CSC 587 Homework 1

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We read Su_raw_matrix.txt into a data frame “su”

```
su <- read.delim("Su_raw_matrix.txt")
```

Gets mean and standard deviation of Liver_2.CEL column,as well as the column mean and sum, and than print the results

```
liver2_mean <- mean(su$Liver_2.CEL)
liver2_sd <- sd(su$Liver_2.CEL)

col_means <- colMeans(su)
col_sums <- colSums(su)

print(liver2_mean)
```

```
## [1] 241.8246
```

```
print(liver2_sd)
```

```
## [1] 1133.352
```

```
print(col_means)
```

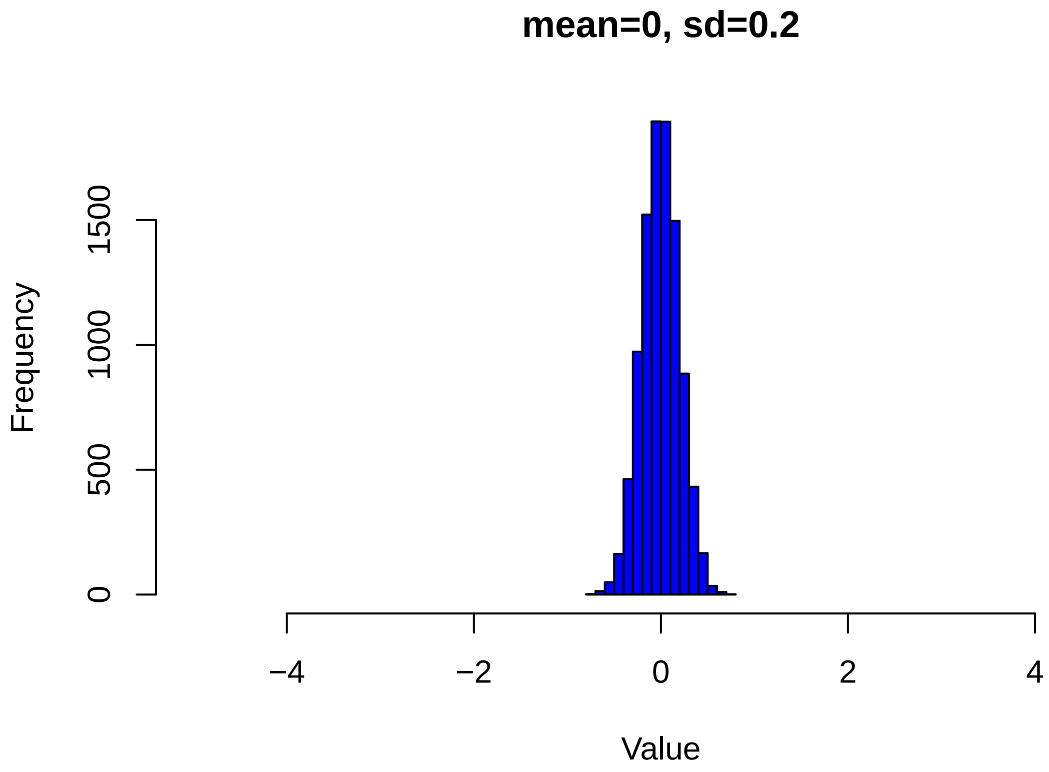
```
##       Brain_1.CEL       Brain_2.CEL Fetal_brain_1.CEL Fetal_brain_2.CEL
##          204.9763          315.0924          198.3439          267.6551
## Fetal_liver_1.CEL Fetal_liver_2.CEL       Liver_1.CEL       Liver_2.CEL
##          209.8722          399.1482          160.8558          241.8246
```

```
print(col_sums)
```

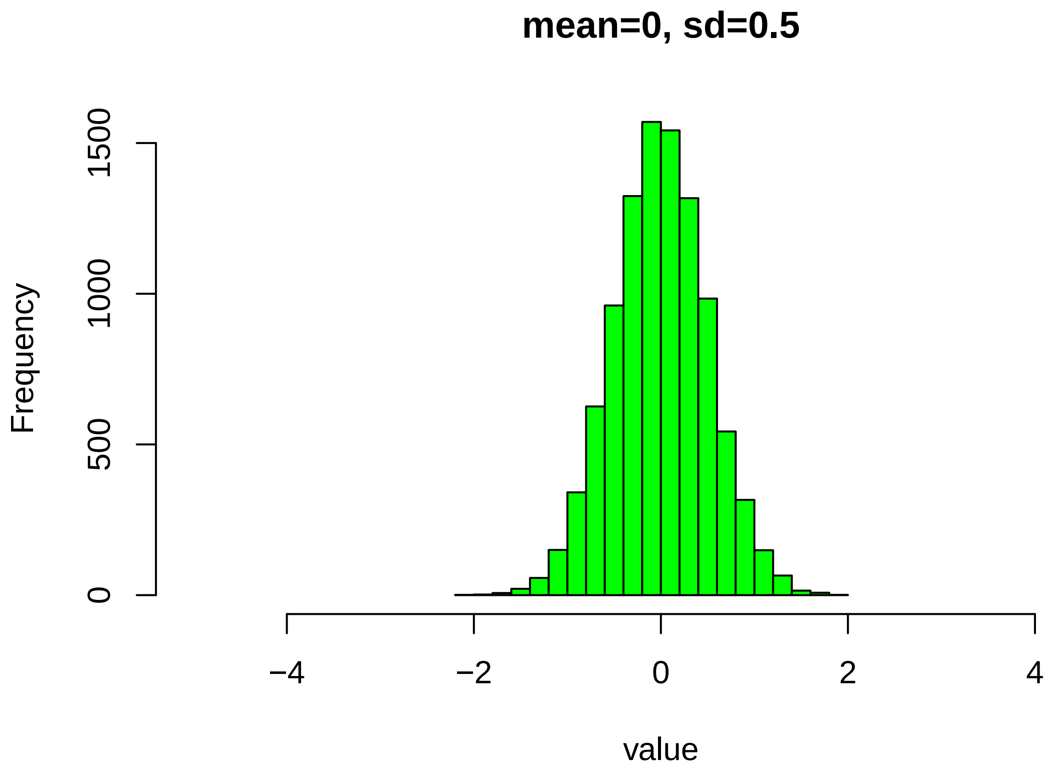
```
##       Brain_1.CEL       Brain_2.CEL Fetal_brain_1.CEL Fetal_brain_2.CEL
##           2588031           3978357           2504290           3379413
## Fetal_liver_1.CEL Fetal_liver_2.CEL       Liver_1.CEL       Liver_2.CEL
##           2649846           5039645           2030966           3053278
```

Here we generate 10,000 random numbers to use for plotting histograms and normal distributions. We do one with a smaller standard deviation of 0.2, and another with a standard deviation of 0.5.

```r
randomNum1 <- rnorm(10000, mean=0, sd=0.2)
hist(randomNum1, xlim=c(-5,5), main="mean=0, sd=0.2", xlab="Value", col="blue")
```



```r
randomNum2 <- rnorm(10000, mean=0, sd=0.5)
hist(randomNum2, xlim=c(-5,5), main="mean=0, sd=0.5", xlab="value", col="green")
```

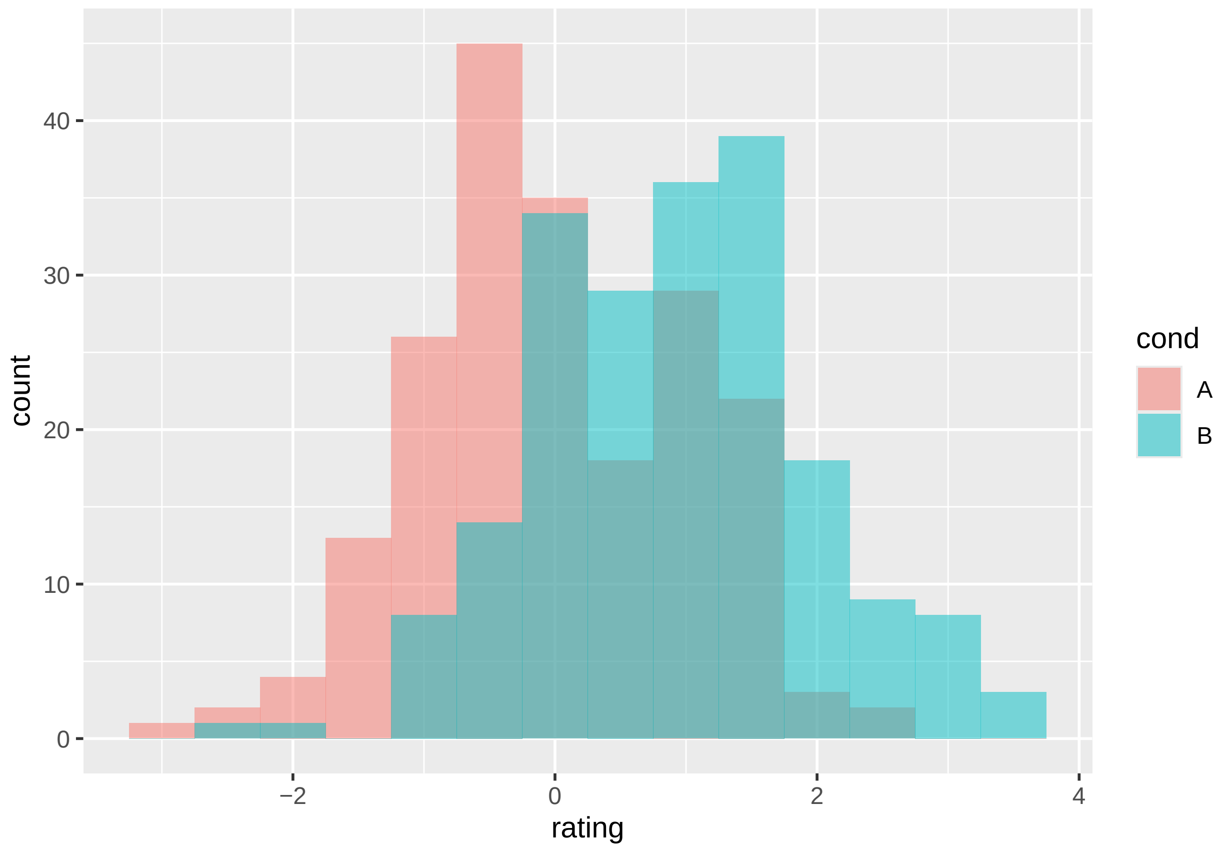


dat will be a sample dataset with two categories, A and B, which will contain 200 values each and then normally distributes, where A has a mean of 0 and B has a mean of 0.8.

```
library(ggplot2)
dat <- data.frame(cond = factor(rep(c("A", "B"), each=200)),
                  rating = c(rnorm(200),rnorm(200, mean=.8)))
```

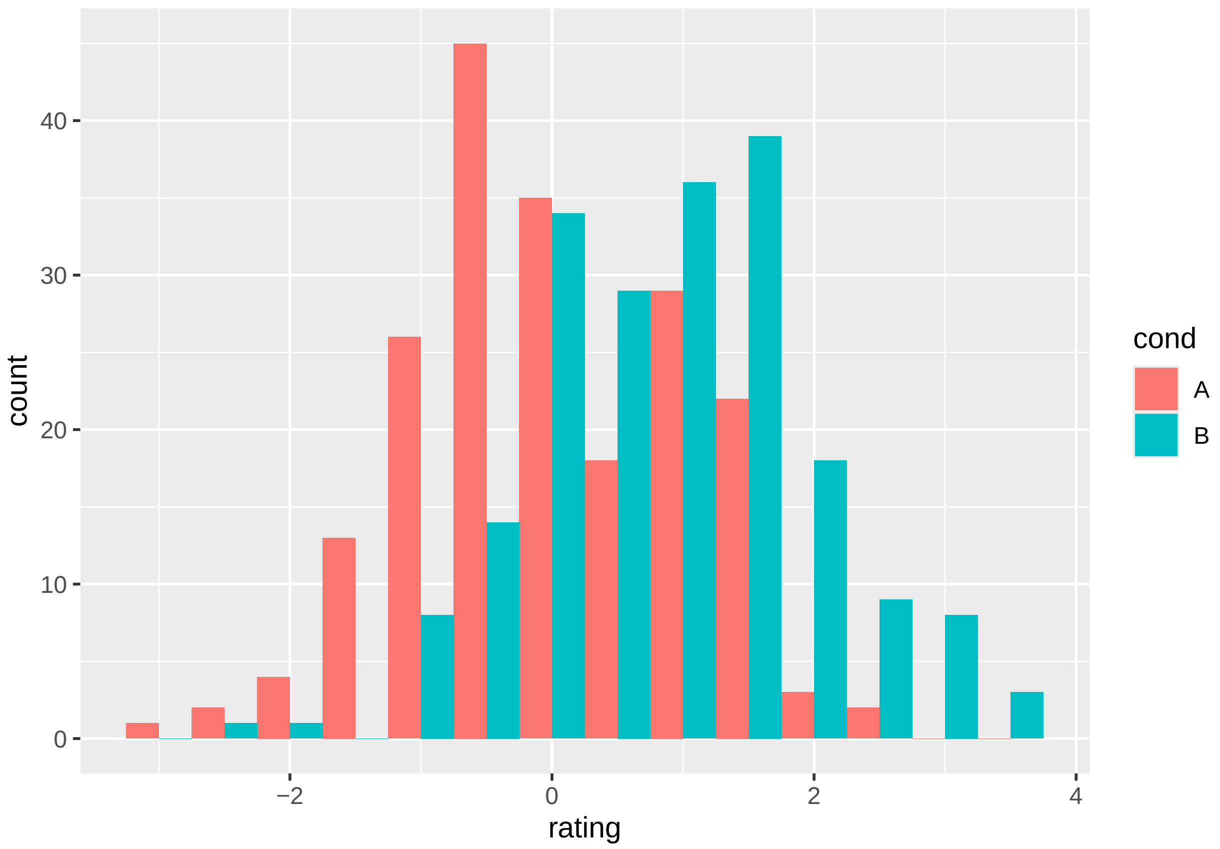
This will produce an overlaid histogram, plotting 'rating' attribute, with bins of 0.5 from the dat sample dataset

```
ggplot(dat, aes(x=rating, fill=cond)) +
  geom_histogram(binwidth=.5, alpha=.5, position="identity")
```



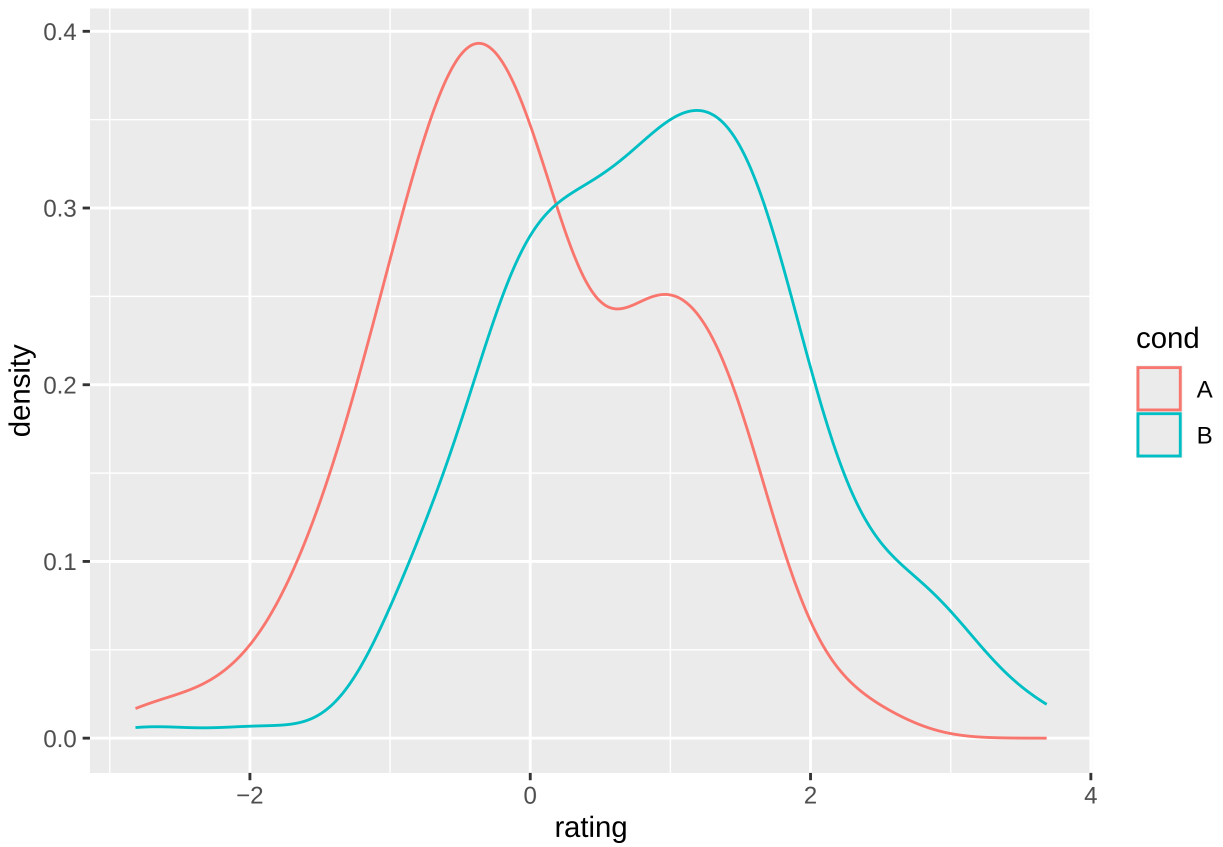
An interleaved histogram of the dat dataset, plotting 'rating' attribute (two side-by-side histograms)

```
ggplot(dat, aes(x=rating, fill=cond)) +
  geom_histogram(binwidth=.5, position="dodge")
```



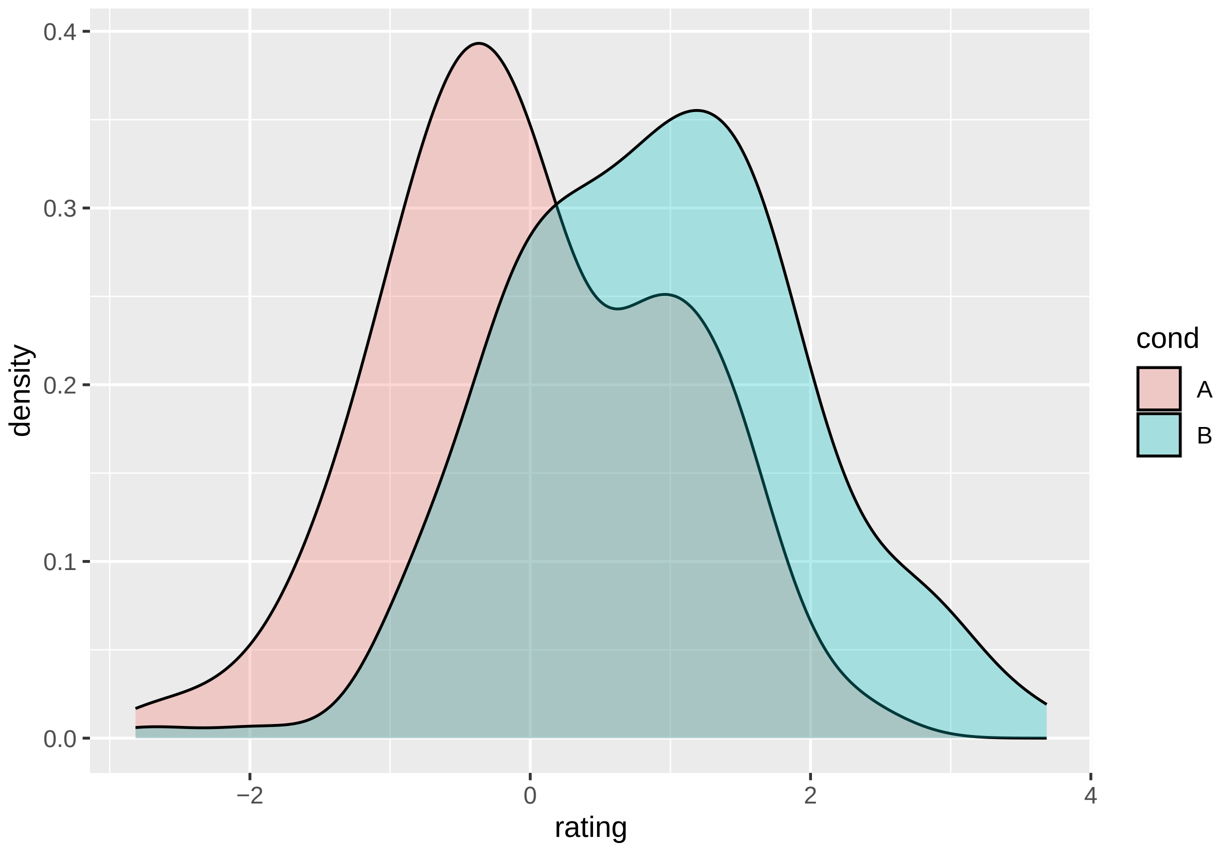
Density plots of dat

```
ggplot(dat, aes(x=rating, colour=cond)) + geom_density()
```



Density plots of dat with fill

```
ggplot(dat, aes(x=rating, fill=cond)) + geom_density(alpha=.3)
```

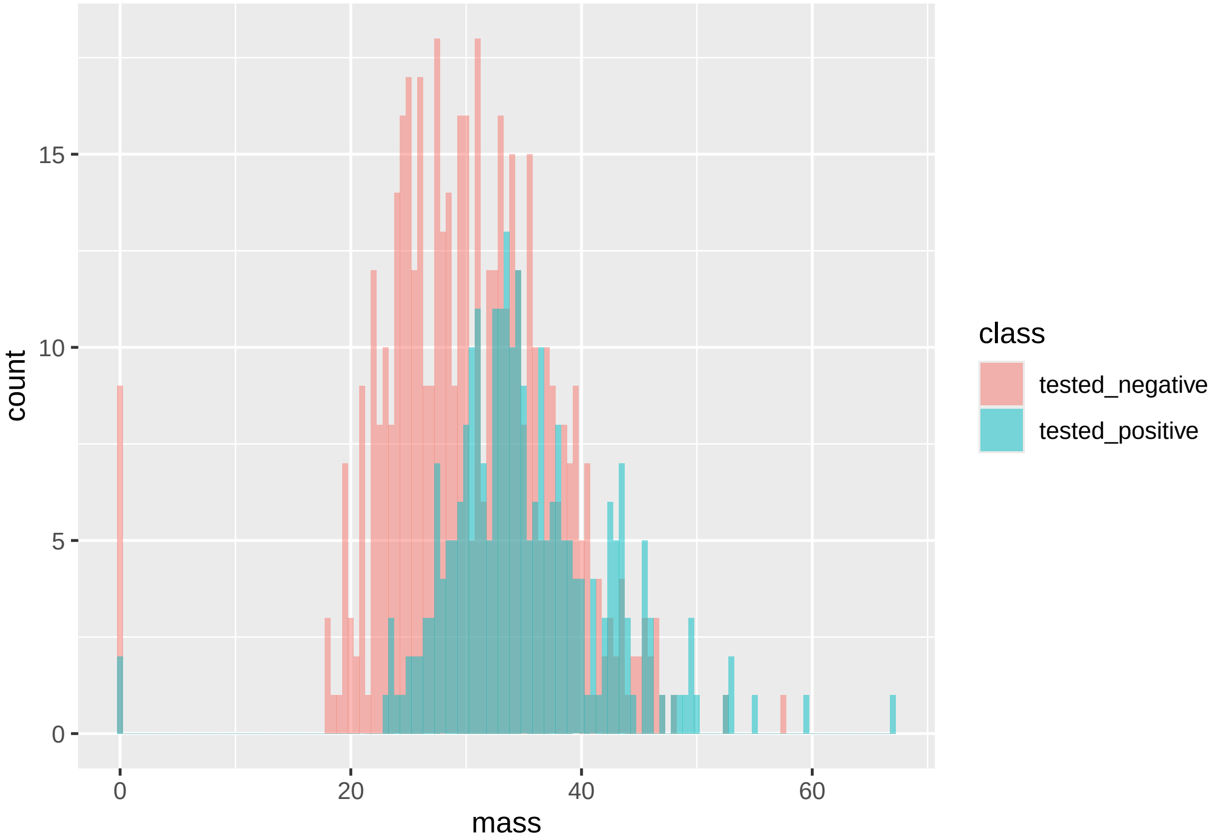


Instead of using random sample set (dat), we'll use a diabetes dataset produced from diabetes_train.csv

```
diabetes <- read.csv("diabetes_train.csv")
```

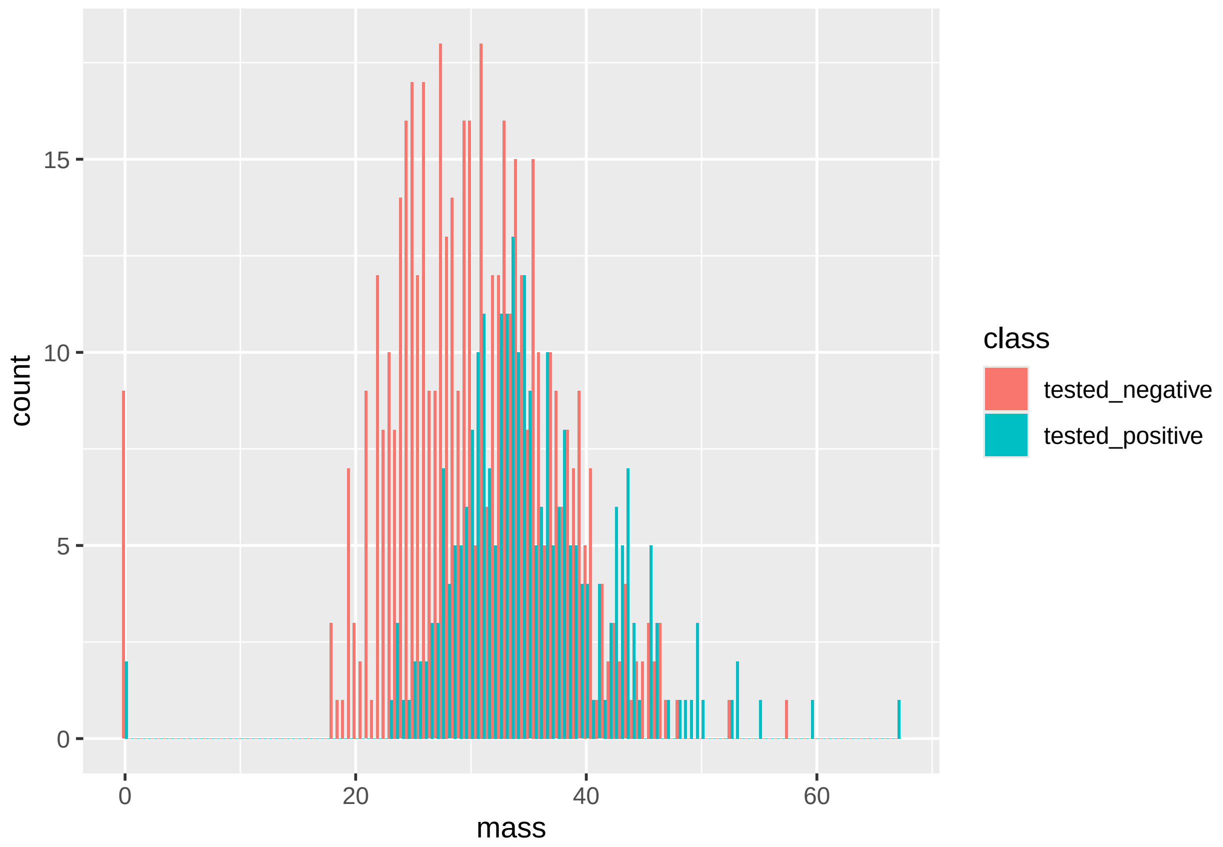
Overlaid histogram of diabetes dataset, plotting mass attribute

```
ggplot(diabetes, aes(x=mass, fill=class)) +
  geom_histogram(binwidth=.5, alpha=.5, position="identity")
```



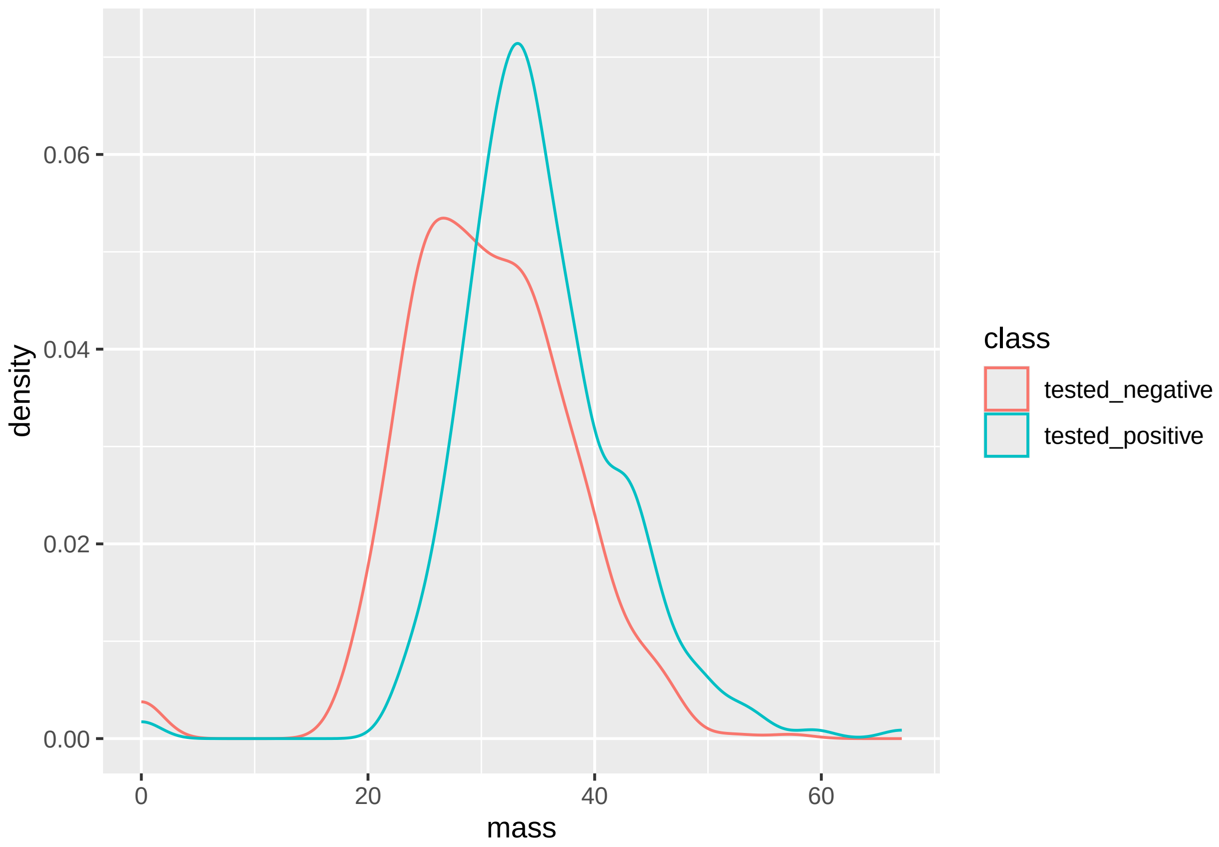
Interleaved histogram of diabetes dataset, plotting mass attribute

```
ggplot(diabetes, aes(x=mass, fill=class)) +
  geom_histogram(binwidth=.5, position="dodge")
```



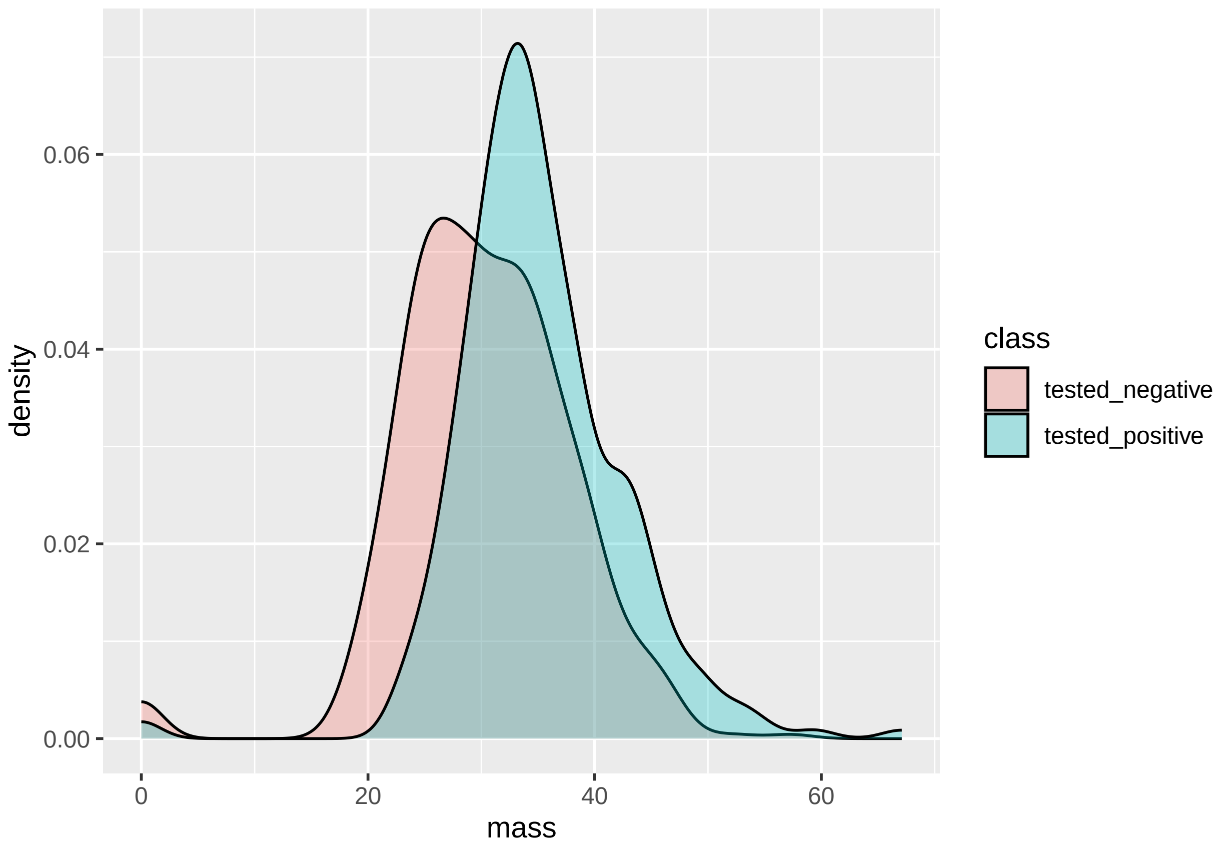
Diabetes dataset density plot

```
ggplot(diabetes, aes(x=mass, colour=class)) + geom_density()
```



Diabetes dataset density plot with fill

```
ggplot(diabetes, aes(x=mass, fill=class)) + geom_density(alpha=.3)
```



```r
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v lubridate 1.9.4     v tibble    3.2.1
## v purrr     1.0.2     v tidyr     1.3.1
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become error
```

```r
passengers <- read.csv("titanic.csv")
```

Here we remove any rows with missing values and provide a summary of statistical information

```r
passengers %>% drop_na() %>% summary()
```

```
##        X          PassengerId       Survived         Pclass         
##  Min.   :  0.0   Min.   :  1.0   Min.   :0.0000   Length:714        
##  1st Qu.:221.2   1st Qu.:222.2   1st Qu.:0.0000   Class :character  
##  Median :444.0   Median :445.0   Median :0.0000   Mode  :character  
##  Mean   :447.6   Mean   :448.6   Mean   :0.4062                     
##  3rd Qu.:676.8   3rd Qu.:677.8   3rd Qu.:1.0000                     
##  Max.   :890.0   Max.   :891.0   Max.   :1.0000  
##      Name               Sex                 Age            SibSp       
##  Length:714         Length:714         Min.   : 0.42   Min.   :0.0000  
##  Class :character   Class :character   1st Qu.:20.12   1st Qu.:0.0000  
##  Mode  :character   Mode  :character   Median :28.00   Median :0.0000  
##                                        Mean   :29.70   Mean   :0.5126  
##                                        3rd Qu.:38.00   3rd Qu.:1.0000  
##                                        Max.   :80.00   Max.   :5.0000  
##      Parch           Ticket               Fare           Cabin          
##  Min.   :0.0000   Length:714         Min.   :  0.00   Length:714        
##  1st Qu.:0.0000   Class :character   1st Qu.:  8.05   Class :character  
##  Median :0.0000   Mode  :character   Median : 15.74   Mode  :character  
##  Mean   :0.4314                      Mean   : 34.69                     
##  3rd Qu.:1.0000                      3rd Qu.: 33.38                     
##  Max.   :6.0000                      Max.   :512.33                     
##    Embarked        
##  Length:714        
##  Class :character  
##  Mode  :character  
##                    
##                    
## 
```

This filters and then creates a new dataset containing only male passengers (only 10 displayed)

```
passengers %>% filter(Sex == "male") %>% head(10)
```

```
##     X PassengerId Survived Pclass                           Name  Sex Age SibSp
## 1   0           1        0      3        Braund, Mr. Owen Harris male  22     1
## 2   4           5        0      3       Allen, Mr. William Henry male  35     0
## 3   5           6        0      3               Moran, Mr. James male  NA     0
## 4   6           7        0      1        McCarthy, Mr. Timothy J male  54     0
## 5   7           8        0      3 Palsson, Master. Gosta Leonard male   2     3
## 6  12          13        0      3 Saundercock, Mr. William Henry male  20     0
## 7  13          14        0      3    Andersson, Mr. Anders Johan male  39     1
## 8  16          17        0      3           Rice, Master. Eugene male   2     4
## 9  17          18        1      2   Williams, Mr. Charles Eugene male  NA     0
## 10 20          21        0      2           Fynney, Mr. Joseph J male  35     0
##    Parch     Ticket    Fare Cabin Embarked
## 1      0 A/5 21171  7.2500              S
## 2      0    373450  8.0500              S
## 3      0    330877  8.4583              Q
## 4      0     17463 51.8625   E46        S
## 5      1    349909 21.0750              S
## 6      0 A/5. 2151  8.0500              S
## 7      5    347082 31.2750              S
## 8      1    382652 29.1250              Q
## 9      0    244373 13.0000              S
## 10     0    239865 26.0000              S
```

We then sort all passengers by Fare, in descending order (the highest-paying passengers will appear first)) (only 10 displayed)

```r
passengers %>% arrange(desc(Fare)) %>% head(10)
```

```
##      X PassengerId Survived Pclass                                  Name    Sex
## 1  258         259        1      1                      Ward, Miss. Anna female
## 2  679         680        1      1    Cardeza, Mr. Thomas Drake Martinez   male
## 3  737         738        1      1                Lesurer, Mr. Gustave J   male
## 4   27          28        0      1        Fortune, Mr. Charles Alexander   male
## 5   88          89        1      1            Fortune, Miss. Mabel Helen female
## 6  341         342        1      1        Fortune, Miss. Alice Elizabeth female
## 7  438         439        0      1                     Fortune, Mr. Mark   male
## 8  311         312        1      1            Ryerson, Miss. Emily Borie female
## 9  742         743        1      1 Ryerson, Miss. Susan Parker "Suzette" female
## 10 118         119        0      1              Baxter, Mr. Quigg Edmond   male
##    Age SibSp Parch   Ticket     Fare           Cabin Embarked
## 1   35     0     0 PC 17755 512.3292                        C
## 2   36     0     1 PC 17755 512.3292     B51 B53 B55        C
## 3   35     0     0 PC 17755 512.3292            B101        C
## 4   19     3     2    19950 263.0000     C23 C25 C27        S
## 5   23     3     2    19950 263.0000     C23 C25 C27        S
## 6   24     3     2    19950 263.0000     C23 C25 C27        S
## 7   64     1     4    19950 263.0000     C23 C25 C27        S
## 8   18     2     2 PC 17608 262.3750 B57 B59 B63 B66        C
## 9   21     2     2 PC 17608 262.3750 B57 B59 B63 B66        C
## 10  24     0     1 PC 17558 247.5208         B58 B60        C
```

This calculates the total number of family members onboard, where Parch is parents/children, and SibSp is siblings/spouse (only 10 displayed)

```r
passengers %>% mutate(Famsize = Parch + SibSp) %>% head(10)
```

```
##    X PassengerId Survived Pclass
## 1  0           1        0      3
## 2  1           2        1      1
## 3  2           3        1      3
## 4  3           4        1      1
## 5  4           5        0      3
## 6  5           6        0      3
## 7  6           7        0      1
## 8  7           8        0      3
## 9  8           9        1      3
## 10 9          10        1      2
##                                                    Name    Sex Age SibSp Parch
## 1                               Braund, Mr. Owen Harris   male  22     1     0
## 2   Cumings, Mrs. John Bradley (Florence Briggs Thayer) female  38     1     0
## 3                                Heikkinen, Miss. Laina female  26     0     0
## 4          Futrelle, Mrs. Jacques Heath (Lily May Peel) female  35     1     0
## 5                              Allen, Mr. William Henry   male  35     0     0
## 6                                      Moran, Mr. James   male  NA     0     0
## 7                               McCarthy, Mr. Timothy J   male  54     0     0
## 8                        Palsson, Master. Gosta Leonard   male   2     3     1
## 9     Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg) female  27     0     2
## 10                  Nasser, Mrs. Nicholas (Adele Achem) female  14     1     0
##                Ticket    Fare Cabin Embarked Famsize
## 1         A/5 21171  7.2500              S       1
## 2          PC 17599 71.2833   C85        C       1
## 3  STON/O2. 3101282  7.9250              S       0
## 4            113803 53.1000  C123        S       1
## 5            373450  8.0500              S       0
## 6            330877  8.4583              Q       0
## 7             17463 51.8625   E46        S       0
## 8            349909 21.0750              S       4
## 9            347742 11.1333              S       2
## 10           237736 30.0708              C       1
```

Here we check the average ticket fare by gender, as well as find the total number of survivors per gender

```
passengers %>% group_by(Sex) %>%
  summarise(meanFare = mean(Fare), numSurv = sum(Survived))
```

```
## # A tibble: 2 x 3
##   Sex    meanFare numSurv
##   <chr>     <dbl>   <int>
## 1 female     44.5     233
## 2 male       25.5     109
```

Here we use quantile to calculate the 10th, 30th, 50th, and 60th percentiles of the skin attribute from the diabetes dataset

```
percentiles <- quantile(diabetes$skin, probs = c(0.1, 0.3, 0.5, 0.6))
print(percentiles)
```

```
## 10% 30% 50% 60%
##   0  10  23  27
```