Final Exam

Name:

For each question, change the code to produce the **correct** output. Each question contains only one mistake, but it may be repeated (e.g., using the wrong function multiple times)

The following libraries are loaded in the global environment when running each snippet of code:

```r
library(tidyverse)
library(fivethirtyeight)
```

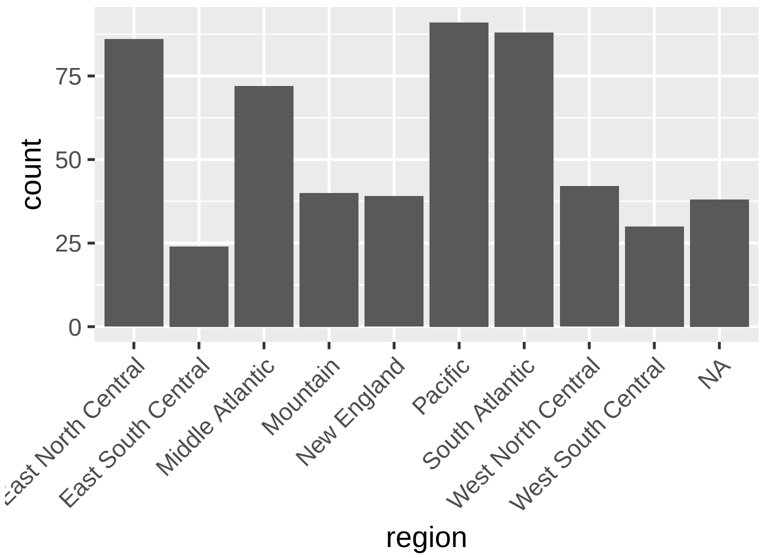
Data Visualization

1.

```r
ggplot(data = steak_survey) +
  geom_col(aes(x = region)) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```

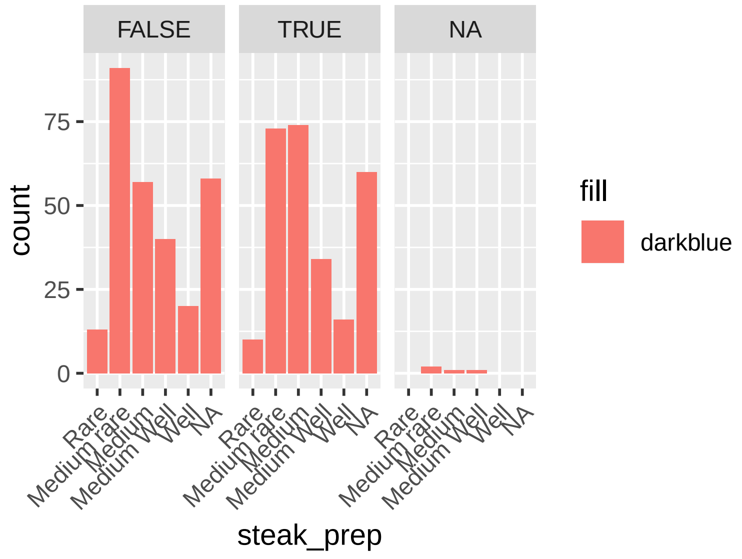
```
## Error in pmin(y, 0): object 'y' not found
```

correct:

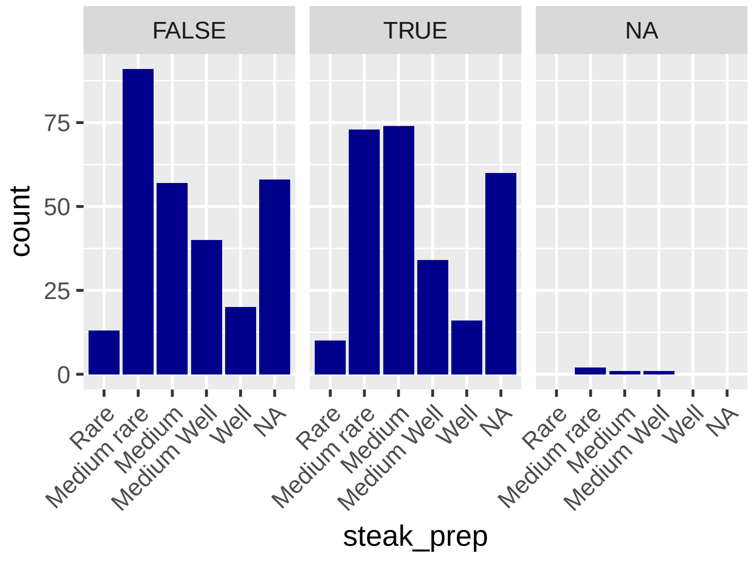


2. Count of subjects in each level of steak preparation preference by gender (using variable `female`)

```r
ggplot(data = steak_survey) +
  geom_bar(aes(x = steak_prep, fill = 'darkblue')) +
  facet_wrap(~ lottery_a) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```



correct:

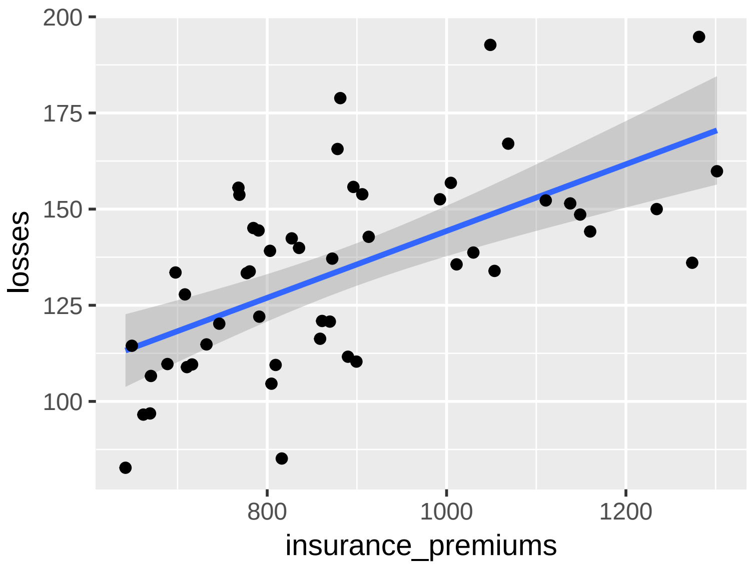


3. Chart of the correlation between `insurance_premiums` and `losses`

```r
ggplot(bad_drivers) +
  geom_smooth(aes(insurance_premiums, losses), method = 'lm') +
  geom_point()
```

```
## Error: geom_point requires the following missing aesthetics: x, y
```

correct:



Data Analysis

4. Total graduates by major_category (first 5 rows)

```
college_recent_grads %>%
  group_by(major_category) %>%
  summarise(Total = sum(total)) %>%
  slice(1:5)
```

```
## # A tibble: 5 x 2
##   major_category                        Total
##   <chr>                                 <int>
## 1 Agriculture & Natural Resources          NA
## 2 Arts                                 357130
## 3 Biology & Life Science               453862
## 4 Business                            1302376
## 5 Communications & Journalism          392601
```

correct:

```
## # A tibble: 5 x 2
##   major_category                        Total
##   <chr>                                 <int>
## 1 Agriculture & Natural Resources       75620
## 2 Arts                                 357130
## 3 Biology & Life Science               453862
## 4 Business                            1302376
## 5 Communications & Journalism          392601
```

5. Total share of women by major_category (first 5 rows)

```
college_recent_grads %>%
  group_by(major_category) %>%
  summarise(percent = n(women)/n(total)) %>%
  slice(1:5)
```

```
## Error in summarise_impl(.data, dots): `n()` does not take arguments
```

correct:

```
## # A tibble: 5 x 2
##   major_category                      percent
##   <chr>                                 <dbl>
## 1 Agriculture & Natural Resources  NA
## 2 Arts                                  0.624
## 3 Biology & Life Science                0.593
## 4 Business                              0.487
## 5 Communications & Journalism           0.664
```

6. Extract the row for the major with the highest share of females

```r
college_recent_grads %>%
  filter(max(sharewomen, na.rm = T)) %>%
  select(major_category:sharewomen)
```

```
## Error in filter_impl(.data, quo): Argument 2 filter condition does not evaluate to a logical vector
```

correct:

```
## # A tibble: 1 x 6
##   major_category total sample_size   men women sharewomen
##   <chr>          <int>       <int> <int> <int>      <dbl>
## 1 Education      37589         342  1167 36422      0.969
```

7. Count of major_category for Engineering and Business only.

```r
college_recent_grads %>%
  filter(major_category == 'Engineering', major_category == 'Business') %>%
  count(major_category)
```

```
## # A tibble: 0 x 2
## # ... with 2 variables: major_category <chr>, n <int>
```

correct:

```
## # A tibble: 2 x 2
##   major_category     n
##   <chr>          <int>
## 1 Business          13
## 2 Engineering       29
```

8. Transform `shareswomen` in percent. Print only the first row and keep only column "sharewoman"

```
college_recent_grads %>%
  slice(1) %>%
  select(sharewomen) %>%
  filter(sharewomen = scales::percent(sharewomen))
```

```
## Error: `sharewomen` (`sharewomen = scales::percent(sharewomen)`) must not be named, do you need `==`
```

correct:

```
## # A tibble: 1 x 1
##   sharewomen
##   <chr>
## 1 12.1%
```

9. Output a vector of means

```
map_dbl(mean, mtcars)
```

```
## Error: Can't convert a `data.frame` object to function
```

correct:

```
##        mpg        cyl       disp         hp       drat         wt 
##  20.090625   6.187500 230.721875 146.687500   3.596563   3.217250 
##       qsec         vs         am       gear       carb 
##  17.848750   0.437500   0.406250   3.687500   2.812500
```

Functions

10. Calculate the mean for each column of a dataframe containing numeric values:

```
columnwiseMean <- function(df) {
  if (is.data.frame(df)) stop('`df` is not a dataframe')
  map(df, mean)
}
columnwiseMean(cars)
```

```
## Error in columnwiseMean(cars): `df` is not a dataframe
```

correct:

```
## $speed
## [1] 15.4
##
## $dist
## [1] 42.98
```

11. Calculate a percentage given a total amount and a fraction of the total observations

```
prc <- function(total, obs, call. = FALSE) {
          if (!is.double(total) | !is.double(obs)) {
            stop('`total` and `obs` must be of type numeric')
            }
         (obs / total) * 100
         x <- paste0(x, '%')
         x
}
prc(400, 20)
```

```
## Error in paste0(x, "%"): object 'x' not found
```

correct:

```
prc(400, 20)
```

```
## [1] "5%"
```

#General R knowledge (TRUE/FALSE)

- `==` performs an assignment operation : F
- a `NA` is equivalent to `0` : F
- In dataframes, each column must have the same number of rows/cells: T
- The code snippets below retrieve the same output: T (vectorization)

```
c(1, 4, 3) + 1            # 1.

c(1, 4, 3) + c(1, 1, 1)   # 2.
```

- The code snippets below retrieve the same output when `x` is the same: F

```
mean(is.na(x))              # 1.

x %>% mean() %>% is.na(x)   # 2.
```

- The code snippets below retrieve the same output when `x` is the same: T

```
bad_drivers %>% filter(num_drivers > x)     # 1.

bad_drivers %>% filter(!(num_drivers <= x))  # 2.
```

- The code snippets below retrieve the same output: F

```
steak_survey %>% count(lottery_a, smoke)          # 1.

steak_survey %>% group_by(lottery_a, smoke) %>%   # 2.
  summarise(sum())
```

- `filter` is for manipulating rows, while `slice` is for manipulating variables: F
- the output from `summarise()` has as many rows as the grouping levels: T
- datasets being plotted in `ggplot()` should be "tidy" (or in longitudinal form): T
- in ggplot, we can map multiple variables to the same aesthetic: F
- every time we query a database using `dplyr` the output is automatically collected locally on our machine: F