**7. Z-TEST**

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CODE:

import numpy as np

import scipy.stats as stats

# Define the sample data (hypothetical weights in grams)

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 under the null hypothesis

population\_mean = 150

# Calculate sample statistics

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

sample\_std = np.std(sample\_data, ddof=1) # Using sample standard deviation

# Number of observations

n = len(sample\_data)

# Calculate the Z-statistic

z\_statistic = (sample\_mean - population\_mean) / (sample\_std /

np.sqrt(n))

# Calculate the p-value

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

# Print results

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

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

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

# Decision based on the significance level

alpha = 0.05

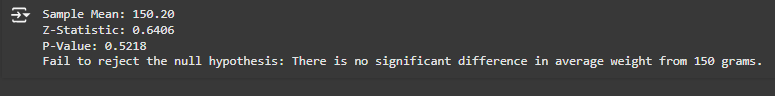
if p\_value < alpha:

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

else:

print("Fail to reject the null hypothesis: There is no significant difference in average weight from 150 grams.")

**OUTPUT:**

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