

# CS23334-FUNDAMENTALS OF DATA SCIENCE

DEVA

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## 12.) Z-TEST

### Aim:

To perform a Z-Test to determine whether there is a significant difference between the sample mean and the population mean.

### Code:

```
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 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.")

Fail to reject the null hypothesis: There is no significant difference in average weight from 150 grams.
```

### Result:

The Z-Test was successfully conducted, and the result showed whether to accept or reject the null hypothesis based on the p-value.