Expt. Name	Page No. 2 Y
Ex	PERIMENT - 10
	One - way Anava and Two-way Anava
goal is to understa	of this experiment is to utilize One way allow techniques in R to explore asiability among different groups. The ond has these analysis of variance whiled to assess the impact of rategorica sociability in a dataset.
Software Required:- R Statistical Software R Studio	
Rolevance of the Experim	ment: - Analysis of vocance is a power
group means in a for individuals invo	ment: - Analysis of womance is a power used to analyze the differences and sample. This experiment is odlamn lund in experimental design, be search it trouides bands - on experience
group means in a first individuals invaded and data analysis a	sample. This experiment is solumnt lund in experimental design, be search it provides hands - on experience understanding the sources of various
group means in a for individuals involved and data analysis, a n identifying and sociality among dir	sample. This experiment is adamn lued in experimental design, be search it provides hands on experience understanding the sources of various flerent groups.

A STATE OF THE STA

Aim: - Make use of One-way ANOVA and Two-way ANOVA techniques in R to explore the sources of variability among different groups

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local fire dataset

data("fire dataset

data("fire dataset

% Function to perform sampling and estimate mean using a given sampling method

% perform.sampling = function.dataset, sample.size, sampling.method) {

% perform.sampling = function.dataset, sample.size, sampling.method) {

10. if (sampling.method = "stimle.random") {

11. sample.data = dataset.sample.random" stratified") {

12. lets if (sampling.method = "stratified") {

13. sample.fisample.size, replace = FALSE)

14. lets if (sampling.method = "systematic") {

16. lets if (sampling.method = "systematic") {

17. n = nrow(dataset)

18. k = sample.size

19. start = sample.size

19. start = sampled.let, l)

10. indices = seq(start, n, by = k)

21. sampled.data = dataset(indices, ]

22. lets (

23. stop("Invalid sampling method.")

24. lets (

25. stop("Invalid sampling method.")

26. return(mean(sampled.dataSepal.Length))

27. lets (

28. sample.size = 30

29. Define parameters

30. sampling.methods < c("simple.random", "stratified", "systematic")

31. punction(method) {

7. replicace(num_tierations, perform_sampling.ciris, sample_size, method))

32. sampling.results < lamply(sampling.methods, function(method) {

7. replicace(num_tierations, perform_sampling.ciris, sample_size, method))

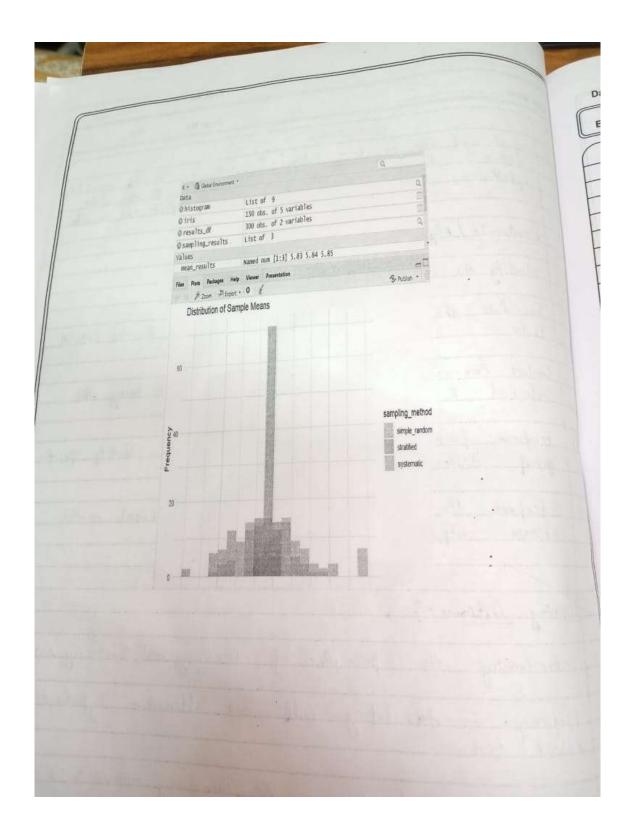
33. lets combine results into a data frame

40. respits df < data, frame(
```

-	. Name	Expt. No.
E	Expt. Name	Page No. 2.5
	impact of one or to within a dataset. hypotheses, conduct	Participants will loan to formulate. Anova tests, and interpret the results.
_	Pseudacode / Algorithm:	
1:	Edonbify the categorical	woriables of interest.
+	formulate the gull a	and afternative hypothesis for the ANOVA
+	Conduct One-way ANDVA	9 or Two-way ANTONA laving the
		tests if necessary to identify specifi
	Interpret the secults ANDVA ONTENT	and draw conducions based on the
ea	iming autromes:	
In	nderstanding the point	oribles of One-way and Two-way An
	ofiency in formulating	g null and alternative hypotheses
Ь	ility to conduct on	ne-way & Two-way ANOVA in R.
		Teacher's Signature:

```
Date
                                                                                                                          35. Sampling results < lapply(sampling methods, function(method) (
36. replicate(ms_iterations, perform_sampling(iris, sample_size, method))
7. The sample of the sample o
                                                                                                                           39 / Combine results into a data frame
                                                                                                                          u) results_df < data.frame(
1 sampling_method = rep(sampling_methods, each = mum_iterations),
                                                                                                                          42 mean = unlist(sampling_results)
                                                                                                                           43 )
                                                                                                                     45 # Plot mistograms
46 histogram - ggolot(results_df, aes(x = mean, fill = sampling_method)) +
47 geom_histogram(position = "identity", alpha = 0.5, bins = 20) +
48 labs(title = "Distribution of Sample Means", x = "Mean Sepal Length", y = "Frequency") +
48 labs(title = "Distribution of Sample Means", x = "Mean Sepal Length", y = "Frequency") +
                                                                                                                      49 theme_minimal()
                                                                                                                       51 print(histogram)
                                                                                                                     53 # Calculate nears
                                                                                                                   54 mean_results < sapply(sampling_results, mean)
                                                                                                                   55 names (mean_results) <- sampling_methods
                                                                                                                    57 # Print results
                                                                                                                  58 print(mean_results)
     > mean_results <- sapply(sampling_results, mean)
   > names(mean_results) <- sampling_methods
 > # Print results
> print(mean_results)
simple_random stratified
                                                                                                                                                             systematic
                       5.832267
                                                                                            5.838022
                                                                                                                                                                         5.848600
```

Date	Expt. No
xpt. Name	Page No. 26
9 Enterpretation of Anbra p-values.	vesults, including F-statistics and
- Practical experience in id different graps and ass	entifying sources of variability among interaction effects between



SCREENSHOTS:

```
> mean_results <- sapply(sampling_results, mean)</pre>
> names(mean_results) <- sampling_methods
>
> # Print results
> print(mean_results)
simple_random
                 stratified
                               systematic
                   5.838022
     5.832267
                                 5.848600
>
 1 # Load required libraries
     library(dplyr)
    library(ggplot2)
 3
 5
    # Load the iris dataset
 6 data("iris")
 8 # Function to perform sampling and estimate mean using a given sampling method
 9- perform_sampling <- function(dataset, sample_size, sampling_method) {
      if (sampling_method == "simple_random") {
 10 -
         sampled_data <- dataset[sample(nrow(dataset), sample_size, replace = FALSE), ]</pre>
 11
       } else if (sampling_method == "stratified") {
12 -
         sampled_data <- dataset %>%
13
14
           group_by(Species) %>%
15
           sample_n(sample_size, replace = FALSE)
       } else if (sampling_method == "systematic") {
16 -
17
         n <- nrow(dataset)</pre>
18
         k <- sample_size</pre>
 19
         start <- sample(1:k, 1)</pre>
 20
         indices \leftarrow seq(start, n, by = k)
 21
         sampled_data <- dataset[indices, ]</pre>
 22 -
       } else {
         stop("Invalid sampling method.")
 23
 24 -
 25
 26
       return(mean(sampled_data$Sepal.Length))
 27 - }
 28
 29 # Define parameters
    sample_size <- 30
 30
    num_iterations <- 100
 31
    sampling_methods <- c("simple_random", "stratified", "systematic")</pre>
 32
 33
 34 # Perform sampling and estimate mean using each technique
 35 - sampling_results <- lapply(sampling_methods, function(method) {
     replicate(num_iterations, perform_sampling(iris, sample_size, method))
 37 4 })
 38
 39 # Combine results into a data frame
 40 results_df <- data.frame(
                                          . .
```

```
34 # Perform sampling and estimate mean using each technique
35 - sampling_results <- lapply(sampling_methods, function(method) {
36 replicate(num_iterations, perform_sampling(iris, sample_size, method))
37 * })
38
39 # Combine results into a data frame
40 results_df <- data.frame(
     sampling_method = rep(sampling_methods, each = num_iterations),
42
     mean = unlist(sampling_results)
43 )
44
45 # Plot histograms
46 histogram <- ggplot(results_df, aes(x = mean, fill = sampling_method)) +
     geom_histogram(position = "identity", alpha = 0.5, bins = 20) +
48
     labs(title = "Distribution of Sample Means", x = "Mean Sepal Length", y = "Frequency") +
49 theme_minimal()
50
51 print(histogram)
52
53 # Calculate means
54 mean_results <- sapply(sampling_results, mean)
55 names(mean_results) <- sampling_methods
56
57 # Print results
58 print(mean_results)
```

