Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
Hingna Road, Wanadongri, Nagpur - 441 110
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Department of Computer Technology B. Tech in Computer Science and Engineering (IOT)

Vision of the Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session 2025-2026

Vision: Dream of where you want.	**Mission:** Means to achieve Vision

Program Educational Objectives of the program (PEO): (broad statements that describe the professional and career accomplishments)

PEO1	**Preparation**	**P: Preparation**	**Pep-CL abbreviation pronounce as Pep-si-lL easy to recall**
PEO2	**Core Competence**	**E: Environment (Learning Environment)**	
PEO3	**Breadth**	**P: Professionalism**	
PEO4	**Professionalism**	**C: Core Competence**	
PEO5	**Learning Environment**	**L: Breadth (Learning in diverse areas)**	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program)

Keywords of POs:
Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

PSO Keywords: Cutting edge technologies, Research

"I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life." *to contribute to the development of cutting-edge technologies and Research*.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Name and Signature of Student and Date
(Signature and Date in Handwritten)

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Session	2024-25 (ODD)	Course Name	MFDA
Semester	5	Course Code	23IOT1526
Roll No	49	Name of Student	Omkar Panchal

Practical Number	5(A) and 5(B)
Course Outcome	
Aim	To find the hypothesis test is null and should be rejected or accepted.
Problem Definition	**5(A)** A Telecom service provider claims that individual customers pay on an average 400 rs. Per month with standard deviation of 25 rs. A random sample of 50 customers bills during a given month is taken with a mean of 250 and standard deviation of 15. What to say with respect to the claim made by the service provider? **5(B)** A streaming service claims the average monthly bill is ₹799 with population standard deviation ₹60 from a sample of 40 users the mean ₹760. Test claims at 5% level.
Theory (100 words)	**Need for Hypothesis Testing** Hypothesis testing is an important procedure in statistics. Hypothesis testing evaluates two mutually exclusive population statements to determine which statement is most supported by sample data. When we say that the findings are statistically significant, it is thanks to hypothesis testing. **Parameters of hypothesis testing** • **Null hypothesis (H0):** In statistics, the null hypothesis is a general given statement or default position that there is no relationship between two measured cases or no relationship among groups. In other words, it is a basic assumption or made based on the problem knowledge. Example: A company production is = 50 units/per day etc. • **Alternative hypothesis (H1):** The alternative hypothesis is the hypothesis used in hypothesis testing that is contrary to the null hypothesis. Example: A company's production is not equal to 50 units/per day etc.

Procedure and Execution **(100 Words)**	The procedure for testing a hypothesis in statistics involves the following steps: 1. Formulate hypotheses: Based on information from a sample, formulate hypotheses about the population. 2. State the hypotheses: State the null hypothesis and the alternative hypothesis. 3. Determine the critical value: Determine the critical value. 4. Calculate the test statistic: Calculate the test statistic under the assumption that the null hypothesis is true. The test statistic compares the data with what is expected under the null hypothesis. 5. Calculate the probability value (p-value): Calculate the p-value using the test statistic. 6. Make a statistical decision: Based on the p-value, make a statistical decision. 7. Make a conclusion: Make a conclusion based on the statistical decision. A hypothesis test is a procedure that uses statistics to determine the probability that a hypothesis is true. It evaluates two mutually exclusive statements about a population to determine which statement is best supported by the sample data.
	Code: **5(A)** mu0 <- 400 xbar <- 250 sigma <- 25 n <- 50 alpha <- 0.05 z_value <- (xbar - mu0) / (sigma / sqrt(n)) z_value z_critical <- qnorm(1 - alpha/2) c(-z_critical, z_critical) p_value <- 2 * (1 - pnorm(abs(z_value))) p_value

```
if (abs(z_value) > z_critical) {
  cat("Reject H0: The telecom provider's claim is not valid.\n")
} else {
  cat("Fail to Reject H0: The telecom provider's claim holds.\n")
}
```

5(A)

```
mu0 <- 799
xbar <- 760
sigma <- 60
n <- 40
alpha <- 0.05


z_value <- (xbar - mu0) / (sigma / sqrt(n))
z_value

z_critical <- qnorm(1 - alpha/2)
c(-z_critical, z_critical)

p_value <- 2 * (1 - pnorm(abs(z_value)))
p_value

if (abs(z_value) > z_critical) {
  cat("Reject H0: The streaming service's claim is not valid.\n")
} else {
  cat("Fail to Reject H0: The streaming service's claim holds true.\n")
}
```

Output:

5(A)

```
Console  Terminal  Background Jobs
R 4.5.1 · ~/
> mu0 <- 400
> xbar <- 250
> sigma <- 25
> n <- 50
> alpha <- 0.05
> z_value <- (xbar - mu0) / (sigma / sqrt(n))
> z_value
[1] -42.42641
> z_critical <- qnorm(1 - alpha/2)
> c(-z_critical, z_critical)
[1] -1.959964  1.959964
> p_value <- 2 * (1 - pnorm(abs(z_value)))
> p_value
[1] 0
> if (abs(z_value) > z_critical) {
+   cat("Reject H0: The telecom provider's claim is not valid.\n")
+ } else {
+   cat("Fail to Reject H0: The telecom provider's claim holds.\n")
+ }
Reject H0: The telecom provider's claim is not valid.
>
>
```

5(B)

```
Console  Terminal  Background Jobs
R 4.5.1 · ~/
> mu0 <- 799
> xbar <- 760
> sigma <- 60
> n <- 40
> alpha <- 0.05
> z_value <- (xbar - mu0) / (sigma / sqrt(n))
> z_value
[1] -4.110961
> z_critical <- qnorm(1 - alpha/2)
> c(-z_critical, z_critical)
[1] -1.959964  1.959964
> p_value <- 2 * (1 - pnorm(abs(z_value)))
> p_value
[1] 3.940158e-05
> if (abs(z_value) > z_critical) {
+   cat("Reject H0: The streaming service's claim is not valid.\n")
+ } else {
+   cat("Fail to Reject H0: The streaming service's claim holds true.\n")
+ }
Reject H0: The streaming service's claim is not valid.
>
>
```

Output Analysis

5(A)

- **Test:** A two-tailed z-test was conducted.

	• **Result:** The calculated z-score is -42.43, which is an extreme value far beyond the critical range of -1.96 to 1.96. • **P-value:** The p-value is effectively 0. • **Conclusion:** There is absolutely conclusive statistical evidence that the true average call duration is **not** 400 minutes. The claim is completely invalid. **5(A)** • **Test:** A two-tailed z-test was conducted. • **Result:** The calculated z-score is -4.11, which falls outside the critical range of -1.96 to 1.96. • **P-value:** The extremely small p-value (0.000039) provides very strong evidence against the claim. • **Conclusion:** There is significant evidence to conclude that the true average watch time is different from 799 minutes. The claim is not valid.
Link of student Github profile where lab assignment has been uploaded	**https://github.com/OmkarPanchal06/MFDA_LAB**
Conclusion	Hence analyzed the data to find out the estimated value.

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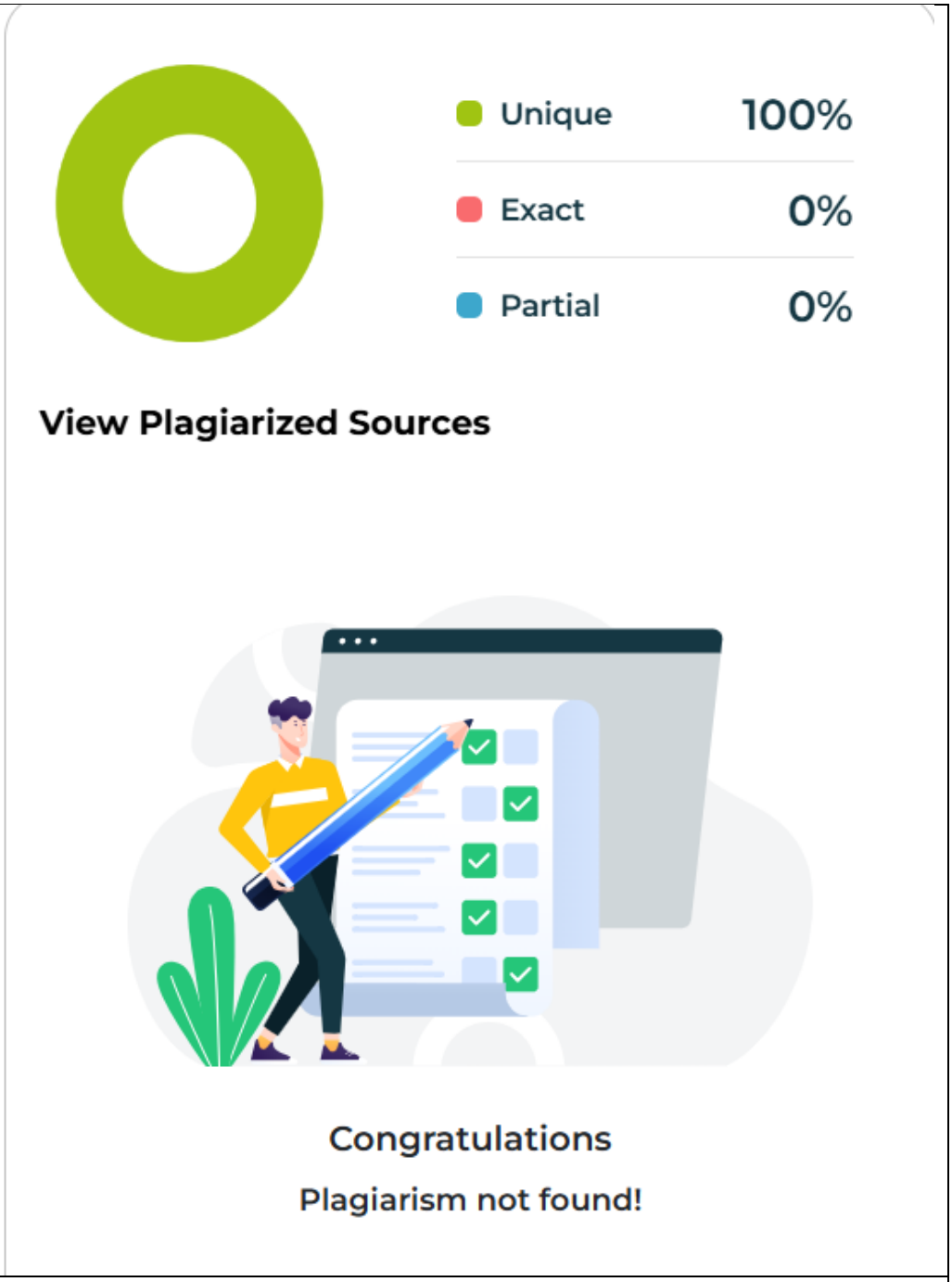
Plag Report (Similarity index < 12%)	
Date	**26/08/25**