final_project

```
library(tidyverse)
```

```
Warning: package 'ggplot2' was built under R version 4.3.2
```

```
Warning: package 'tidyr' was built under R version 4.3.2
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.4     v readr     2.1.4
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.0     v tibble    3.2.1
v lubridate 1.9.3     v tidyr     1.3.1
v purrr     1.0.2
-- 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 becor
```

```
simCorn <- function(overallEffect=0, fertilizerEffect=c(0,0,0), rowEffect=c(0,0,0), colEff
                    seed=NULL, dist = rnorm, ...) {


  if ((!is.numeric(seed)) && (!is.null(seed)))
    stop("You did not enter a valid seed")

  n <- length(fertilizerEffect)^2

    set.seed(seed)
    error <- dist(n, ...)
```

```
    Fertilizer = factor(c("A", "B", "C", "C", "A", "B", "B", "C", "A"))
    Row = factor(c(1, 1, 1, 2, 2, 2, 3, 3, 3))
    Column = factor(c(1, 2, 3, 1, 2, 3, 1, 2, 3))
    Yield = overallEffect + fertilizerEffect + rowEffect + colEffect + error
    x <- data.frame(Fertilizer, Row, Column, Yield)

  return (x)
}
```

```
simCorn()
```

```
  Fertilizer Row Column       Yield
1          A   1      1 -0.44749897
2          B   1      2 -0.03641480
3          C   1      3 -0.51516386
4          C   2      1  0.02246551
5          A   2      2 -0.65584660
6          B   2      3  0.26256326
7          B   3      1  2.63643116
8          C   3      2  0.96921027
9          A   3      3  0.72645438
```

```
simCorn(overallEffect=10,seed=2123,dist=rgamma,shape=2)
```

```
  Fertilizer Row Column    Yield
1          A   1      1 14.83727
2          B   1      2 10.45424
3          C   1      3 13.13900
4          C   2      1 10.47095
5          A   2      2 10.90779
6          B   2      3 13.44940
7          B   3      1 10.77832
8          C   3      2 11.49251
9          A   3      3 10.62710
```

```
mu <- 7
alpha <- c(1,2,3)
beta <- c(2,2,1)
```

```r
gamma <- c(3,3,2)
y <- simCorn(overallEffect=mu, fertilizerEffect=alpha, rowEffect=beta, colEffect=gamma,
             seed=29429, rnorm, mean=3, sd=2)
y
```

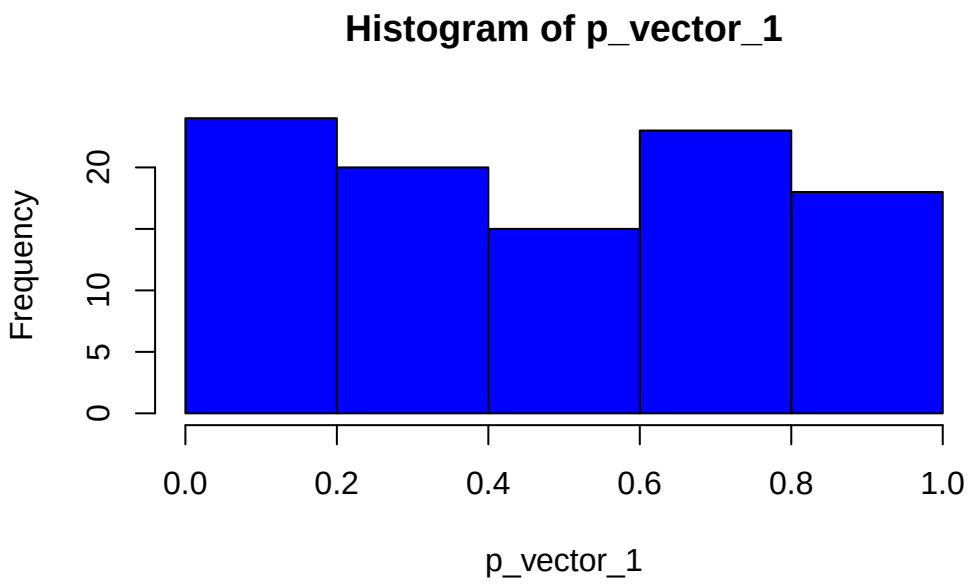
```
  Fertilizer Row Column    Yield
1          A   1      1 19.97551
2          B   1      2 16.08501
3          C   1      3 16.82301
4          C   2      1 13.00537
5          A   2      2 16.31535
6          B   2      3 13.89126
7          B   3      1 15.24435
8          C   3      2 16.98722
9          A   3      3 19.10382
```

```r
pValue <- numeric(100)
p_vector_1 <- vector(mode = "numeric", length = 100)
set.seed(1331)
for (k in 1:100) {

  y <- simCorn(overallEffect=10, dist=rnorm)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_1[k] <- pValue[k]

}


p_vector_2 <- vector(mode = "numeric", length = 100)
set.seed(18694)


for (k in 1:100) {

  y <- simCorn(overallEffect=10, c(1,2,3), c(0,0,1), c(0,0,1), dist=rnorm)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_2[k] <- pValue[k]
```

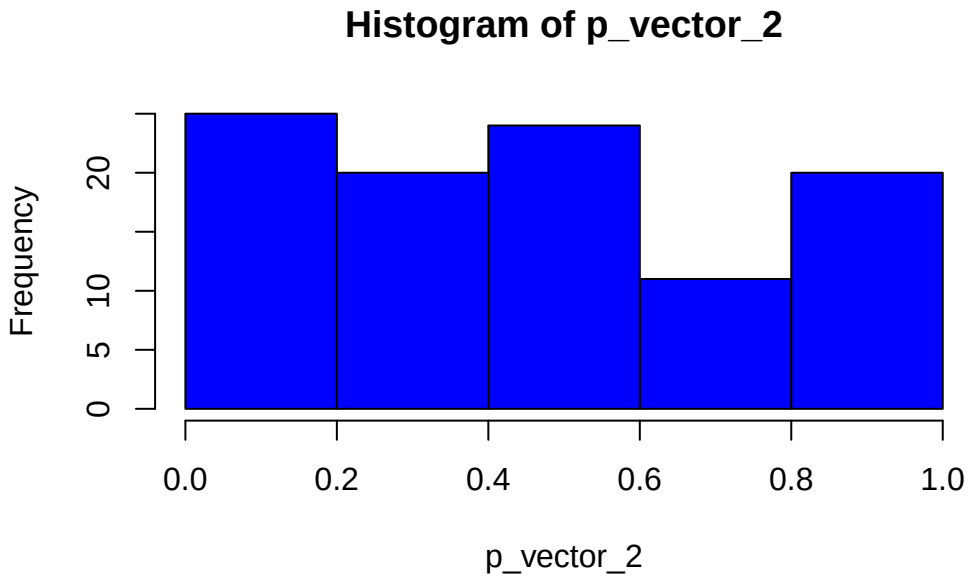
```
}


p_vector_3 <- vector(mode = "numeric", length = 100)
set.seed(6516)

for (k in 1:100) {

  y <- simCorn(overallEffect=10, c(1,2,3), c(1,0,1), c(0,1,1), dist=rnorm)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_3[k] <- pValue[k]

}


p_vector_4 <- vector(mode = "numeric", length = 100)
set.seed(5)

for (k in 1:100) {

  y <- simCorn(overallEffect=10, c(1,2,3), c(1,0,1), c(0,1,1), dist=rnorm)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_4[k] <- pValue[k]

}



p_vector_5 <- vector(mode = "numeric", length = 100)
set.seed(574)
for (k in 1:100) {

  y <- simCorn(overallEffect=10, c(1,2,3), c(0,0,1), c(0,0,1), dist=rexp)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_5[k] <- pValue[k]

}
```

```r
p_vector_6 <- vector(mode = "numeric", length = 100)
set.seed(9576)

for (k in 1:100) {

  y <- simCorn(overallEffect=10, c(1,2,3), c(1,0,1), c(0,1,1), dist=rexp)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_6[k] <- pValue[k]

}


p_vector_7 <- vector(mode = "numeric", length = 100)
set.seed(9743)


for (k in 1:100) {

  y <- simCorn(overallEffect=10, c(1,2,3), c(0,1,0), c(0,1,0), dist=rexp)
  fitCorn <- lm(Yield ~ Fertilizer + Row + Column, data=y)
  pValue[k] <- anova(fitCorn)$"Pr(>F)"[1]
  p_vector_5[k] <- pValue[k]

}
```

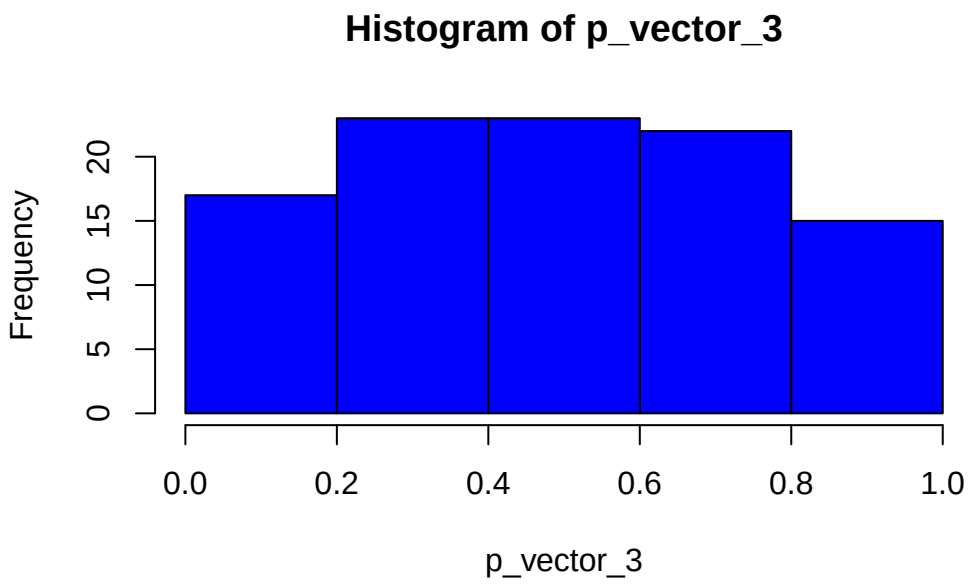
```r
hist(p_vector_1, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```



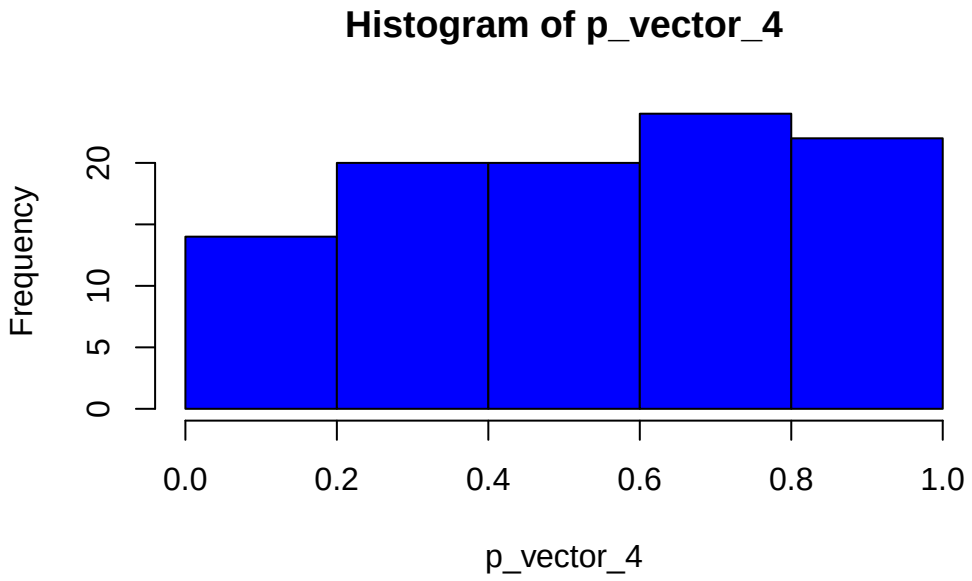

```r
hist(p_vector_2, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```



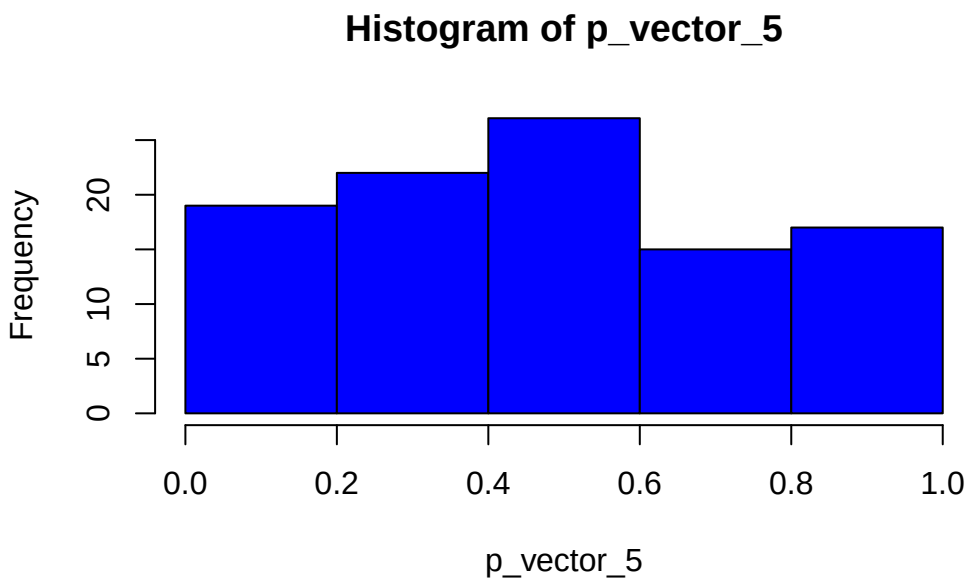

```r
hist(p_vector_3, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```



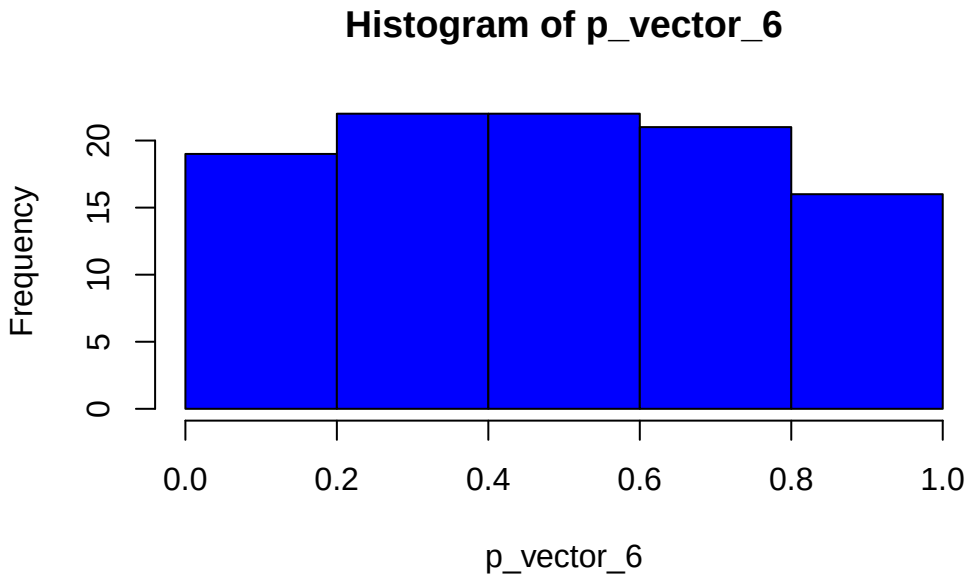

```r
hist(p_vector_4, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```



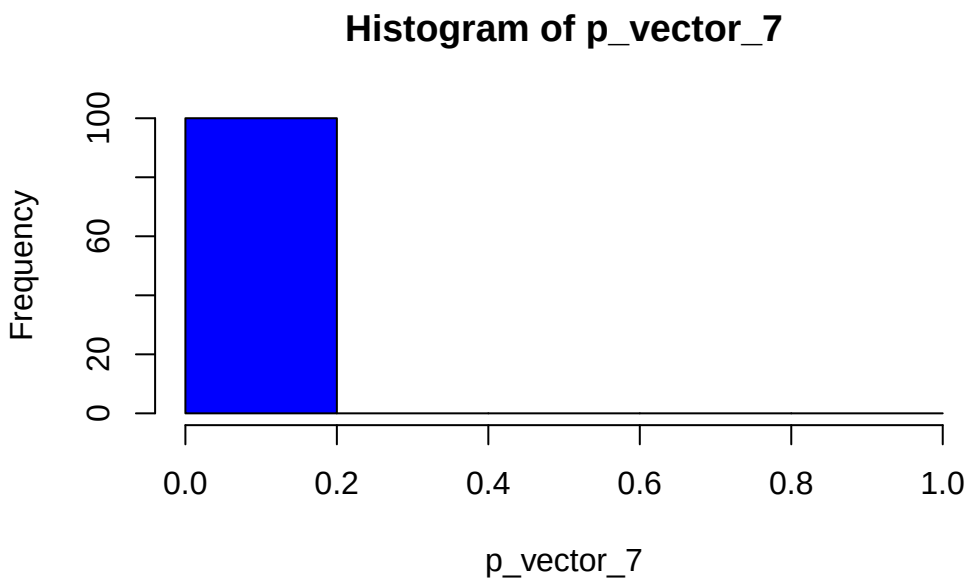

```r
hist(p_vector_5, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```




```r
hist(p_vector_6, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```




```r
hist(p_vector_7, breaks = c(0.0, 0.2, 0.4, 0.6, 0.8, 1.0), col = "blue", )
```


Histogram of p_vector_7
Frequency
0
20
60
100
0.0
0.2
0.4
0.6
0.8
1.0
p_vector_7