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
NAAC A++
Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

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	Computer Workshop Lab
Semester	5	Course Code	23IOT1526
Roll No	49	Name of Student	Omkar Panchal

Practical Number	**4**
Course Outcome	
Aim	To draw a conclusion using a hypothesis.
Problem Definition	Suppose the manufactures claim that the means lifetime of a light bulb is more than 10,000 hours. In a sample of 30 light bulbs, it was found that they only last 9,900 hours on average. Assume the population standard deviation is 120 hours. At 0.5 significance level. Can we reject the claim by the manufacturer?
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.

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Procedure and Execution (100 Words)	**Steps in Hypothesis Testing**
	Step 1: The initial phase involves identifying the research questions and hypotheses. Remember, these options are mutually exclusive. If one theory claims a truth, the other must counter it.
	Step 2: Consider the statistical assumptions, such as independence of observations, data normality, random errors and their probability distribution, randomization during sampling, and similar factors.
	Step 3: The third step is about choosing the test to verify the hypothesis. Simultaneously, determine the method for testing the null hypothesis using sample data.
	Step 4: In the fourth stage, the data from a sample is examined. This is when assessments such as mean values, normal distributions, t distributions, and z-scores are sought.
	Step 5: The final stage involves making a decision on whether to reject the null hypothesis in favour of the alternative or to retain it. Hypothesis testing is used to determine whether the evidence within a sample dataset is substantial enough to validate or refute research conditions for the entire population. The Z-test serves to assess the assumption within a specific sample. Typically, in hypothesis testing, we compare two sets by comparing them against a synthesized dataset and an idealized model.

Code:

```
mu0 <- 10000
xbar <- 9900
sigma <- 120
n <- 30
alpha <- 0.05

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

z_critical <- qnorm(alpha)
z_critical
```
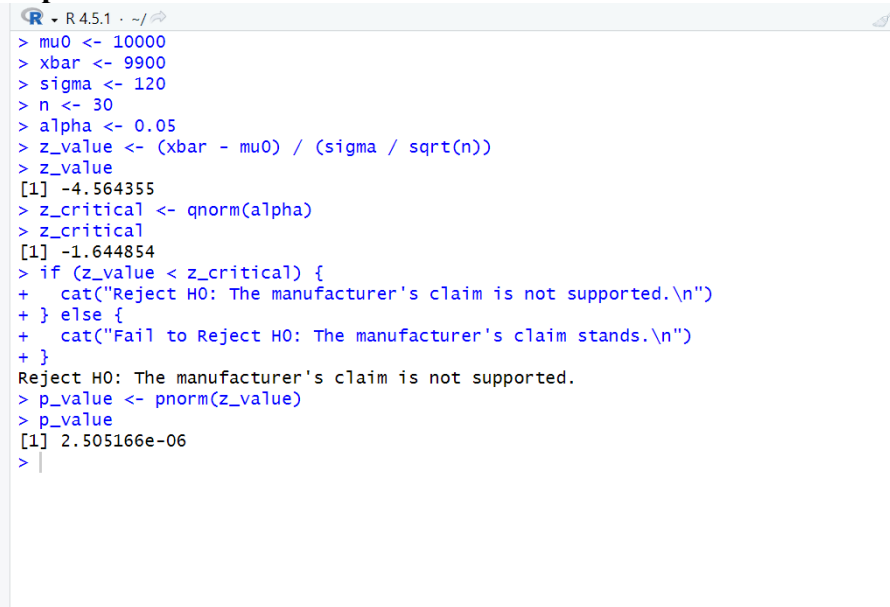
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<table>
<tr>
<td></td>
<td>

```r
if (z_value < z_critical) {
  cat("Reject H0: The manufacturer's claim is not supported.\n")
} else {
  cat("Fail to Reject H0: The manufacturer's claim stands.\n")
}

p_value <- pnorm(z_value)
p_value
```

Output:

```
R 4.5.1 · ~/
> mu0 <- 10000
> xbar <- 9900
> sigma <- 120
> n <- 30
> alpha <- 0.05
> z_value <- (xbar - mu0) / (sigma / sqrt(n))
> z_value
[1] -4.564355
> z_critical <- qnorm(alpha)
> z_critical
[1] -1.644854
> if (z_value < z_critical) {
+   cat("Reject H0: The manufacturer's claim is not supported.\n")
+ } else {
+   cat("Fail to Reject H0: The manufacturer's claim stands.\n")
+ }
Reject H0: The manufacturer's claim is not supported.
> p_value <- pnorm(z_value)
> p_value
[1] 2.505166e-06
> |
```
</td>
</tr>
<tr>
<td>Output Analysis</td>
<td>

- **Test Result:** The calculated z-score is -4.56, which is far less than the critical value of -1.645.
- **P-value:** The extremely small p-value (0.0000025) is strong evidence against the claim.
</td>
</tr>
<tr>
<td>Link of student Github profile where lab assignment has been uploaded</td>
<td>

https://github.com/OmkarPanchal06/MFDA_LAB
</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Hence analyzed the data to find out the estimated value.</td>
</tr>
</table>

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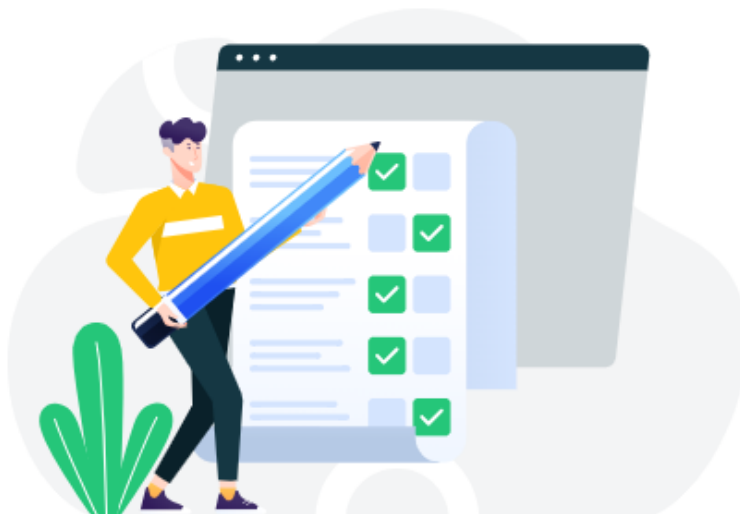
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