HW1 613

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1/16/2022

*Excercise*1

Number of households surveyed in 2007:

```
length(dathh2007$idmen)
```

```
## [1] 10498
```

Number of households with marital status "Couple with kids" in 2005:

```
nrow(filter(dathh2005,mstatus == "Couple, No kids"))
```

```
## [1] 2656
```

Number of individuals surveyed in 2008:

```
length(datind2008$idind)
```

```
## [1] 25510
```

Number of individuals aged between 25 and 35 in 2016:

```
length(filter(datind2016, age >= 25 & age <=35))
```

```
## [1] 10
```

Cross-table gender/profession in 2009:

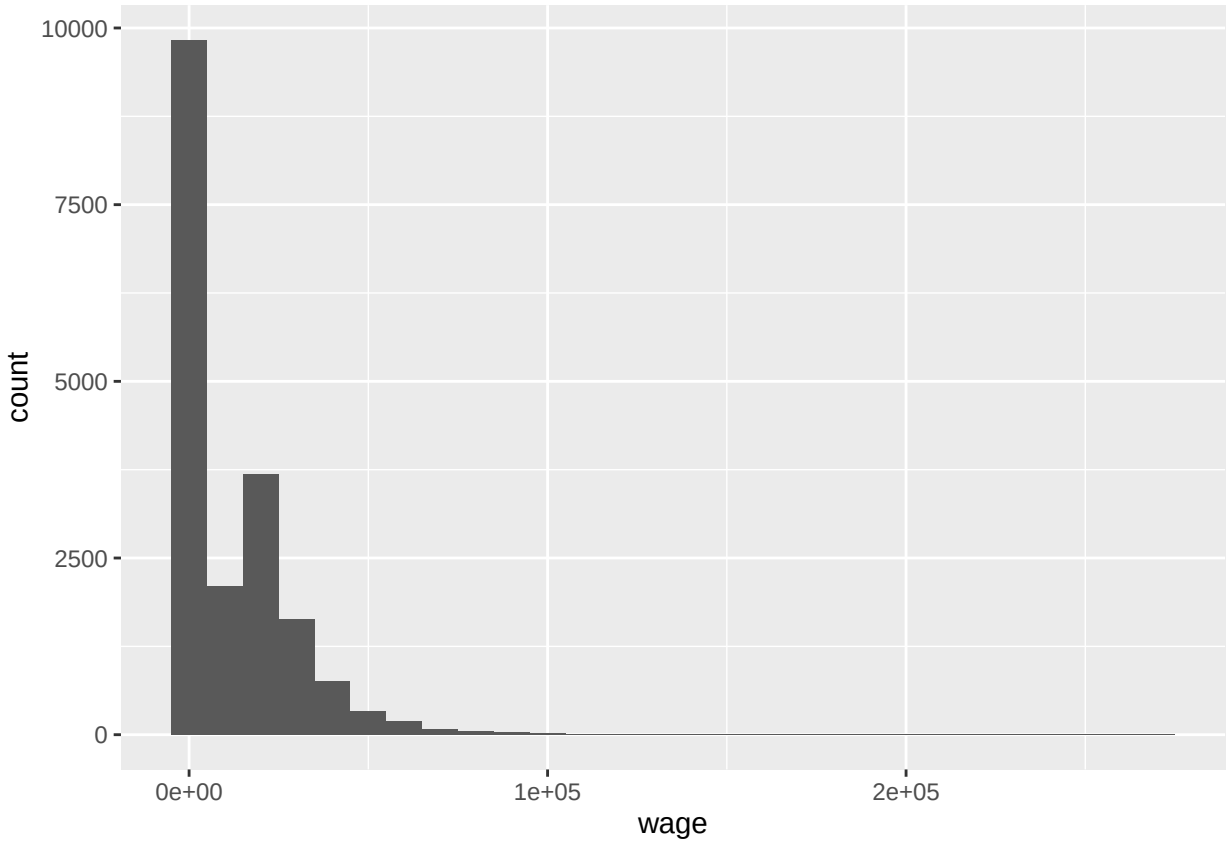
```
gender_prof_table_09 = table(datind2009$profession, datind2009$gender)
gender_prof_table_09
```

```
##
##      Female Male
##   0      11   19
##   11     30   57
##   12      8   19
##   13     29   78
##   21     63  213
##   22     65  114
##   23      8   48
##   31     68   98
##   33     85  107
##   34    184  142
##   35     50   59
##   37    179  260
##   38     78  368
##   42    258  110
```

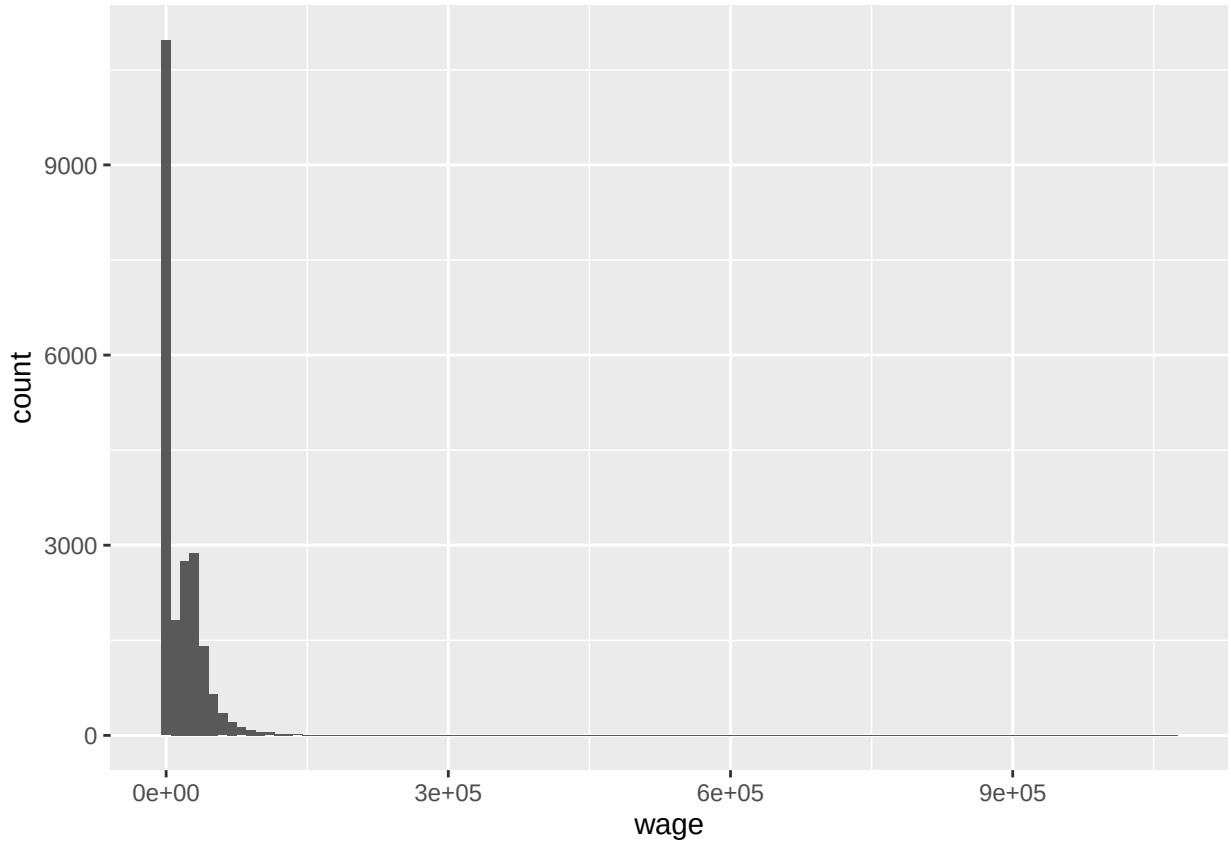
```
##    43    437  117
##    44      1    2
##    45    153   95
##    46    410  340
##    47     82  429
##    48     22  215
##    52    782  169
##    53     27  182
##    54    584   98
##    55    353  101
##    56    696   74
##    62     64  443
##    63     35  520
##    64     29  246
##    65     19  159
##    67    147  237
##    68    120  177
##    69     40   82
```

Distribution of wages in 2005 and 2019. Report the mean, the standard deviation, the inter-decile ratio D9/D1 and the Gini coefficient:

```
datind2005_wageclean = datind2005 %>% filter(!is.na(wage))
datind2019_wageclean = datind2019 %>% filter(!is.na(wage))
ggplot(data=datind2005_wageclean, aes(x=wage))+geom_histogram(binwidth=10000)
```



```
ggplot(data=datind2019_wageclean, aes(x=wage))+geom_histogram(binwidth=10000)
```




```
mean(datind2005_wageclean$wage)
```

```
## [1] 11992.26
```

```
mean(datind2019_wageclean$wage)
```

```
## [1] 15350.47
```

```
sd(datind2005_wageclean$wage)
```

```
## [1] 17318.56
```

```
sd(datind2019_wageclean$wage)
```

```
## [1] 23207.18
```

```
D9_1_2005 = quantile(datind2005_wageclean$wage, 0.9)/quantile(datind2005_wageclean$wage, 0.1)
D9_1_2019 = quantile(datind2019_wageclean$wage, 0.9)/quantile(datind2019_wageclean$wage, 0.1)

Gini(datind2005_wageclean$wage)
```

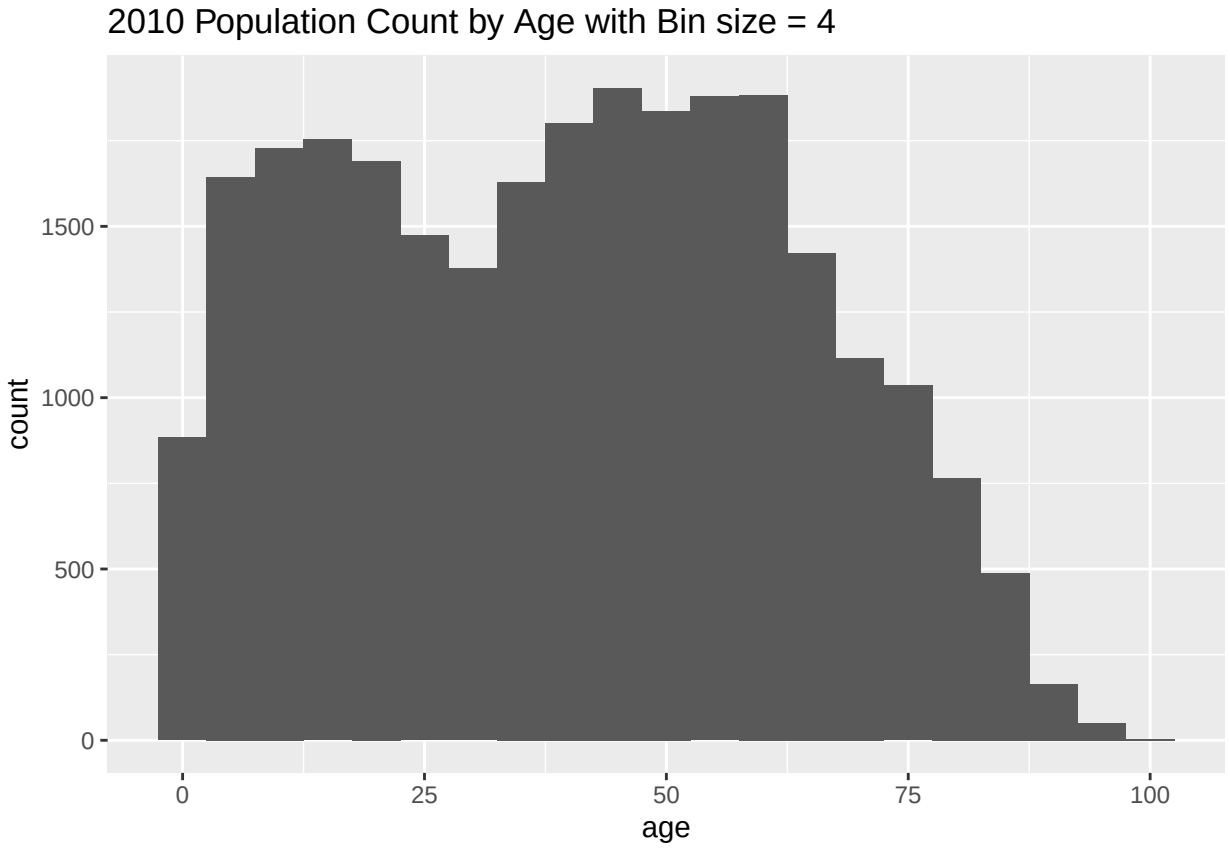
```
## [1] 0.6671654
```

```
Gini(datind2019_wageclean$wage)
```

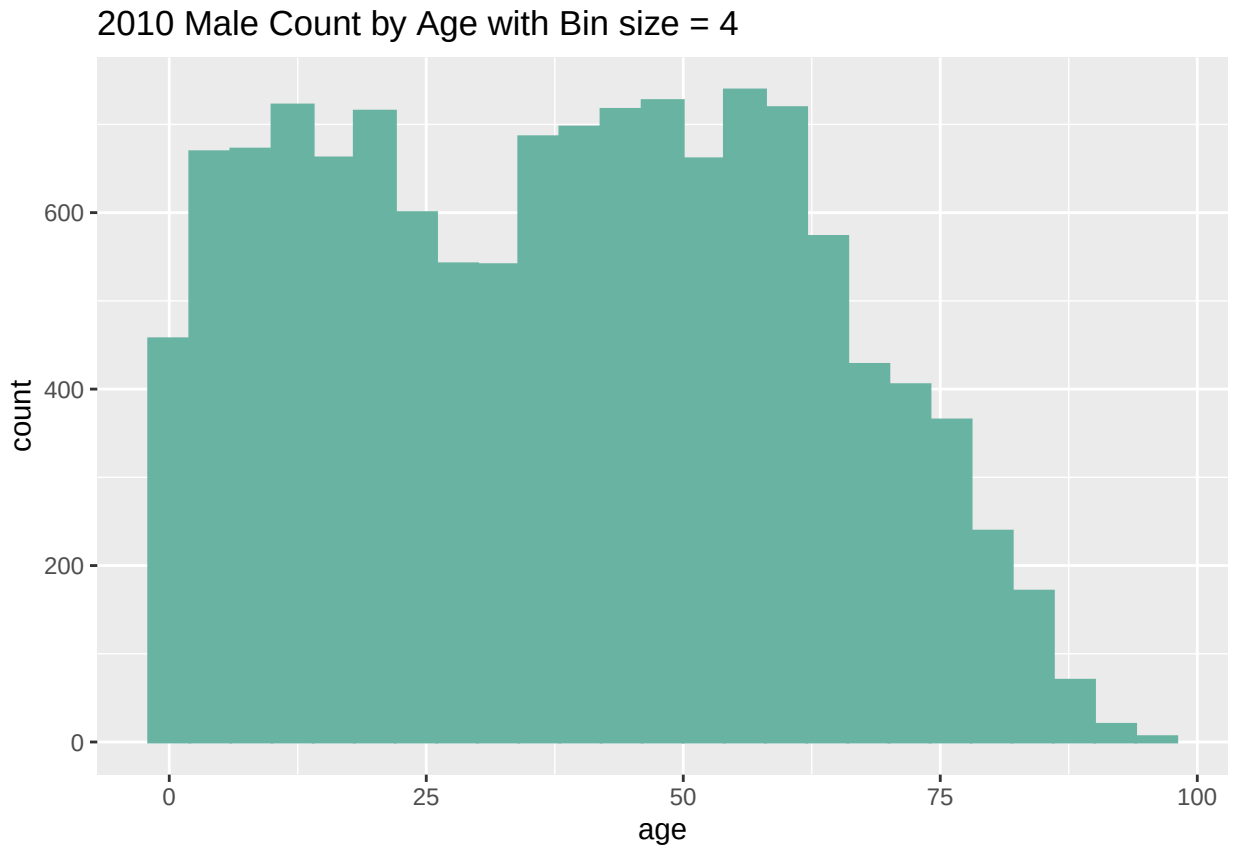
```
## [1] 0.6655301
```

Distribution of age in 2010. Plot an histogram. Is there any difference between men and women?

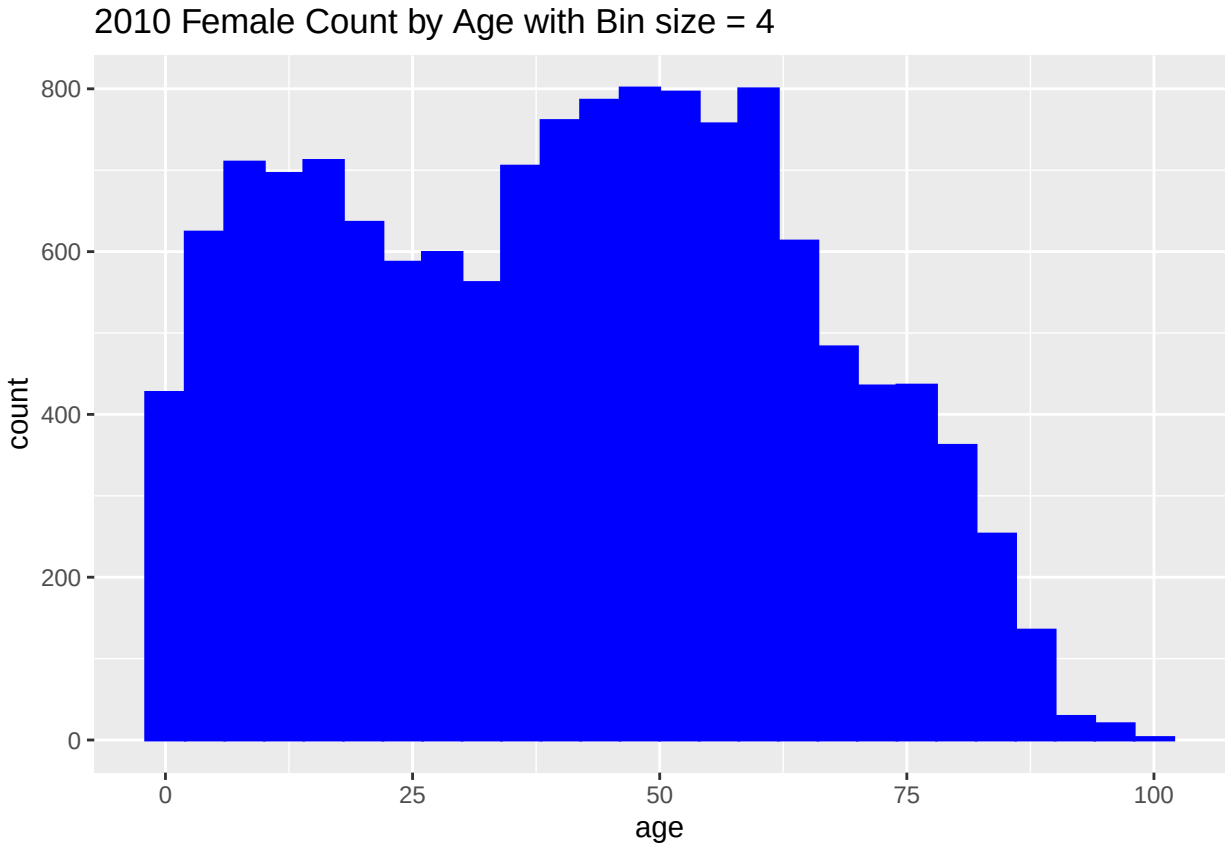
```
datind2010_ageclean = datind2010 %>% filter(!is.na(age))

ggplot(datind2010_ageclean) + aes(age) + geom_histogram(binwidth=5) + ggtitle("2010 Population Count by
```




```
male_age_2010 <- datind2010_ageclean %>% filter( gender == "Male" ) %>% ggplot( aes(x=age)) +
    geom_histogram( binwidth=4, fill="#69b3a2", color="#69b3a2") + ggtitle("2010 Male Count by Age with

female_age_2010 <- datind2010_ageclean %>% filter( gender == "Female" ) %>% ggplot( aes(x=age)) +
    geom_histogram( binwidth=4, fill = "blue", color="blue") + ggtitle("2010 Female Count by Age with Bi

male_age_2010
```




```
female_age_2010
```



No noticable difference based on the graphs.

Number of individuals in Paris in 2011:

```
Pop_ind = left_join(dathh2011,datind2011,by="idmen")
Paris_ind = Pop_ind %>% filter(location == "Paris")
nrow(Paris_ind)
```

```
## [1] 3514
```

Excercise2

Read all individual datasets from 2004 to 2019. Append all these datasets:

```
datind_full = unique(rbind(datind2004,datind2005,datind2006,datind2007,datind2008,datind2009,datind2010
```

Read all household datasets from 2004 to 2019. Append all these datasets:

```
dathh_full = unique(rbind(dathh2004,dathh2005,dathh2006,dathh2007,dathh2008,dathh2009,dathh2010,dathh20
```

List the variables that are simultaneously present in the individual and household datasets:

```
col_check = colnames(dathh_full) %in% colnames(datind_full)

i=1
while (i <= length(col_check)){
  if (col_check[i] == "TRUE"){
    print(colnames(dathh_full)[i])
  }
```

```
  i= i+1
}
```

```
## [1] "X"
## [1] "idmen"
## [1] "year"
```

Number of households in which there are more than four family members:

```
Full_Data = unique(left_join(dathh_full,datind_full,by=c("idmen","year")))
```

```
idmen_count <- Full_Data %>% group_by(idmen,year) %>% mutate(count_4 = n()) %>% filter(count_4 > 4)
```

```
length(unique(idmen_count$idmen))
```

```
## [1] 3622
```

Number of households in which at least one member is unemployed:

```
Unemployed = Full_Data %>% group_by(idmen, year, empstat) %>% filter(empstat == "Unemployed")

length(unique(Unemployed$idmen))
```

```
## [1] 8161
```

Number of households in which at least two members are of the same profession:

```
Same_Profession = Full_Data %>% group_by(idmen, year, profession) %>% mutate(n_member = n()) %>% filter

length(unique(Same_Profession$idmen))
```

```
## [1] 7032
```

Number of individuals in the panel that are from household-Couple with kids:

```
Couple_kids = Full_Data %>% group_by(idmen,year,mstatus) %>% filter(mstatus == "Couple, with Kids")

length(unique(Couple_kids$idind))
```

```
## [1] 15567
```

Number of individuals in the panel that are from Paris:

```
Paris = Full_Data %>% group_by(idind,year,location) %>% filter(location == "Paris")

length(unique(Paris$idind))
```

```
## [1] 6177
```

Find the household with the most number of family members. Report its idmen:

```
max_idmen = idmen_count %>% filter(count_4 == max(idmen_count$count_4))
unique(max_idmen$idmen)
```

```
## [1] 2.207811e+15 2.510263e+15
```

Number of households present in 2010 and 2011:

```
dathh_1011 = intersect(dathh2010$idmen,dathh2011$idmen)
length(dathh_1011)
```

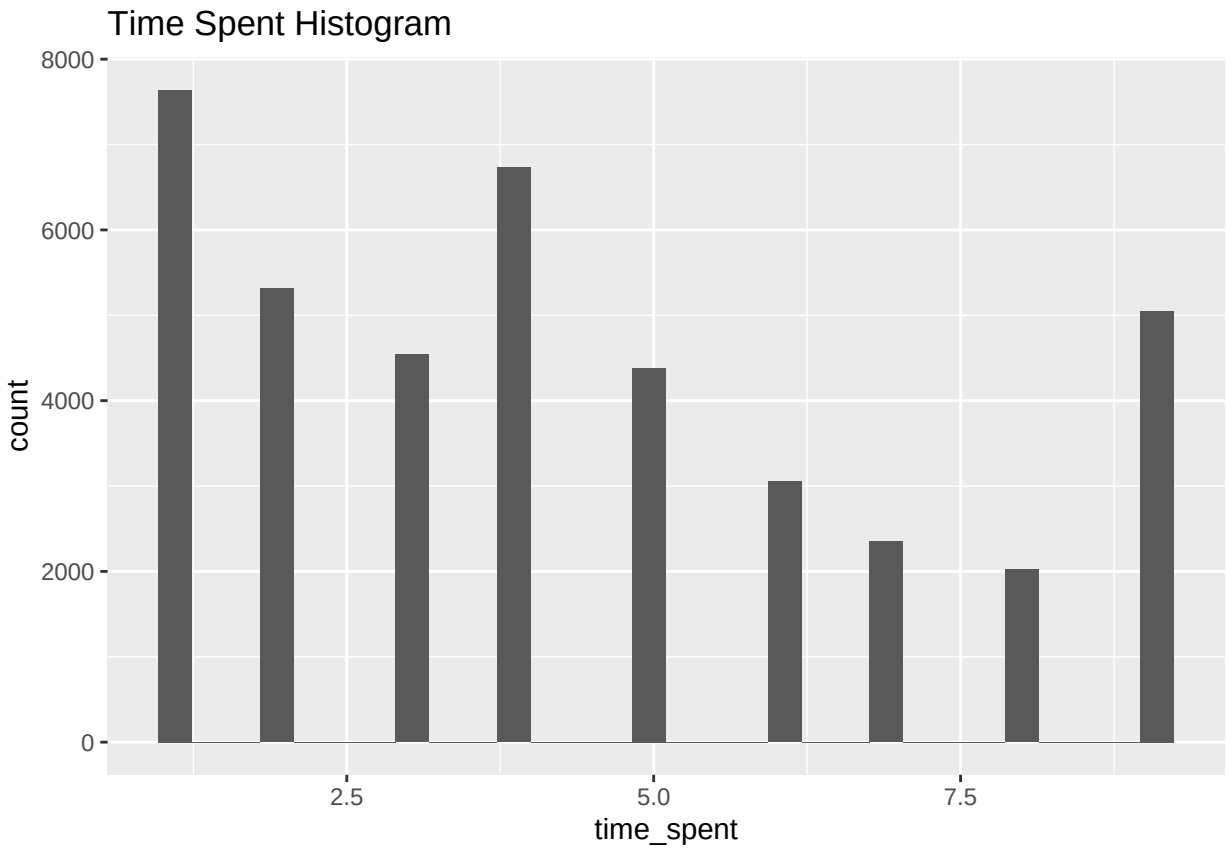
```
## [1] 8984
```

Exercise3

Find out the year each household enters and exit the panel. Report the distribution of the time spent in the survey for each household.

```
entry_exit <- Full_Data %>% group_by(idmen) %>% summarize(entry = min(year), exit = max(year)) %>% muta
```

```
ggplot(entry_exit, aes(x=time_spent)) + geom_histogram(bins = 30) + ggtitle("Time Spent Histogram")
```



Based on datent, identify whether or not a household moved into its current dwelling at the year of survey. Report the first 10 rows of your result and plot the share of individuals in that situation across years:

```
hh_year = Full_Data %>% mutate(move_in_check = ifelse(datent == year,1,0))
```

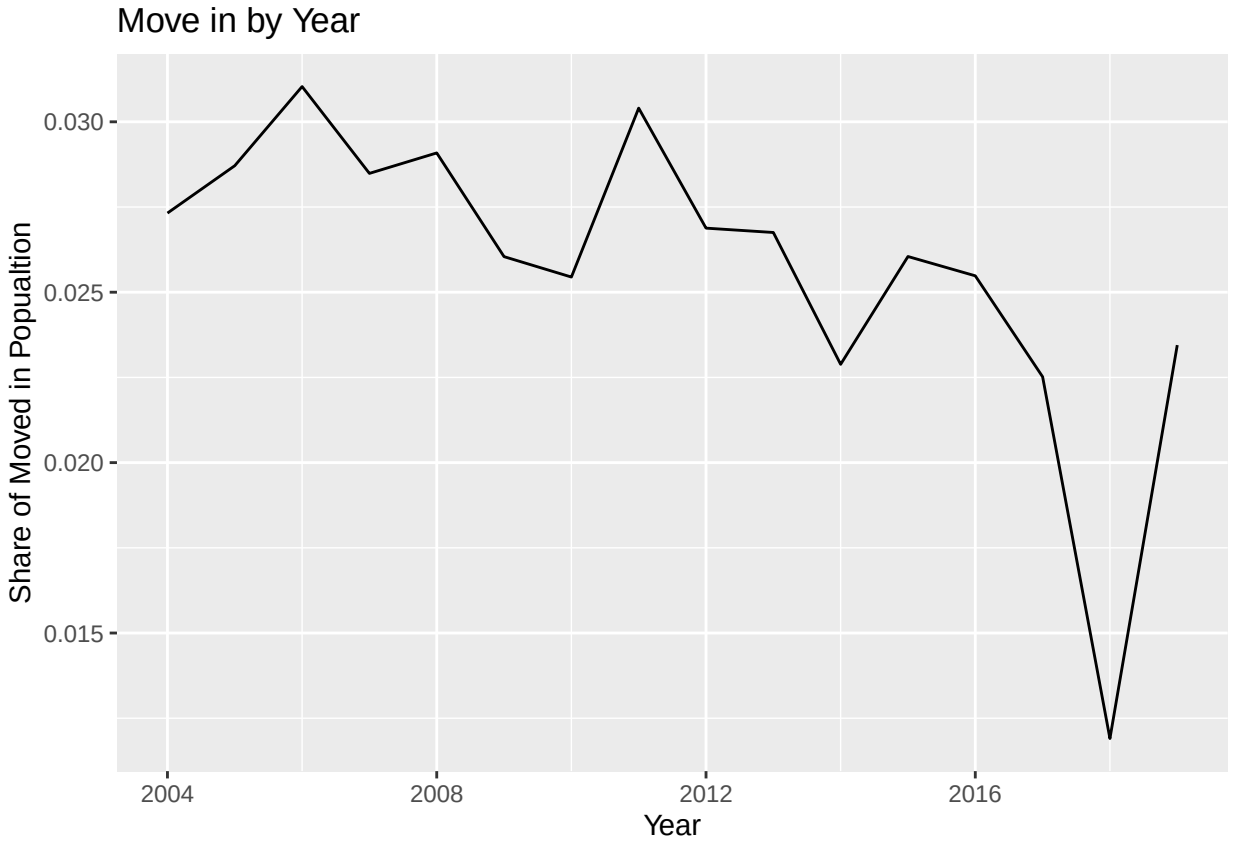
```
head(hh_year, 10)
```

```
##    X.x       idmen year datent myear         mstatus move location X.y
## 1    1 1.20001e+15 2004   2000  2000          Single   NA    Paris   1
## 2    2 1.20001e+15 2004   2001  2001   Single Parent   NA    Paris   2
## 3    2 1.20001e+15 2004   2001  2001   Single Parent   NA    Paris   3
## 4    3 1.20001e+15 2004   2000  2000 Couple, No kids   NA    Paris   4
## 5    3 1.20001e+15 2004   2000  2000 Couple, No kids   NA    Paris   5
## 6    4 1.20001e+15 2004   1957  1957          Single   NA    Paris   6
## 7    5 1.20001e+15 2004   2001  2001 Couple, No kids   NA    Paris   7
## 8    5 1.20001e+15 2004   2001  2001 Couple, No kids   NA    Paris   8
## 9    6 1.20001e+15 2004   1990  1990   Single Parent   NA    Paris   9
## 10   6 1.20001e+15 2004   1990  1990   Single Parent   NA    Paris  10
##           idind  empstat respondent profession gender age  wage move_in_check
```

```
## 1  1.120001e+18 Employed          1          67   Male  31 19187            0
## 2  1.120001e+18 Employed          1          56 Female  30 11586            0
## 3  1.120001e+18 Inactive          0             Female   9    NA            0
## 4  1.120001e+18 Employed          1          38   Male  31 44656            0
## 5  1.120001e+18 Employed          0          45 Female  27 20413            0
## 6  1.120001e+18  Retired          1             Female  89     0            0
## 7  1.120001e+18 Employed          1          34   Male  36 30702            0
## 8  1.120001e+18 Employed          0          42 Female  34 24650            0
## 9  1.120001e+18 Employed          1          46 Female  40 29604            0
## 10 1.120001e+18 Inactive          0             Female  15    NA            0
```

```
hh_year_ratio = hh_year %>% group_by(year) %>% summarise(total_c = n(), move_c = sum(move_in_check,na.rm
```

```
ggplot(hh_year_ratio, aes(y=m_ratio,x=year)) + geom_line() + ggtitle("Move in by Year") + xlab("Year") +
```



Based on myear and move, identify whether or not household migrated at the year of survey. Report the first 10 rows of your result and plot the share of individuals in that situation across years:

```
summary(Full_Data)
```

```
##       X.x             idmen                year          datent
##  Min.   :    1   Min.   :1.200e+15   Min.   :2004   Min.   :1912
##  1st Qu.: 2676   1st Qu.:2.003e+15   1st Qu.:2008   1st Qu.:1990
##  Median : 5375   Median :2.311e+15   Median :2012   Median :2001
##  Mean   : 5418   Mean   :2.349e+15   Mean   :2012   Mean   :1997
##  3rd Qu.: 8095   3rd Qu.:2.710e+15   3rd Qu.:2015   3rd Qu.:2007
##  Max.   :11999   Max.   :3.413e+15   Max.   :2019   Max.   :2019
##                                                     NA's   :245
##      myear          mstatus              move          location
```

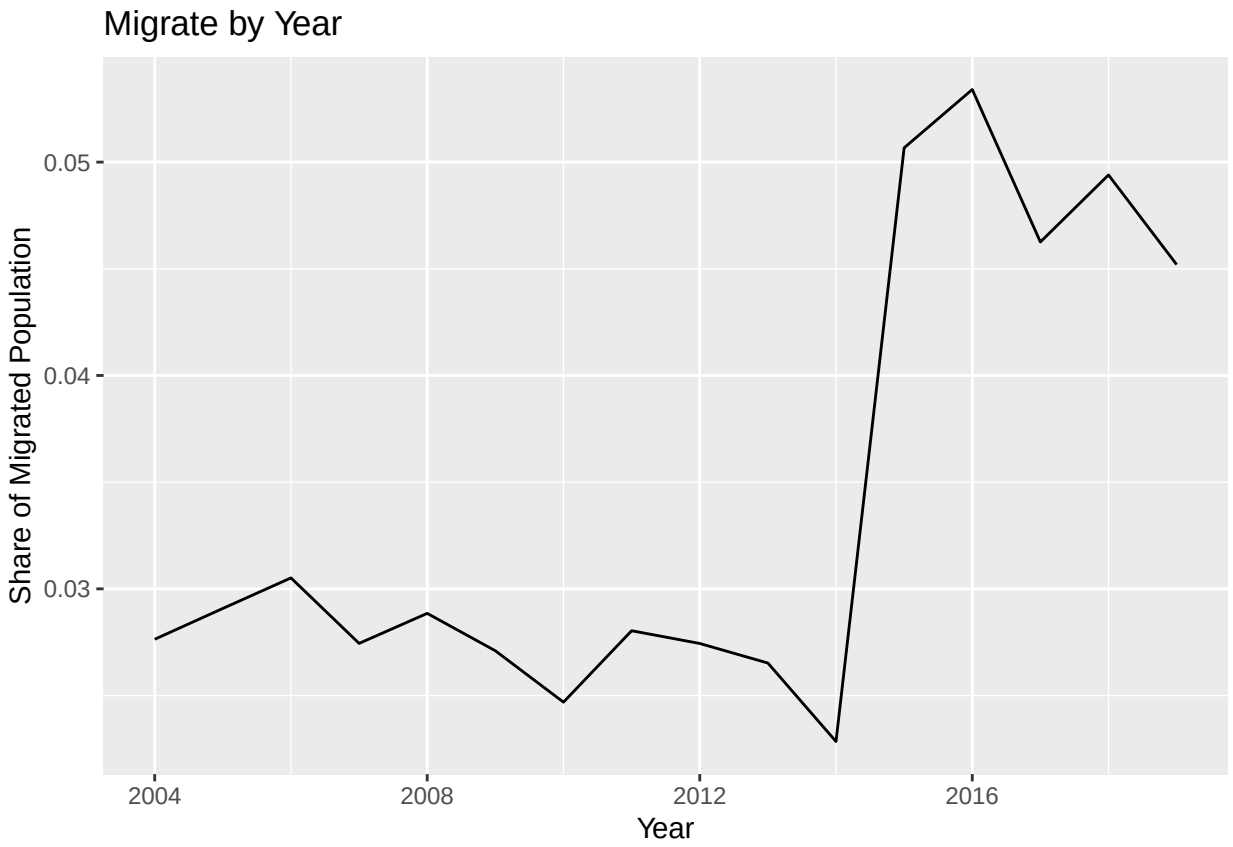
```
##  Min.   :1922     Length:413501      Min.   :1.00     Length:413501
##  1st Qu.:1989     Class :character   1st Qu.:1.00     Class :character
##  Median :2000     Mode  :character   Median :1.00     Mode  :character
##  Mean   :1996                        Mean   :1.06
##  3rd Qu.:2005                        3rd Qu.:1.00
##  Max.   :2014                        Max.   :2.00
##  NA's   :136321                      NA's   :308876
##       X.y            idind             empstat            respondent
##  Min.   :    1   Min.   :1.200e+17   Length:413501      Min.   :0.0000
##  1st Qu.: 6462   1st Qu.:1.200e+18   Class :character   1st Qu.:0.0000
##  Median :12923   Median :1.240e+18   Mode  :character   Median :0.0000
##  Mean   :12960   Mean   :1.272e+18                      Mean   :0.4063
##  3rd Qu.:19384   3rd Qu.:1.281e+18                      3rd Qu.:1.0000
##  Max.   :28534   Max.   :2.331e+18                      Max.   :1.0000
##
##   profession           gender               age              wage
##  Length:413501      Length:413501      Min.   : -1.00   Min.   :      0
##  Class :character   Class :character   1st Qu.: 19.00   1st Qu.:      0
##  Mode  :character   Mode  :character   Median : 41.00   Median :   3880
##                                        Mean   : 40.35   Mean   :  13693
##                                        3rd Qu.: 59.00   3rd Qu.:  23357
##                                        Max.   :102.00   Max.   :1747898
##                                        NA's   :2        NA's   :85183
```

```
migrate_year = Full_Data %>% mutate(mi_check = ifelse(is.na(move) == F & move ==2, 1, ifelse(year == my

head(migrate_year, 10)
```

```
##    X.x       idmen year datent myear         mstatus move location X.y
## 1    1 1.20001e+15 2004   2000  2000          Single   NA    Paris   1
## 2    2 1.20001e+15 2004   2001  2001   Single Parent   NA    Paris   2
## 3    2 1.20001e+15 2004   2001  2001   Single Parent   NA    Paris   3
## 4    3 1.20001e+15 2004   2000  2000 Couple, No kids   NA    Paris   4
## 5    3 1.20001e+15 2004   2000  2000 Couple, No kids   NA    Paris   5
## 6    4 1.20001e+15 2004   1957  1957          Single   NA    Paris   6
## 7    5 1.20001e+15 2004   2001  2001 Couple, No kids   NA    Paris   7
## 8    5 1.20001e+15 2004   2001  2001 Couple, No kids   NA    Paris   8
## 9    6 1.20001e+15 2004   1990  1990   Single Parent   NA    Paris   9
## 10   6 1.20001e+15 2004   1990  1990   Single Parent   NA    Paris  10
##           idind  empstat respondent profession gender age  wage mi_check
## 1  1.120001e+18 Employed          1         67   Male  31 19187        0
## 2  1.120001e+18 Employed          1         56 Female  30 11586        0
## 3  1.120001e+18 Inactive          0            Female   9    NA        0
## 4  1.120001e+18 Employed          1         38   Male  31 44656        0
## 5  1.120001e+18 Employed          0         45 Female  27 20413        0
## 6  1.120001e+18  Retired          1            Female  89     0        0
## 7  1.120001e+18 Employed          1         34   Male  36 30702        0
## 8  1.120001e+18 Employed          0         42 Female  34 24650        0
## 9  1.120001e+18 Employed          1         46 Female  40 29604        0
## 10 1.120001e+18 Inactive          0            Female  15    NA        0
```

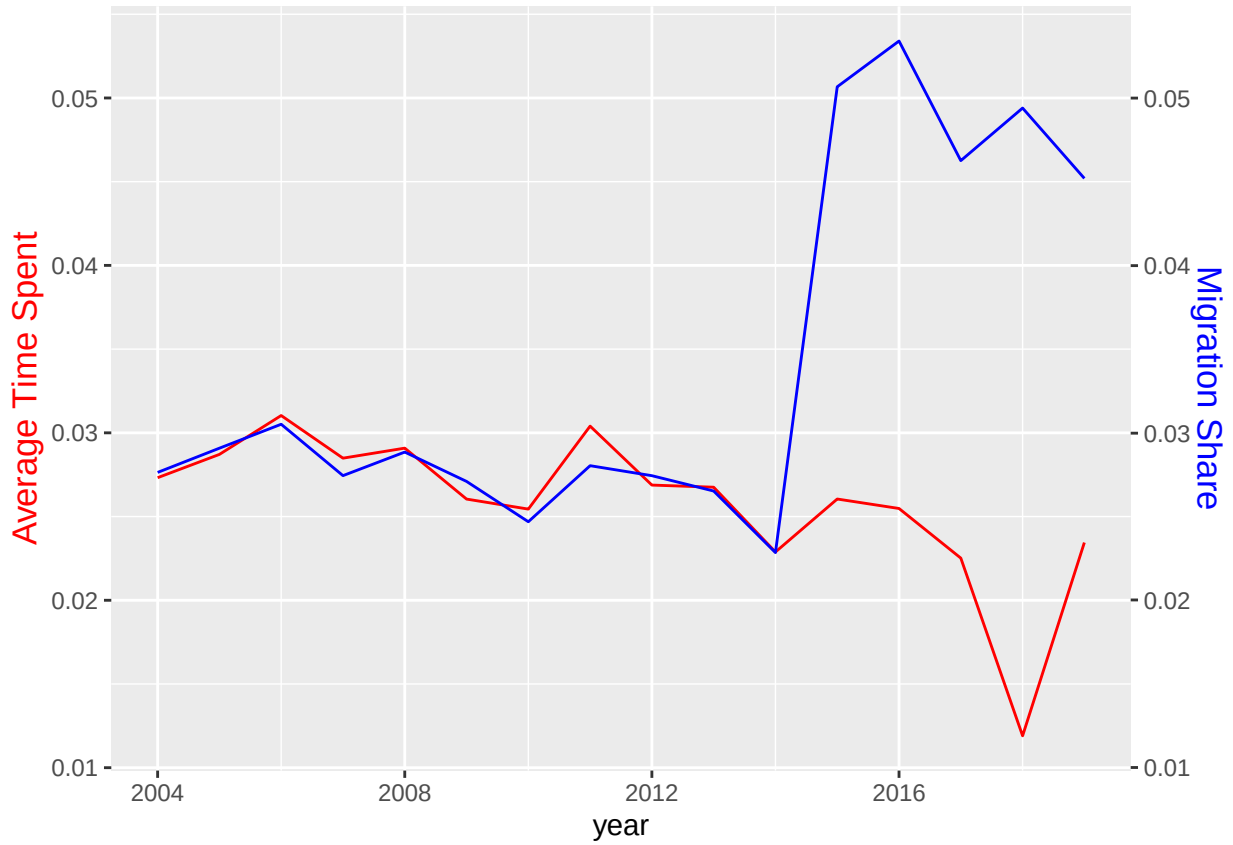
```
migrate_year_share = migrate_year %>% group_by(year) %>% summarise(year_count = n(), mi_count = sum(mi_
```

```
ggplot(migrate_year_share, aes(y=mi_share,x=year)) + geom_line() + ggtitle("Migrate by Year") + xlab("Y
```



Mix the two plots you created above in one graph, clearly label the graph. Do you prefer one method over the other? Justify:

```
ggplot(by_plot, aes(x=year)) +
   geom_line( aes(y=m_ratio),color="red") +  geom_line( aes(y=mi_share), color="blue") +

  scale_y_continuous(name = "Average Time Spent",sec.axis = sec_axis(trans=~.*1,,name="Migration Share")

  theme(
    axis.title.y = element_text(color = "red", size=13),
    axis.title.y.right = element_text(color = "blue", size=13)
  )
```



I prefer the time spent graph since it is straightfoward to understand. Moreover, migration share data has many missing values. In fact, after 2014, we do not have data on myear, and this inconsistency in measurement partially contributes to the jump after 2015.

For households who migrate, find out how many households had at least one family member changed his/her profession or employment status:

```
prof_emp_c = migrate_year %>% filter(mi_check == 1) %>% group_by(idmen,profession,empstat) %>% mutate(cl
```

```
length(prof_emp_c$idmen)
```

```
## [1] 7239
```

*Exercise*4

Compute the attrition across each year, where attrition is defined as the reduction in the number of individuals staying in the data panel. Report your final result as a table in proportions.

```
entry_exit = entry_exit %>% mutate(attrition = ifelse(time_spent == 1,1,0))
Full_att = left_join(Full_Data,entry_exit, by = "idmen") %>% group_by(year) %>% summarise(full_count = n
Full_att
```

```
## # A tibble: 14 x 2
##     year attrition_ratio
##    <int>           <dbl>
##  1  2005          0.0176
##  2  2006          0.0197
##  3  2007          0.0160
##  4  2008          0.0164
```

```
##  5  2009          0.0151
##  6  2010          0.0193
##  7  2011          0.0221
##  8  2012          0.0231
##  9  2013          0.0176
## 10  2014          0.0199
## 11  2015          0.0199
## 12  2016          0.0217
## 13  2017          0.0204
## 14  2018          0.0281
```