EXPERIMENT 12

Hypothetical Using Z-Test

Aim:

To test whether the average weight of a species of birds differ from 150 grams.

Algorithm:

1. Import required libraries — numpy and scipy.stats.

2. Input the sample data and the population mean.

3. Calculate the sample mean, standard deviation, and sample size.

4. Compute the Z-statistic using the sample statistics.

5. Find the p-value from the standard normal distribution.

6. Set the significance level (α), usually 0.05.

7. Compare the p-value with α to decide whether to reject or accept the null hypothesis.

8. Display the sample mean, Z-statistic, p-value, and final conclusion.

Program:

import numpy as np

import scipy.stats as stats

sample\_data = np.array([

152, 148, 151, 149, 147, 153, 150, 148, 152, 149,

151, 150, 149, 152, 151, 148, 150, 152, 149, 150,

148, 153, 151, 150, 149, 152, 148, 151, 150, 153

])

population\_mean = 150

sample\_mean = np.mean(sample\_data)

sample\_std = np.std(sample\_data, ddof=1)

n = len(sample\_data)

z\_statistic = (sample\_mean - population\_mean) / (sample\_std / np.sqrt(n))

p\_value = 2 \* (1 - stats.norm.cdf(np.abs(z\_statistic)))

print(f"Sample Mean: {sample\_mean:.2f}")

print(f"Z-Statistic: {z\_statistic:.4f}")

print(f"P-Value: {p\_value:.4f}")

alpha = 0.05

if p\_value < alpha:

print("Reject the null hypothesis: The average weight differs from 150 grams.")

else:

print("Fail to reject the null hypothesis: No significant difference from 150 grams.")

Output:

A close-up of a sign

AI-generated content may be incorrect.

Result:

Hence a python program for hypothetical using Z-Test is written and executed successfully.