dylan NA
## 1763           j         C        M Millennial   Christian NA
## 1764           j         C        M Millennial      Wesley NA
## 1765           j         C        M Millennial        Seth NA
## 1766           j         C        M Millennial      Austin NA
## 1767           j         C        M Millennial     Gabriel NA
## 1768           j         C        M Millennial        Evan NA
## 1769           j         C        M Millennial       Casey NA
## 1770           j         C        M Millennial        Luis NA
## 1771           j         C        F     Boomer      Gloria NA
## 1772           j         C        F     Boomer        Joan NA
## 1773           j         C        F     Boomer     Dorothy NA
## 1774           j         C        F     Boomer     Shirley NA
## 1775           j         C        F     Boomer       Betty NA
## 1776           j         C        F     Boomer      Dianne NA
## 1777           j         C        F     Boomer         Kay NA
## 1778           j         C        F     Boomer    Marjorie NA
## 1779           j         C        F     Boomer    Lorraine NA
## 1780           j         C        F     Boomer     Mildred NA
## 1781           j         C        F       GenX       Tracy NA
```

```
## 1782          j          C          F          GenX          Dawn NA
## 1783          j          C          F          GenX          Tina NA
## 1784          j          C          F          GenX         Tammy NA
## 1785          j          C          F          GenX       Melinda NA
## 1786          j          C          F          GenX        Tamara NA
## 1787          j          C          F          GenX        Tracey NA
## 1788          j          C          F          GenX       Colleen NA
## 1789          j          C          F          GenX        Sherri NA
## 1790          j          C          F          GenX         Heidi NA
## 1791          j          C          F Millennial  Samantha NA
## 1792          j          C          F Millennial    Alexis NA
## 1793          j          C          F Millennial   Brittany NA
## 1794          j          C          F Millennial    Lauren NA
## 1795          j          C          F Millennial    Taylor NA
## 1796          j          C          F Millennial   Bethany NA
## 1797          j          C          F Millennial    Latoya NA
## 1798          j          C          F Millennial   Candice NA
## 1799          j          C          F Millennial  Brittney NA
## 1800          j          C          F Millennial  Cheyenne NA
## 1801          k          A          M        Boomer  Theodore NA
## 1802          k          A          M        Boomer   Bernard NA
## 1803          k          A          M        Boomer      Gene NA
## 1804          k          A          M        Boomer   Herbert NA
## 1805          k          A          M        Boomer       Ray NA
## 1806          k          A          M        Boomer       Tom NA
## 1807          k          A          M        Boomer       Lee NA
## 1808          k          A          M        Boomer    Alfred NA
## 1809          k          A          M        Boomer     Leroy NA
## 1810          k          A          M        Boomer     Eddie NA
## 1811          k          A          M          GenX      Marc NA
## 1812          k          A          M          GenX     Jamie NA
## 1813          k          A          M          GenX      Greg NA
## 1814          k          A          M          GenX    Darryl NA
## 1815          k          A          M          GenX       Tim NA
## 1816          k          A          M          GenX      Dean NA
## 1817          k          A          M          GenX       Jon NA
## 1818          k          A          M          GenX     Chris NA
## 1819          k          A          M          GenX      Troy NA
## 1820          k          A          M          GenX      Jeff NA
## 1821          k          A          M Millennial   Zachary NA
## 1822          k          A          M Millennial     Dylan NA
## 1823          k          A          M Millennial Christian NA
## 1824          k          A          M Millennial    Wesley NA
## 1825          k          A          M Millennial      Seth NA
## 1826          k          A          M Millennial    Austin NA
## 1827          k          A          M Millennial   Gabriel NA
## 1828          k          A          M Millennial      Evan NA
## 1829          k          A          M Millennial     Casey NA
## 1830          k          A          M Millennial      Luis NA
## 1831          k          A          F        Boomer    Gloria NA
## 1832          k          A          F        Boomer      Joan NA
## 1833          k          A          F        Boomer   Dorothy NA
## 1834          k          A          F        Boomer   Shirley NA
## 1835          k          A          F        Boomer     Betty NA
```

```
## 1836          k           A           F         Boomer     Dianne NA
## 1837          k           A           F         Boomer        Kay NA
## 1838          k           A           F         Boomer   Marjorie NA
## 1839          k           A           F         Boomer   Lorraine NA
## 1840          k           A           F         Boomer    Mildred NA
## 1841          k           A           F           GenX      Tracy NA
## 1842          k           A           F           GenX       Dawn NA
## 1843          k           A           F           GenX       Tina NA
## 1844          k           A           F           GenX      Tammy NA
## 1845          k           A           F           GenX    Melinda NA
## 1846          k           A           F           GenX     Tamara NA
## 1847          k           A           F           GenX     Tracey NA
## 1848          k           A           F           GenX    Colleen NA
## 1849          k           A           F           GenX      Sherri NA
## 1850          k           A           F           GenX      Heidi NA
## 1851          k           A           F Millennial   Samantha NA
## 1852          k           A           F Millennial     Alexis NA
## 1853          k           A           F Millennial    Brittany NA
## 1854          k           A           F Millennial     Lauren NA
## 1855          k           A           F Millennial      Taylor NA
## 1856          k           A           F Millennial     Bethany NA
## 1857          k           A           F Millennial      Latoya NA
## 1858          k           A           F Millennial     Candice NA
## 1859          k           A           F Millennial    Brittney NA
## 1860          k           A           F Millennial    Cheyenne NA
## 1861          k           B           M         Boomer   Theodore NA
## 1862          k           B           M         Boomer    Bernard NA
## 1863          k           B           M         Boomer       Gene NA
## 1864          k           B           M         Boomer    Herbert NA
## 1865          k           B           M         Boomer        Ray NA
## 1866          k           B           M         Boomer        Tom NA
## 1867          k           B           M         Boomer        Lee NA
## 1868          k           B           M         Boomer     Alfred NA
## 1869          k           B           M         Boomer      Leroy NA
## 1870          k           B           M         Boomer      Eddie NA
## 1871          k           B           M           GenX       Marc NA
## 1872          k           B           M           GenX      Jamie NA
## 1873          k           B           M           GenX       Greg NA
## 1874          k           B           M           GenX     Darryl NA
## 1875          k           B           M           GenX        Tim NA
## 1876          k           B           M           GenX       Dean NA
## 1877          k           B           M           GenX        Jon NA
## 1878          k           B           M           GenX      Chris NA
## 1879          k           B           M           GenX       Troy NA
## 1880          k           B           M           GenX       Jeff NA
## 1881          k           B           M Millennial    Zachary NA
## 1882          k           B           M Millennial      Dylan NA
## 1883          k           B           M Millennial  Christian NA
## 1884          k           B           M Millennial     Wesley NA
## 1885          k           B           M Millennial       Seth NA
## 1886          k           B           M Millennial     Austin NA
## 1887          k           B           M Millennial    Gabriel NA
## 1888          k           B           M Millennial       Evan NA
## 1889          k           B           M Millennial       Casey NA
```

```
## 1890          k          B          M Millennial       Luis NA
## 1891          k          B          F      Boomer     Gloria NA
## 1892          k          B          F      Boomer       Joan NA
## 1893          k          B          F      Boomer    Dorothy NA
## 1894          k          B          F      Boomer    Shirley NA
## 1895          k          B          F      Boomer      Betty NA
## 1896          k          B          F      Boomer     Dianne NA
## 1897          k          B          F      Boomer        Kay NA
## 1898          k          B          F      Boomer   Marjorie NA
## 1899          k          B          F      Boomer   Lorraine NA
## 1900          k          B          F      Boomer    Mildred NA
## 1901          k          B          F        GenX      Tracy NA
## 1902          k          B          F        GenX       Dawn NA
## 1903          k          B          F        GenX       Tina NA
## 1904          k          B          F        GenX      Tammy NA
## 1905          k          B          F        GenX    Melinda NA
## 1906          k          B          F        GenX     Tamara NA
## 1907          k          B          F        GenX     Tracey NA
## 1908          k          B          F        GenX    Colleen NA
## 1909          k          B          F        GenX     Sherri NA
## 1910          k          B          F        GenX      Heidi NA
## 1911          k          B          F Millennial   Samantha NA
## 1912          k          B          F Millennial     Alexis NA
## 1913          k          B          F Millennial   Brittany NA
## 1914          k          B          F Millennial     Lauren NA
## 1915          k          B          F Millennial     Taylor NA
## 1916          k          B          F Millennial    Bethany NA
## 1917          k          B          F Millennial     Latoya NA
## 1918          k          B          F Millennial    Candice NA
## 1919          k          B          F Millennial   Brittney NA
## 1920          k          B          F Millennial   Cheyenne NA
## 1921          k          C          M      Boomer   Theodore NA
## 1922          k          C          M      Boomer    Bernard NA
## 1923          k          C          M      Boomer       Gene NA
## 1924          k          C          M      Boomer    Herbert NA
## 1925          k          C          M      Boomer        Ray NA
## 1926          k          C          M      Boomer        Tom NA
## 1927          k          C          M      Boomer        Lee NA
## 1928          k          C          M      Boomer     Alfred NA
## 1929          k          C          M      Boomer      Leroy NA
## 1930          k          C          M      Boomer      Eddie NA
## 1931          k          C          M        GenX       Marc NA
## 1932          k          C          M        GenX      Jamie NA
## 1933          k          C          M        GenX       Greg NA
## 1934          k          C          M        GenX     Darryl NA
## 1935          k          C          M        GenX        Tim NA
## 1936          k          C          M        GenX       Dean NA
## 1937          k          C          M        GenX        Jon NA
## 1938          k          C          M        GenX      Chris NA
## 1939          k          C          M        GenX       Troy NA
## 1940          k          C          M        GenX       Jeff NA
## 1941          k          C          M Millennial    Zachary NA
## 1942          k          C          M Millennial      Dylan NA
## 1943          k          C          M Millennial  Christian NA
```

```
## 1944          k          C          M Millennial     Wesley NA
## 1945          k          C          M Millennial       Seth NA
## 1946          k          C          M Millennial     Austin NA
## 1947          k          C          M Millennial    Gabriel NA
## 1948          k          C          M Millennial       Evan NA
## 1949          k          C          M Millennial      Casey NA
## 1950          k          C          M Millennial       Luis NA
## 1951          k          C          F    Boomer     Gloria NA
## 1952          k          C          F    Boomer       Joan NA
## 1953          k          C          F    Boomer    Dorothy NA
## 1954          k          C          F    Boomer    Shirley NA
## 1955          k          C          F    Boomer      Betty NA
## 1956          k          C          F    Boomer     Dianne NA
## 1957          k          C          F    Boomer        Kay NA
## 1958          k          C          F    Boomer   Marjorie NA
## 1959          k          C          F    Boomer   Lorraine NA
## 1960          k          C          F    Boomer    Mildred NA
## 1961          k          C          F      GenX      Tracy NA
## 1962          k          C          F      GenX       Dawn NA
## 1963          k          C          F      GenX       Tina NA
## 1964          k          C          F      GenX      Tammy NA
## 1965          k          C          F      GenX    Melinda NA
## 1966          k          C          F      GenX     Tamara NA
## 1967          k          C          F      GenX     Tracey NA
## 1968          k          C          F      GenX    Colleen NA
## 1969          k          C          F      GenX     Sherri NA
## 1970          k          C          F      GenX      Heidi NA
## 1971          k          C          F Millennial   Samantha NA
## 1972          k          C          F Millennial     Alexis NA
## 1973          k          C          F Millennial   Brittany NA
## 1974          k          C          F Millennial     Lauren NA
## 1975          k          C          F Millennial     Taylor NA
## 1976          k          C          F Millennial    Bethany NA
## 1977          k          C          F Millennial     Latoya NA
## 1978          k          C          F Millennial     Candice NA
## 1979          k          C          F Millennial    Brittney NA
## 1980          k          C          F Millennial    Cheyenne NA
## 1981          l          A          M    Boomer   Theodore NA
## 1982          l          A          M    Boomer    Bernard NA
## 1983          l          A          M    Boomer       Gene NA
## 1984          l          A          M    Boomer    Herbert NA
## 1985          l          A          M    Boomer        Ray NA
## 1986          l          A          M    Boomer        Tom NA
## 1987          l          A          M    Boomer        Lee NA
## 1988          l          A          M    Boomer     Alfred NA
## 1989          l          A          M    Boomer      Leroy NA
## 1990          l          A          M    Boomer      Eddie NA
## 1991          l          A          M      GenX       Marc NA
## 1992          l          A          M      GenX      Jamie NA
## 1993          l          A          M      GenX       Greg NA
## 1994          l          A          M      GenX     Darryl NA
## 1995          l          A          M      GenX        Tim NA
## 1996          l          A          M      GenX       Dean NA
## 1997          l          A          M      GenX        Jon NA
```

```
## 1998        l        A        M        GenX       Chris NA
## 1999        l        A        M        GenX        Troy NA
## 2000        l        A        M        GenX        Jeff NA
## 2001        l        A        M Millennial    Zachary NA
## 2002        l        A        M Millennial      Dylan NA
## 2003        l        A        M Millennial  Christian NA
## 2004        l        A        M Millennial     Wesley NA
## 2005        l        A        M Millennial       Seth NA
## 2006        l        A        M Millennial     Austin NA
## 2007        l        A        M Millennial    Gabriel NA
## 2008        l        A        M Millennial       Evan NA
## 2009        l        A        M Millennial      Casey NA
## 2010        l        A        M Millennial       Luis NA
## 2011        l        A        F     Boomer      Gloria NA
## 2012        l        A        F     Boomer        Joan NA
## 2013        l        A        F     Boomer     Dorothy NA
## 2014        l        A        F     Boomer     Shirley NA
## 2015        l        A        F     Boomer       Betty NA
## 2016        l        A        F     Boomer      Dianne NA
## 2017        l        A        F     Boomer         Kay NA
## 2018        l        A        F     Boomer    Marjorie NA
## 2019        l        A        F     Boomer     Lorraine NA
## 2020        l        A        F     Boomer      Mildred NA
## 2021        l        A        F       GenX       Tracy NA
## 2022        l        A        F       GenX        Dawn NA
## 2023        l        A        F       GenX        Tina NA
## 2024        l        A        F       GenX       Tammy NA
## 2025        l        A        F       GenX     Melinda NA
## 2026        l        A        F       GenX      Tamara NA
## 2027        l        A        F       GenX      Tracey NA
## 2028        l        A        F       GenX     Colleen NA
## 2029        l        A        F       GenX       Sherri NA
## 2030        l        A        F       GenX        Heidi NA
## 2031        l        A        F Millennial   Samantha NA
## 2032        l        A        F Millennial      Alexis NA
## 2033        l        A        F Millennial     Brittany NA
## 2034        l        A        F Millennial       Lauren NA
## 2035        l        A        F Millennial       Taylor NA
## 2036        l        A        F Millennial      Bethany NA
## 2037        l        A        F Millennial       Latoya NA
## 2038        l        A        F Millennial      Candice NA
## 2039        l        A        F Millennial     Brittney NA
## 2040        l        A        F Millennial     Cheyenne NA
## 2041        l        B        M     Boomer    Theodore NA
## 2042        l        B        M     Boomer      Bernard NA
## 2043        l        B        M     Boomer         Gene NA
## 2044        l        B        M     Boomer      Herbert NA
## 2045        l        B        M     Boomer          Ray NA
## 2046        l        B        M     Boomer          Tom NA
## 2047        l        B        M     Boomer          Lee NA
## 2048        l        B        M     Boomer       Alfred NA
## 2049        l        B        M     Boomer        Leroy NA
## 2050        l        B        M     Boomer        Eddie NA
## 2051        l        B        M       GenX         Marc NA
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## 2052          l          B          M          GenX        Jamie NA
## 2053          l          B          M          GenX         Greg NA
## 2054          l          B          M          GenX       Darryl NA
## 2055          l          B          M          GenX          Tim NA
## 2056          l          B          M          GenX         Dean NA
## 2057          l          B          M          GenX          Jon NA
## 2058          l          B          M          GenX        Chris NA
## 2059          l          B          M          GenX         Troy NA
## 2060          l          B          M          GenX         Jeff NA
## 2061          l          B          M Millennial    Zachary NA
## 2062          l          B          M Millennial      Dylan NA
## 2063          l          B          M Millennial  Christian NA
## 2064          l          B          M Millennial     Wesley NA
## 2065          l          B          M Millennial       Seth NA
## 2066          l          B          M Millennial     Austin NA
## 2067          l          B          M Millennial    Gabriel NA
## 2068          l          B          M Millennial       Evan NA
## 2069          l          B          M Millennial      Casey NA
## 2070          l          B          M Millennial       Luis NA
## 2071          l          B          F      Boomer     Gloria NA
## 2072          l          B          F      Boomer       Joan NA
## 2073          l          B          F      Boomer    Dorothy NA
## 2074          l          B          F      Boomer    Shirley NA
## 2075          l          B          F      Boomer      Betty NA
## 2076          l          B          F      Boomer     Dianne NA
## 2077          l          B          F      Boomer        Kay NA
## 2078          l          B          F      Boomer    Marjorie NA
## 2079          l          B          F      Boomer    Lorraine NA
## 2080          l          B          F      Boomer     Mildred NA
## 2081          l          B          F        GenX      Tracy NA
## 2082          l          B          F        GenX       Dawn NA
## 2083          l          B          F        GenX       Tina NA
## 2084          l          B          F        GenX      Tammy NA
## 2085          l          B          F        GenX    Melinda NA
## 2086          l          B          F        GenX     Tamara NA
## 2087          l          B          F        GenX     Tracey NA
## 2088          l          B          F        GenX    Colleen NA
## 2089          l          B          F        GenX      Sherri NA
## 2090          l          B          F        GenX       Heidi NA
## 2091          l          B          F Millennial   Samantha NA
## 2092          l          B          F Millennial     Alexis NA
## 2093          l          B          F Millennial    Brittany NA
## 2094          l          B          F Millennial     Lauren NA
## 2095          l          B          F Millennial     Taylor NA
## 2096          l          B          F Millennial    Bethany NA
## 2097          l          B          F Millennial     Latoya NA
## 2098          l          B          F Millennial    Candice NA
## 2099          l          B          F Millennial    Brittney NA
## 2100          l          B          F Millennial    Cheyenne NA
## 2101          l          C          M      Boomer   Theodore NA
## 2102          l          C          M      Boomer    Bernard NA
## 2103          l          C          M      Boomer       Gene NA
## 2104          l          C          M      Boomer    Herbert NA
## 2105          l          C          M      Boomer        Ray NA
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## 2106          l         C         M       Boomer       Tom NA
## 2107          l         C         M       Boomer       Lee NA
## 2108          l         C         M       Boomer    Alfred NA
## 2109          l         C         M       Boomer     Leroy NA
## 2110          l         C         M       Boomer     Eddie NA
## 2111          l         C         M         GenX      Marc NA
## 2112          l         C         M         GenX     Jamie NA
## 2113          l         C         M         GenX      Greg NA
## 2114          l         C         M         GenX    Darryl NA
## 2115          l         C         M         GenX       Tim NA
## 2116          l         C         M         GenX      Dean NA
## 2117          l         C         M         GenX       Jon NA
## 2118          l         C         M         GenX     Chris NA
## 2119          l         C         M         GenX      Troy NA
## 2120          l         C         M         GenX      Jeff NA
## 2121          l         C         M Millennial   Zachary NA
## 2122          l         C         M Millennial     Dylan NA
## 2123          l         C         M Millennial Christian NA
## 2124          l         C         M Millennial    Wesley NA
## 2125          l         C         M Millennial      Seth NA
## 2126          l         C         M Millennial    Austin NA
## 2127          l         C         M Millennial    Gabriel NA
## 2128          l         C         M Millennial      Evan NA
## 2129          l         C         M Millennial     Casey NA
## 2130          l         C         M Millennial      Luis NA
## 2131          l         C         F       Boomer    Gloria NA
## 2132          l         C         F       Boomer      Joan NA
## 2133          l         C         F       Boomer   Dorothy NA
## 2134          l         C         F       Boomer   Shirley NA
## 2135          l         C         F       Boomer     Betty NA
## 2136          l         C         F       Boomer    Dianne NA
## 2137          l         C         F       Boomer       Kay NA
## 2138          l         C         F       Boomer   Marjorie NA
## 2139          l         C         F       Boomer   Lorraine NA
## 2140          l         C         F       Boomer   Mildred NA
## 2141          l         C         F         GenX     Tracy NA
## 2142          l         C         F         GenX      Dawn NA
## 2143          l         C         F         GenX      Tina NA
## 2144          l         C         F         GenX     Tammy NA
## 2145          l         C         F         GenX   Melinda NA
## 2146          l         C         F         GenX    Tamara NA
## 2147          l         C         F         GenX    Tracey NA
## 2148          l         C         F         GenX   Colleen NA
## 2149          l         C         F         GenX    Sherri NA
## 2150          l         C         F         GenX     Heidi NA
## 2151          l         C         F Millennial  Samantha NA
## 2152          l         C         F Millennial    Alexis NA
## 2153          l         C         F Millennial   Brittany NA
## 2154          l         C         F Millennial    Lauren NA
## 2155          l         C         F Millennial    Taylor NA
## 2156          l         C         F Millennial   Bethany NA
## 2157          l         C         F Millennial    Latoya NA
## 2158          l         C         F Millennial   Candice NA
## 2159          l         C         F Millennial   Brittney NA
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## 2160      l          C         F Millennial   Cheyenne NA
## 2161      m          A         M     Boomer   Theodore NA
## 2162      m          A         M     Boomer    Bernard NA
## 2163      m          A         M     Boomer       Gene NA
## 2164      m          A         M     Boomer    Herbert NA
## 2165      m          A         M     Boomer        Ray NA
## 2166      m          A         M     Boomer        Tom NA
## 2167      m          A         M     Boomer        Lee NA
## 2168      m          A         M     Boomer     Alfred NA
## 2169      m          A         M     Boomer      Leroy NA
## 2170      m          A         M     Boomer      Eddie NA
## 2171      m          A         M       GenX       Marc NA
## 2172      m          A         M       GenX      Jamie NA
## 2173      m          A         M       GenX       Greg NA
## 2174      m          A         M       GenX     Darryl NA
## 2175      m          A         M       GenX        Tim NA
## 2176      m          A         M       GenX       Dean NA
## 2177      m          A         M       GenX        Jon NA
## 2178      m          A         M       GenX      Chris NA
## 2179      m          A         M       GenX       Troy NA
## 2180      m          A         M       GenX       Jeff NA
## 2181      m          A         M Millennial    Zachary NA
## 2182      m          A         M Millennial      Dylan NA
## 2183      m          A         M Millennial  Christian NA
## 2184      m          A         M Millennial     Wesley NA
## 2185      m          A         M Millennial       Seth NA
## 2186      m          A         M Millennial     Austin NA
## 2187      m          A         M Millennial    Gabriel NA
## 2188      m          A         M Millennial       Evan NA
## 2189      m          A         M Millennial      Casey NA
## 2190      m          A         M Millennial       Luis NA
## 2191      m          A         F     Boomer     Gloria NA
## 2192      m          A         F     Boomer       Joan NA
## 2193      m          A         F     Boomer    Dorothy NA
## 2194      m          A         F     Boomer    Shirley NA
## 2195      m          A         F     Boomer      Betty NA
## 2196      m          A         F     Boomer     Dianne NA
## 2197      m          A         F     Boomer        Kay NA
## 2198      m          A         F     Boomer   Marjorie NA
## 2199      m          A         F     Boomer   Lorraine NA
## 2200      m          A         F     Boomer    Mildred NA
## 2201      m          A         F       GenX      Tracy NA
## 2202      m          A         F       GenX       Dawn NA
## 2203      m          A         F       GenX       Tina NA
## 2204      m          A         F       GenX      Tammy NA
## 2205      m          A         F       GenX    Melinda NA
## 2206      m          A         F       GenX     Tamara NA
## 2207      m          A         F       GenX     Tracey NA
## 2208      m          A         F       GenX    Colleen NA
## 2209      m          A         F       GenX      Sherri NA
## 2210      m          A         F       GenX       Heidi NA
## 2211      m          A         F Millennial   Samantha NA
## 2212      m          A         F Millennial     Alexis NA
## 2213      m          A         F Millennial    Brittany NA
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## 2214          m          A          F Millennial     Lauren NA
## 2215          m          A          F Millennial     Taylor NA
## 2216          m          A          F Millennial    Bethany NA
## 2217          m          A          F Millennial     Latoya NA
## 2218          m          A          F Millennial    Candice NA
## 2219          m          A          F Millennial   Brittney NA
## 2220          m          A          F Millennial   Cheyenne NA
## 2221          m          B          M     Boomer   Theodore NA
## 2222          m          B          M     Boomer    Bernard NA
## 2223          m          B          M     Boomer       Gene NA
## 2224          m          B          M     Boomer    Herbert NA
## 2225          m          B          M     Boomer        Ray NA
## 2226          m          B          M     Boomer        Tom NA
## 2227          m          B          M     Boomer        Lee NA
## 2228          m          B          M     Boomer     Alfred NA
## 2229          m          B          M     Boomer      Leroy NA
## 2230          m          B          M     Boomer      Eddie NA
## 2231          m          B          M       GenX       Marc NA
## 2232          m          B          M       GenX      Jamie NA
## 2233          m          B          M       GenX       Greg NA
## 2234          m          B          M       GenX     Darryl NA
## 2235          m          B          M       GenX        Tim NA
## 2236          m          B          M       GenX       Dean NA
## 2237          m          B          M       GenX        Jon NA
## 2238          m          B          M       GenX      Chris NA
## 2239          m          B          M       GenX       Troy NA
## 2240          m          B          M       GenX       Jeff NA
## 2241          m          B          M Millennial    Zachary NA
## 2242          m          B          M Millennial      Dylan NA
## 2243          m          B          M Millennial  Christian NA
## 2244          m          B          M Millennial     Wesley NA
## 2245          m          B          M Millennial       Seth NA
## 2246          m          B          M Millennial     Austin NA
## 2247          m          B          M Millennial    Gabriel NA
## 2248          m          B          M Millennial       Evan NA
## 2249          m          B          M Millennial      Casey NA
## 2250          m          B          M Millennial       Luis NA
## 2251          m          B          F     Boomer     Gloria NA
## 2252          m          B          F     Boomer       Joan NA
## 2253          m          B          F     Boomer    Dorothy NA
## 2254          m          B          F     Boomer    Shirley NA
## 2255          m          B          F     Boomer      Betty NA
## 2256          m          B          F     Boomer     Dianne NA
## 2257          m          B          F     Boomer        Kay NA
## 2258          m          B          F     Boomer   Marjorie NA
## 2259          m          B          F     Boomer   Lorraine NA
## 2260          m          B          F     Boomer    Mildred NA
## 2261          m          B          F       GenX      Tracy NA
## 2262          m          B          F       GenX       Dawn NA
## 2263          m          B          F       GenX       Tina NA
## 2264          m          B          F       GenX      Tammy NA
## 2265          m          B          F       GenX    Melinda NA
## 2266          m          B          F       GenX     Tamara NA
## 2267          m          B          F       GenX     Tracey NA
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## 2268         m          B       F       GenX    Colleen NA
## 2269         m          B       F       GenX     Sherri NA
## 2270         m          B       F       GenX      Heidi NA
## 2271         m          B       F Millennial   Samantha NA
## 2272         m          B       F Millennial     Alexis NA
## 2273         m          B       F Millennial   Brittany NA
## 2274         m          B       F Millennial     Lauren NA
## 2275         m          B       F Millennial     Taylor NA
## 2276         m          B       F Millennial    Bethany NA
## 2277         m          B       F Millennial     Latoya NA
## 2278         m          B       F Millennial    Candice NA
## 2279         m          B       F Millennial   Brittney NA
## 2280         m          B       F Millennial   Cheyenne NA
## 2281         m          C       M    Boomer   Theodore NA
## 2282         m          C       M    Boomer    Bernard NA
## 2283         m          C       M    Boomer       Gene NA
## 2284         m          C       M    Boomer    Herbert NA
## 2285         m          C       M    Boomer        Ray NA
## 2286         m          C       M    Boomer        Tom NA
## 2287         m          C       M    Boomer        Lee NA
## 2288         m          C       M    Boomer     Alfred NA
## 2289         m          C       M    Boomer      Leroy NA
## 2290         m          C       M    Boomer      Eddie NA
## 2291         m          C       M      GenX       Marc NA
## 2292         m          C       M      GenX      Jamie NA
## 2293         m          C       M      GenX       Greg NA
## 2294         m          C       M      GenX     Darryl NA
## 2295         m          C       M      GenX        Tim NA
## 2296         m          C       M      GenX       Dean NA
## 2297         m          C       M      GenX        Jon NA
## 2298         m          C       M      GenX      Chris NA
## 2299         m          C       M      GenX       Troy NA
## 2300         m          C       M      GenX       Jeff NA
## 2301         m          C       M Millennial    Zachary NA
## 2302         m          C       M Millennial      Dylan NA
## 2303         m          C       M Millennial  Christian NA
## 2304         m          C       M Millennial     Wesley NA
## 2305         m          C       M Millennial       Seth NA
## 2306         m          C       M Millennial     Austin NA
## 2307         m          C       M Millennial    Gabriel NA
## 2308         m          C       M Millennial       Evan NA
## 2309         m          C       M Millennial      Casey NA
## 2310         m          C       M Millennial       Luis NA
## 2311         m          C       F    Boomer     Gloria NA
## 2312         m          C       F    Boomer       Joan NA
## 2313         m          C       F    Boomer    Dorothy NA
## 2314         m          C       F    Boomer    Shirley NA
## 2315         m          C       F    Boomer      Betty NA
## 2316         m          C       F    Boomer     Dianne NA
## 2317         m          C       F    Boomer        Kay NA
## 2318         m          C       F    Boomer   Marjorie NA
## 2319         m          C       F    Boomer   Lorraine NA
## 2320         m          C       F    Boomer    Mildred NA
## 2321         m          C       F      GenX      Tracy NA
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## 2322          m          C          F          GenX          Dawn NA
## 2323          m          C          F          GenX          Tina NA
## 2324          m          C          F          GenX         Tammy NA
## 2325          m          C          F          GenX       Melinda NA
## 2326          m          C          F          GenX        Tamara NA
## 2327          m          C          F          GenX        Tracey NA
## 2328          m          C          F          GenX       Colleen NA
## 2329          m          C          F          GenX         Sherri NA
## 2330          m          C          F          GenX         Heidi NA
## 2331          m          C          F Millennial   Samantha NA
## 2332          m          C          F Millennial      Alexis NA
## 2333          m          C          F Millennial     Brittany NA
## 2334          m          C          F Millennial       Lauren NA
## 2335          m          C          F Millennial       Taylor NA
## 2336          m          C          F Millennial      Bethany NA
## 2337          m          C          F Millennial       Latoya NA
## 2338          m          C          F Millennial       Candice NA
## 2339          m          C          F Millennial     Brittney NA
## 2340          m          C          F Millennial     Cheyenne NA
## 2341          n          A          M      Boomer      Theodore NA
## 2342          n          A          M      Boomer       Bernard NA
## 2343          n          A          M      Boomer          Gene NA
## 2344          n          A          M      Boomer       Herbert NA
## 2345          n          A          M      Boomer           Ray NA
## 2346          n          A          M      Boomer           Tom NA
## 2347          n          A          M      Boomer           Lee NA
## 2348          n          A          M      Boomer        Alfred NA
## 2349          n          A          M      Boomer         Leroy NA
## 2350          n          A          M      Boomer         Eddie NA
## 2351          n          A          M        GenX          Marc NA
## 2352          n          A          M        GenX         Jamie NA
## 2353          n          A          M        GenX          Greg NA
## 2354          n          A          M        GenX        Darryl NA
## 2355          n          A          M        GenX           Tim NA
## 2356          n          A          M        GenX          Dean NA
## 2357          n          A          M        GenX           Jon NA
## 2358          n          A          M        GenX         Chris NA
## 2359          n          A          M        GenX          Troy NA
## 2360          n          A          M        GenX          Jeff NA
## 2361          n          A          M Millennial       Zachary NA
## 2362          n          A          M Millennial         Dylan NA
## 2363          n          A          M Millennial     Christian NA
## 2364          n          A          M Millennial        Wesley NA
## 2365          n          A          M Millennial          Seth NA
## 2366          n          A          M Millennial        Austin NA
## 2367          n          A          M Millennial        Gabriel NA
## 2368          n          A          M Millennial          Evan NA
## 2369          n          A          M Millennial         Casey NA
## 2370          n          A          M Millennial          Luis NA
## 2371          n          A          F      Boomer        Gloria NA
## 2372          n          A          F      Boomer          Joan NA
## 2373          n          A          F      Boomer       Dorothy NA
## 2374          n          A          F      Boomer       Shirley NA
## 2375          n          A          F      Boomer         Betty NA
```

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## 2376          n          A          F          Boomer        Dianne NA
## 2377          n          A          F          Boomer           Kay NA
## 2378          n          A          F          Boomer      Marjorie NA
## 2379          n          A          F          Boomer      Lorraine NA
## 2380          n          A          F          Boomer       Mildred NA
## 2381          n          A          F            GenX         Tracy NA
## 2382          n          A          F            GenX          Dawn NA
## 2383          n          A          F            GenX          Tina NA
## 2384          n          A          F            GenX         Tammy NA
## 2385          n          A          F            GenX       Melinda NA
## 2386          n          A          F            GenX        Tamara NA
## 2387          n          A          F            GenX        Tracey NA
## 2388          n          A          F            GenX       Colleen NA
## 2389          n          A          F            GenX        Sherri NA
## 2390          n          A          F            GenX         Heidi NA
## 2391          n          A          F Millennial      Samantha NA
## 2392          n          A          F Millennial        Alexis NA
## 2393          n          A          F Millennial       Brittany NA
## 2394          n          A          F Millennial         Lauren NA
## 2395          n          A          F Millennial         Taylor NA
## 2396          n          A          F Millennial        Bethany NA
## 2397          n          A          F Millennial         Latoya NA
## 2398          n          A          F Millennial        Candice NA
## 2399          n          A          F Millennial       Brittney NA
## 2400          n          A          F Millennial       Cheyenne NA
## 2401          n          B          M          Boomer      Theodore NA
## 2402          n          B          M          Boomer       Bernard NA
## 2403          n          B          M          Boomer          Gene NA
## 2404          n          B          M          Boomer       Herbert NA
## 2405          n          B          M          Boomer           Ray NA
## 2406          n          B          M          Boomer           Tom NA
## 2407          n          B          M          Boomer           Lee NA
## 2408          n          B          M          Boomer        Alfred NA
## 2409          n          B          M          Boomer         Leroy NA
## 2410          n          B          M          Boomer         Eddie NA
## 2411          n          B          M            GenX          Marc NA
## 2412          n          B          M            GenX         Jamie NA
## 2413          n          B          M            GenX          Greg NA
## 2414          n          B          M            GenX        Darryl NA
## 2415          n          B          M            GenX           Tim NA
## 2416          n          B          M            GenX          Dean NA
## 2417          n          B          M            GenX           Jon NA
## 2418          n          B          M            GenX         Chris NA
## 2419          n          B          M            GenX          Troy NA
## 2420          n          B          M            GenX          Jeff NA
## 2421          n          B          M Millennial       Zachary NA
## 2422          n          B          M Millennial         Dylan NA
## 2423          n          B          M Millennial Christian NA
## 2424          n          B          M Millennial        Wesley NA
## 2425          n          B          M Millennial          Seth NA
## 2426          n          B          M Millennial        Austin NA
## 2427          n          B          M Millennial       Gabriel NA
## 2428          n          B          M Millennial          Evan NA
## 2429          n          B          M Millennial         Casey NA
```

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## 2430          n          B          M Millennial        Luis NA
## 2431          n          B          F      Boomer      Gloria NA
## 2432          n          B          F      Boomer        Joan NA
## 2433          n          B          F      Boomer     Dorothy NA
## 2434          n          B          F      Boomer     Shirley NA
## 2435          n          B          F      Boomer        Betty NA
## 2436          n          B          F      Boomer      Dianne NA
## 2437          n          B          F      Boomer         Kay NA
## 2438          n          B          F      Boomer    Marjorie NA
## 2439          n          B          F      Boomer    Lorraine NA
## 2440          n          B          F      Boomer     Mildred NA
## 2441          n          B          F        GenX       Tracy NA
## 2442          n          B          F        GenX        Dawn NA
## 2443          n          B          F        GenX        Tina NA
## 2444          n          B          F        GenX       Tammy NA
## 2445          n          B          F        GenX     Melinda NA
## 2446          n          B          F        GenX      Tamara NA
## 2447          n          B          F        GenX      Tracey NA
## 2448          n          B          F        GenX     Colleen NA
## 2449          n          B          F        GenX      Sherri NA
## 2450          n          B          F        GenX       Heidi NA
## 2451          n          B          F Millennial    Samantha NA
## 2452          n          B          F Millennial      Alexis NA
## 2453          n          B          F Millennial    Brittany NA
## 2454          n          B          F Millennial      Lauren NA
## 2455          n          B          F Millennial       Taylor NA
## 2456          n          B          F Millennial     Bethany NA
## 2457          n          B          F Millennial      Latoya NA
## 2458          n          B          F Millennial     Candice NA
## 2459          n          B          F Millennial    Brittney NA
## 2460          n          B          F Millennial    Cheyenne NA
## 2461          n          C          M      Boomer    Theodore NA
## 2462          n          C          M      Boomer     Bernard NA
## 2463          n          C          M      Boomer        Gene NA
## 2464          n          C          M      Boomer     Herbert NA
## 2465          n          C          M      Boomer         Ray NA
## 2466          n          C          M      Boomer         Tom NA
## 2467          n          C          M      Boomer         Lee NA
## 2468          n          C          M      Boomer      Alfred NA
## 2469          n          C          M      Boomer       Leroy NA
## 2470          n          C          M      Boomer       Eddie NA
## 2471          n          C          M        GenX        Marc NA
## 2472          n          C          M        GenX       Jamie NA
## 2473          n          C          M        GenX        Greg NA
## 2474          n          C          M        GenX      Darryl NA
## 2475          n          C          M        GenX         Tim NA
## 2476          n          C          M        GenX        Dean NA
## 2477          n          C          M        GenX         Jon NA
## 2478          n          C          M        GenX       Chris NA
## 2479          n          C          M        GenX        Troy NA
## 2480          n          C          M        GenX        Jeff NA
## 2481          n          C          M Millennial     Zachary NA
## 2482          n          C          M Millennial       Dylan NA
## 2483          n          C          M Millennial   Christian NA
```

```
## 2484         n         C      M Millennial     Wesley NA
## 2485         n         C      M Millennial       Seth NA
## 2486         n         C      M Millennial     Austin NA
## 2487         n         C      M Millennial    Gabriel NA
## 2488         n         C      M Millennial       Evan NA
## 2489         n         C      M Millennial      Casey NA
## 2490         n         C      M Millennial       Luis NA
## 2491         n         C      F     Boomer     Gloria NA
## 2492         n         C      F     Boomer       Joan NA
## 2493         n         C      F     Boomer    Dorothy NA
## 2494         n         C      F     Boomer    Shirley NA
## 2495         n         C      F     Boomer      Betty NA
## 2496         n         C      F     Boomer     Dianne NA
## 2497         n         C      F     Boomer        Kay NA
## 2498         n         C      F     Boomer   Marjorie NA
## 2499         n         C      F     Boomer   Lorraine NA
## 2500         n         C      F     Boomer    Mildred NA
## 2501         n         C      F       GenX      Tracy NA
## 2502         n         C      F       GenX       Dawn NA
## 2503         n         C      F       GenX       Tina NA
## 2504         n         C      F       GenX      Tammy NA
## 2505         n         C      F       GenX    Melinda NA
## 2506         n         C      F       GenX     Tamara NA
## 2507         n         C      F       GenX     Tracey NA
## 2508         n         C      F       GenX    Colleen NA
## 2509         n         C      F       GenX     Sherri NA
## 2510         n         C      F       GenX      Heidi NA
## 2511         n         C      F Millennial   Samantha NA
## 2512         n         C      F Millennial     Alexis NA
## 2513         n         C      F Millennial    Brittany NA
## 2514         n         C      F Millennial     Lauren NA
## 2515         n         C      F Millennial     Taylor NA
## 2516         n         C      F Millennial    Bethany NA
## 2517         n         C      F Millennial     Latoya NA
## 2518         n         C      F Millennial    Candice NA
## 2519         n         C      F Millennial    Brittney NA
## 2520         n         C      F Millennial   Cheyenne NA
```

Packages

Install the package `pacman` using regular base R.

```
#install.packages("pacman", repos = "https://cran.r-project.org/web/packages/pacman/index.html")
```

First, install the package `testthat` (a widely accepted testing suite for R) from https://github.com/r-lib/testthat using `pacman`. If you are using Windows, this will be a long install, but you have to go through it for some of the stuff we are doing in class. LINUX (or MAC) is preferred for coding. If you can't get it to work, install this package from CRAN (still using `pacman`), but this is not recommended long term.

```
pacman::p_load(testthat)
```

- Create vector `v` consisting of all numbers from -100 to 100 and test using the second line of code su

```
v= seq(-100, 100)
#expect_equal(v, -100 : 101) error
```

If there are any errors, the `expect_equal` function will tell you about them. If there are no errors, then it will be silent.

Test the `my_reverse` function from lab2 using the following code:

```
v = 1:100
expect_equal(my_reverse(v), rev(v))
expect_equal(my_reverse(c("A", "B", "C")), c("C", "B", "A"))
# if it's equal, you get nothing
```

Multinomial Classification using KNN

Write a $k = 1$ nearest neighbor algorithm using the Euclidean distance function. This is standard "Roxygen" format for documentation. Hopefully, we will get to packages at some point and we will go over this again. It is your job also to fill in this documentation.

```
#' One Nearest Neighbor Classifier
#'
#' Classifies an observation based on the label of the closest observation in a set of training observa
#'
#' @param Xinput      a matrix of features for training data observations
#' @param y_binary    the vector of training data labels
#' @param xtest       a test observation as a row vector
#' @return            the predicted label for the test observation
nn_algorithm_predict = function(Xinput, y_binary, xtest){
  n = nrow(Xinput)
  distances = array(NA, n)
  for (i in 1:n) {
    distances[i] = sum((Xinput[i,] - xtest)^2) # squared euclidean distance (don't need to sqrt)
  }
  y_binary[which.min(distances)]
}
```

Write a few tests to ensure it actually works:

```
data(iris)
pacman::p_load(skimr)

iris = iris[iris$Species != "virginica",]
y = as.integer(iris$Species == "versicolor")
iris
```

```
##      Sepal.Length Sepal.Width Petal.Length Petal.Width   Species
## 1             5.1         3.5          1.4         0.2    setosa
## 2             4.9         3.0          1.4         0.2    setosa
## 3             4.7         3.2          1.3         0.2    setosa
## 4             4.6         3.1          1.5         0.2    setosa
## 5             5.0         3.6          1.4         0.2    setosa
## 6             5.4         3.9          1.7         0.4    setosa
```

```
## 7           4.6         3.4         1.4         0.3        setosa
## 8           5.0         3.4         1.5         0.2        setosa
## 9           4.4         2.9         1.4         0.2        setosa
## 10          4.9         3.1         1.5         0.1        setosa
## 11          5.4         3.7         1.5         0.2        setosa
## 12          4.8         3.4         1.6         0.2        setosa
## 13          4.8         3.0         1.4         0.1        setosa
## 14          4.3         3.0         1.1         0.1        setosa
## 15          5.8         4.0         1.2         0.2        setosa
## 16          5.7         4.4         1.5         0.4        setosa
## 17          5.4         3.9         1.3         0.4        setosa
## 18          5.1         3.5         1.4         0.3        setosa
## 19          5.7         3.8         1.7         0.3        setosa
## 20          5.1         3.8         1.5         0.3        setosa
## 21          5.4         3.4         1.7         0.2        setosa
## 22          5.1         3.7         1.5         0.4        setosa
## 23          4.6         3.6         1.0         0.2        setosa
## 24          5.1         3.3         1.7         0.5        setosa
## 25          4.8         3.4         1.9         0.2        setosa
## 26          5.0         3.0         1.6         0.2        setosa
## 27          5.0         3.4         1.6         0.4        setosa
## 28          5.2         3.5         1.5         0.2        setosa
## 29          5.2         3.4         1.4         0.2        setosa
## 30          4.7         3.2         1.6         0.2        setosa
## 31          4.8         3.1         1.6         0.2        setosa
## 32          5.4         3.4         1.5         0.4        setosa
## 33          5.2         4.1         1.5         0.1        setosa
## 34          5.5         4.2         1.4         0.2        setosa
## 35          4.9         3.1         1.5         0.2        setosa
## 36          5.0         3.2         1.2         0.2        setosa
## 37          5.5         3.5         1.3         0.2        setosa
## 38          4.9         3.6         1.4         0.1        setosa
## 39          4.4         3.0         1.3         0.2        setosa
## 40          5.1         3.4         1.5         0.2        setosa
## 41          5.0         3.5         1.3         0.3        setosa
## 42          4.5         2.3         1.3         0.3        setosa
## 43          4.4         3.2         1.3         0.2        setosa
## 44          5.0         3.5         1.6         0.6        setosa
## 45          5.1         3.8         1.9         0.4        setosa
## 46          4.8         3.0         1.4         0.3        setosa
## 47          5.1         3.8         1.6         0.2        setosa
## 48          4.6         3.2         1.4         0.2        setosa
## 49          5.3         3.7         1.5         0.2        setosa
## 50          5.0         3.3         1.4         0.2        setosa
## 51          7.0         3.2         4.7         1.4 versicolor
## 52          6.4         3.2         4.5         1.5 versicolor
## 53          6.9         3.1         4.9         1.5 versicolor
## 54          5.5         2.3         4.0         1.3 versicolor
## 55          6.5         2.8         4.6         1.5 versicolor
## 56          5.7         2.8         4.5         1.3 versicolor
## 57          6.3         3.3         4.7         1.6 versicolor
## 58          4.9         2.4         3.3         1.0 versicolor
## 59          6.6         2.9         4.6         1.3 versicolor
## 60          5.2         2.7         3.9         1.4 versicolor
```

```
## 61            5.0            2.0            3.5            1.0 versicolor
## 62            5.9            3.0            4.2            1.5 versicolor
## 63            6.0            2.2            4.0            1.0 versicolor
## 64            6.1            2.9            4.7            1.4 versicolor
## 65            5.6            2.9            3.6            1.3 versicolor
## 66            6.7            3.1            4.4            1.4 versicolor
## 67            5.6            3.0            4.5            1.5 versicolor
## 68            5.8            2.7            4.1            1.0 versicolor
## 69            6.2            2.2            4.5            1.5 versicolor
## 70            5.6            2.5            3.9            1.1 versicolor
## 71            5.9            3.2            4.8            1.8 versicolor
## 72            6.1            2.8            4.0            1.3 versicolor
## 73            6.3            2.5            4.9            1.5 versicolor
## 74            6.1            2.8            4.7            1.2 versicolor
## 75            6.4            2.9            4.3            1.3 versicolor
## 76            6.6            3.0            4.4            1.4 versicolor
## 77            6.8            2.8            4.8            1.4 versicolor
## 78            6.7            3.0            5.0            1.7 versicolor
## 79            6.0            2.9            4.5            1.5 versicolor
## 80            5.7            2.6            3.5            1.0 versicolor
## 81            5.5            2.4            3.8            1.1 versicolor
## 82            5.5            2.4            3.7            1.0 versicolor
## 83            5.8            2.7            3.9            1.2 versicolor
## 84            6.0            2.7            5.1            1.6 versicolor
## 85            5.4            3.0            4.5            1.5 versicolor
## 86            6.0            3.4            4.5            1.6 versicolor
## 87            6.7            3.1            4.7            1.5 versicolor
## 88            6.3            2.3            4.4            1.3 versicolor
## 89            5.6            3.0            4.1            1.3 versicolor
## 90            5.5            2.5            4.0            1.3 versicolor
## 91            5.5            2.6            4.4            1.2 versicolor
## 92            6.1            3.0            4.6            1.4 versicolor
## 93            5.8            2.6            4.0            1.2 versicolor
## 94            5.0            2.3            3.3            1.0 versicolor
## 95            5.6            2.7            4.2            1.3 versicolor
## 96            5.7            3.0            4.2            1.2 versicolor
## 97            5.7            2.9            4.2            1.3 versicolor
## 98            6.2            2.9            4.3            1.3 versicolor
## 99            5.1            2.5            3.0            1.1 versicolor
## 100           5.7            2.8            4.1            1.3 versicolor
```

```r
iris = iris[, 1:4]

x_test1 = c(5.1, 3.6, 1.4, 0.1) # 0
x_test2 = c(5.0, 3.5, 1.4, 0.3) # 0
x_test3 = c(5.9, 3.0, 4.1, 1.5) # 1
x_test4 = c(6.4, 3.2, 4.5, 1.5) # 1

nn_algorithm_predict(iris, y, x_test1) # is 0 !
```

```
## [1] 0
```

```
nn_algorithm_predict(iris, y, x_test2) # is 0 !
```

```
## [1] 0
```

```
nn_algorithm_predict(iris, y, x_test3) # is 1 !
```

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

```
nn_algorithm_predict(iris, y, x_test4) # is 1 !
```

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

We now add an argument `d` representing any legal distance function to the `nn_algorithm_predict` function. Update the implementation so it performs NN using that distance function. Set the default function to be the Euclidean distance in the original function. Also, alter the documentation in the appropriate places.

```
#' One Nearest Neighbor Classifier
#'
#' Classifies an observation based on the label of the closest observation in a set of training observa
#'
#' @param Xinput      a matrix of features for training data observations
#' @param y_binary    the vector of training data labels
#' @param xtest       a test observation as a row vector
#' @param d           a distance function which take inputs to different row vectors
#' @return            the predicted label for the test observation
nn_algorithm_predict = function(Xinput, y_binary, xtest, d = function(v1, v2){sum((v1 - v2)^2)}){
  n = nrow(Xinput)
  distances = array(NA, n)
  for (i in 1:n) {
    distances[i] = d(Xinput[i,], xtest) # squared euclidean distance (don't need to sqrt)
  }
  y_binary[which.min(distances)]
}
```

For extra credit (unless you're a masters student), add an argument `k` to the `nn_algorithm_predict` function and update the implementation so it performs KNN. In the case of a tie, choose $\hat{y}$ randomly. Set the default `k` to be the square root of the size of $\mathcal{D}$ which is an empirical rule-of-thumb popularized by the "Pattern Classification" book by Duda, Hart and Stork (2007). Also, alter the documentation in the appropriate places.

```
#TO-DO for the 650 students but extra credit for undergrads
# add K arg, find K nearest, find modal label
```

Basic Binary Classification Modeling

- Load the famous `iris` data frame into the namespace. Provide a summary of the columns using the `skim` function in package `skimr` and write a few descriptive sentences about the distributions using the code below and in English.

```
data(iris)
pacman::p_load(skimr)
skim(iris)
```

Table 1: Data summary

Name	iris
Number of rows	150
Number of columns	5
Column type frequency:	
factor	1
numeric	4
Group variables	None

Variable type: factor

skim_variable	n_missing	complete_rate	ordered	n_unique	top_counts
Species	0	1	FALSE	3	set: 50, ver: 50, vir: 50

Variable type: numeric

skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
Sepal.Length	0	1	5.84	0.83	4.3	5.1	5.80	6.4	7.9	
Sepal.Width	0	1	3.06	0.44	2.0	2.8	3.00	3.3	4.4	
Petal.Length	0	1	3.76	1.77	1.0	1.6	4.35	5.1	6.9	
Petal.Width	0	1	1.20	0.76	0.1	0.3	1.30	1.8	2.5	

This dataset describes 150 different iris' (number of rows) with 5 different properties (number of columns). It contains 1 factor and 4 numerics. The factor is the Species property, which is either set (setosa), ver (versicolor), or vir (virginica). Then, each iris has numeric properties such as their Sepal.Length, Sepal.Width, Petal.Length and Petal.Width which measure their sepal and petal sizes. The species are evenly split in the data set (50 of each).

The outcome / label / response is `Species`. This is what we will be trying to predict. However, we only care about binary classification between "setosa" and "versicolor" for the purposes of this exercise. Thus the first order of business is to drop one class. Let's drop the data for the level "virginica" from the data frame.

```
iris = iris[iris$Species != "virginica",]
```

Now create a vector `y` that is length the number of remaining rows in the data frame whose entries are 0 if "setosa" and 1 if "versicolor".

```
y = as.integer(iris$Species == "versicolor") # was setosa in class (mistake?)
```

- Write a function `mode` returning the sample mode.

```
# sorted_counts = sort(table(sample(letters,1000,replace=TRUE)),decreasing=TRUE)
# names(sorted_counts[1])
mode = function(v) {
  names(sort(table(v), decreasing = TRUE)[1])
}
mode(y)
```

```
## [1] "0"
```

- Fit a threshold model to y using the feature `Sepal.Length`. Write your own code to do this. What is the estimated value of the threshold parameter? Save the threshold value as `threshold`.

```
n = nrow(iris) # n = 100
num_errors = array(dim = n)
for (i in 1 : n) {
  temp_threshold = iris$Sepal.Length[i]
  g = as.integer(iris$Sepal.Length > temp_threshold)
  num_errors[i] = sum(as.integer(g != y))
}

num_errors
```

```
##    [1] 18 31 39 41 25 11 41 25 46 31 11 34 34 49 24 22 11 18 22 18 11 18 41 18 34
##   [26] 25 25 16 16 39 34 11 16 14 31 25 14 31 46 18 25 45 46 25 18 34 18 41 15 25
##   [51] 50 41 49 14 42 22 39 31 44 16 25 26 30 34 19 47 19 24 36 19 26 34 39 34 41
##   [76] 44 48 47 30 22 14 14 24 30 11 30 47 39 19 14 14 34 24 25 19 22 22 36 18 22
```

```
which.min(num_errors)
```

```
## [1] 6
```

```
threshold = iris$Sepal.Length[which.min(num_errors)]
threshold
```

```
## [1] 5.4
```

What is the total number of errors this model makes?

```
for (i in 1 : n) {
  errors = sum(as.integer(iris$Sepal.Length > threshold) != y)
}

errors
```

```
## [1] 11
```

Does the threshold model's performance make sense given the following summaries:

```
threshold
```

```
## [1] 5.4
```

```
summary(iris[iris$Species == "setosa", "Sepal.Length"])
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   4.300   4.800   5.000   5.006   5.200   5.800
```

```
summary(iris[iris$Species == "versicolor", "Sepal.Length"])
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   4.900   5.600   5.900   5.936   6.300   7.000
```

This makes sense because the threshold I reached was 5.4, and the median for versicolor is 5.9 whereas the median for setosa is 5.0. The threshold is split in between these so then it will decently model the two outcomes.

Create the function g explicitly that can predict y from x being a new Sepal.Length.

```
g = function(x){
  ifelse (x > threshold, 1, 0)
}
```

Perceptron

You will code the "perceptron learning algorithm" for arbitrary number of features p. Take a look at the comments above the function. Respect the spec below:

```
#' Perceptron Learning Algorithm
#'
#' For linearly separable data, returns the best possible vector to separate the outputs given
#' a maximum amount of iterations
#'
#' @param Xinput     The input features
#' @param y_binary   Binary output of 1 or 0
#' @param MAX_ITER    Maximum amount of iterations to perform
#' @param w           A vector of weights of features
#'
#' @return           The computed final parameter (weight) as a vector of length p + 1
perceptron_learning_algorithm = function(Xinput, y_binary, MAX_ITER = 1000, w = NULL){

  Xinput = as.matrix(cbind(1, Xinput[,, drop = FALSE]))
  n = nrow(Xinput)
  p = ncol(Xinput)
  w = rep(0, p)
  for (i in 1 : MAX_ITER) {
    for (j in 1 : n) {
      x_j = Xinput[j,]
      y_hat = ifelse(sum(x_j * w) > 0, 1, 0)
```

```
      for (k in 1 : p) {
        w[k] = w[k] + (y_binary[j] - y_hat) * x_j[k]
      }
    }
  }

  w
}
```

To understand what the algorithm is doing - linear "discrimination" between two response categories, we can draw a picture. First let's make up some very simple training data $\mathbb{D}$.

```
Xy_simple = data.frame(
 response = factor(c(0, 0, 0, 1, 1, 1)), #nominal
 first_feature = c(1, 1, 2, 3, 3, 4),    #continuous
 second_feature = c(1, 2, 1, 3, 4, 3)    #continuous
)
```

We haven't spoken about visualization yet, but it is important we do some of it now. Thus, I will write this code for you and you will just run it. First we load the visualization library we're going to use:

```
pacman::p_load(ggplot2)
```

We are going to just get some plots and not talk about the code to generate them as we will have a whole unit on visualization using `ggplot2` in the future.

Let's first plot y by the two features so the coordinate plane will be the two features and we use different colors to represent the third dimension, y.

```
simple_viz_obj = ggplot(Xy_simple, aes(x = first_feature, y = second_feature, color = response)) +
  geom_point(size = 5)
simple_viz_obj
```
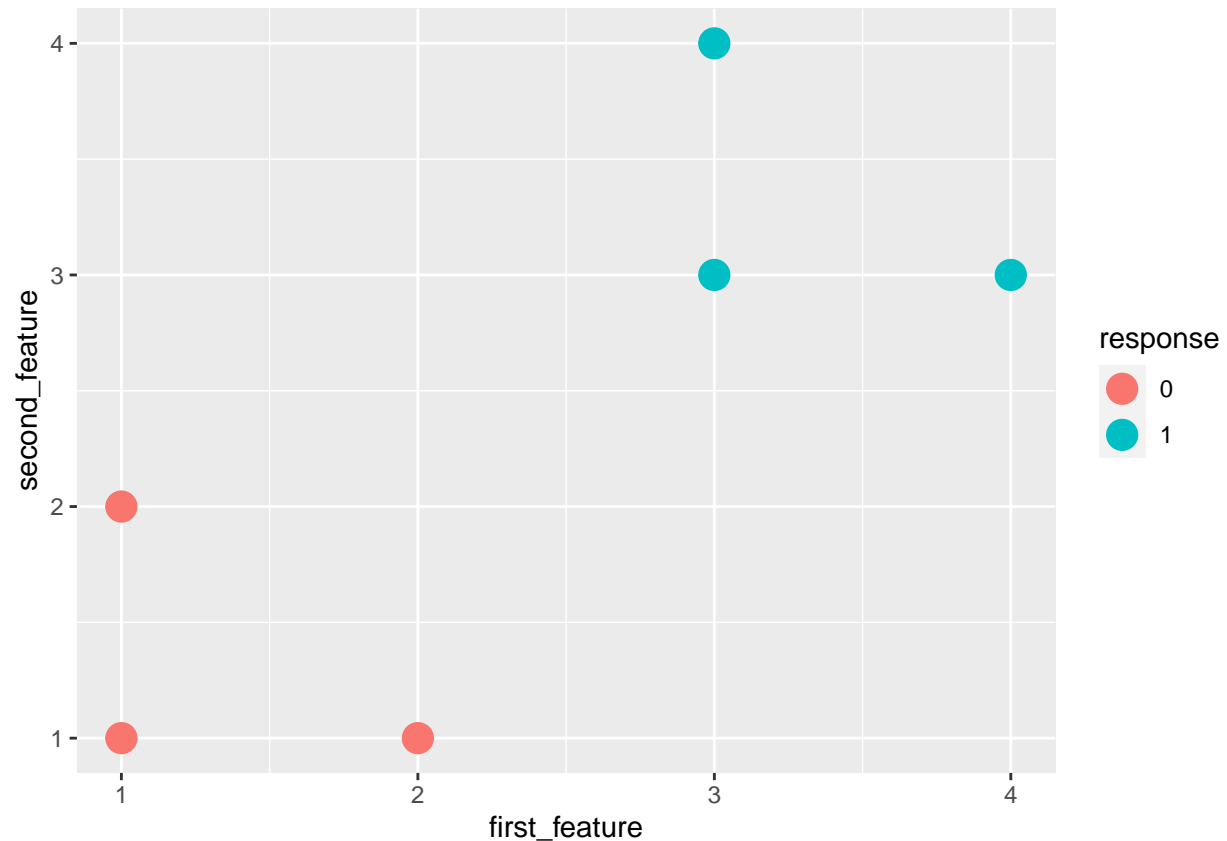
The blue ones are shown in the top right corner and the red zeros are near the bottom left corner. So, this data is clearly linearly separable, thus a perceptron would be useful here.

Now, let us run the algorithm and see what happens:

```
w_vec_simple_per = perceptron_learning_algorithm(
  cbind(Xy_simple$first_feature, Xy_simple$second_feature),
  as.numeric(Xy_simple$response == 1))
w_vec_simple_per
```

```
## [1] -7  4 -1
```

Explain this output. What do the numbers mean? What is the intercept of this line and the slope? You will have to do some algebra.

The output is (b, w0, w1), where b is the bias, w0, w1 are weights. The intercept is -7 and the slope is 4.

```
simple_perceptron_line = geom_abline(
    intercept = -w_vec_simple_per[1] / w_vec_simple_per[3],
    slope = -w_vec_simple_per[2] / w_vec_simple_per[3],
    color = "orange")
simple_viz_obj + simple_perceptron_line
```
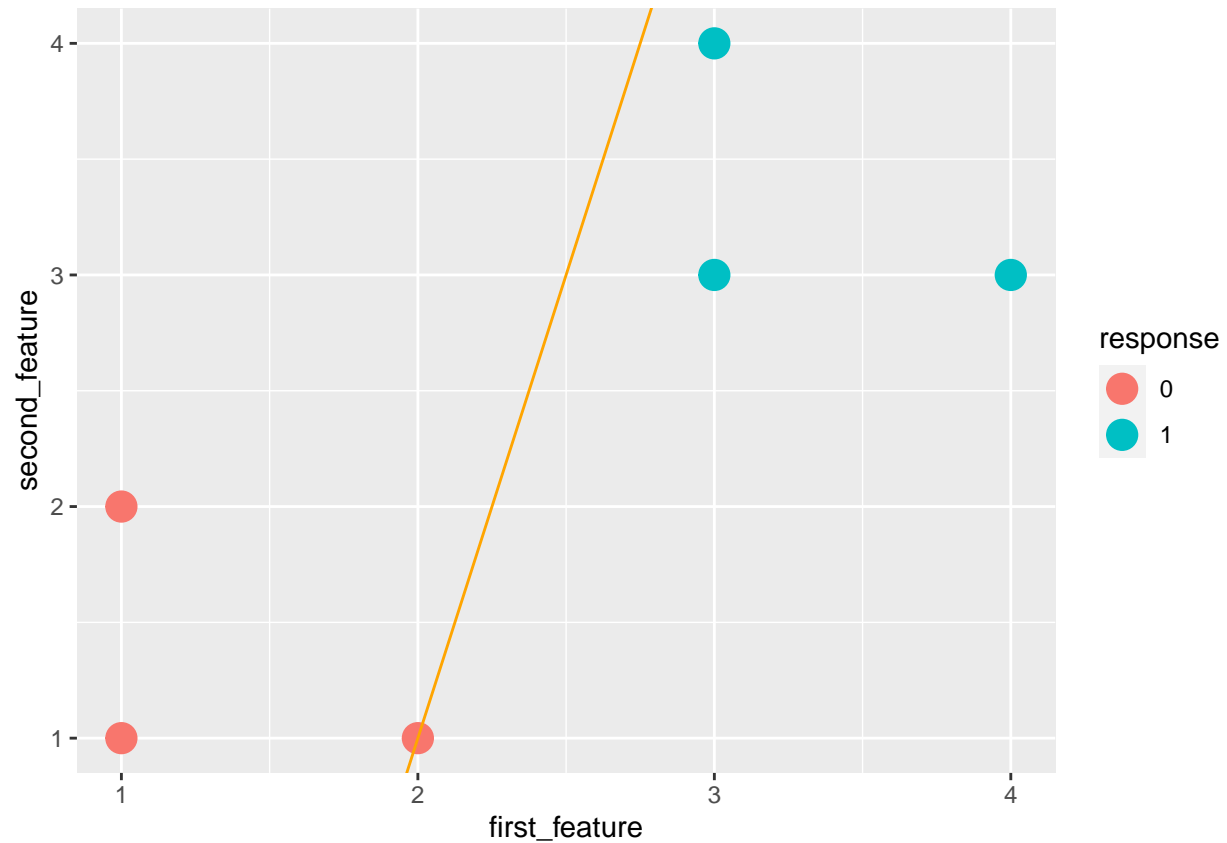
Explain this picture. Why is this line of separation not "satisfying" to you?

This line is not satisfying because it is not cleanly separating the orange and blue data points. The line is crossing the orange data point at (2,1).

For extra credit, program the maximum-margin hyperplane perceptron that provides the best linear discrimination model for linearly separable data. Make sure you provide ROxygen documentation for this function.

```
#TO-DO
```