EXPERIMENT NO: 13

Hypothetical Testing - T Test

Aim:

To test whether the average IQ score of a sample of students differs significantly from a population mean IQ score of 100.

Algorithm:

- Null Hypothesis (H_0): The average IQ score of the sample is 100.
- Alternative Hypothesis (H_1): The average IQ score of the sample is not 100.
- Sample: Measure the IQ scores of 25 randomly selected students.
- T-Test: Conduct a one-sample T-test to compare the sample mean to 100.
- Decision Rule: Use a significance level of α = 0.05.

Program:

[1]:
```
import numpy as np
import scipy.stats as stats
```

[2]:
```
np.random.seed(42)
sample_size = 25
sample_data = np.random.normal(loc=102, scale=15, size=sample_size)
```

[3]:
```
population_mean = 100
sample_mean = np.mean(sample_data)
sample_std = np.std(sample_data, ddof=1)
```

[4]:
```
n = len(sample_data)
t_statistic, p_value = stats.ttest_1samp(sample_data,population_mean)
```

[7]:
```
print(f"Sample Mean: {sample_mean:.2f}")
print(f"T-Statistic: {t_statistic:.4f}")
print(f"P-Value: {p_value:.4f}")
```

```
Sample Mean: 99.55
T-Statistic: -0.1577
P-Value: 0.8760
```

[8]:
```
alpha = 0.05
if p_value < alpha:
    print("Reject the null hypothesis: The average IQ score is significantly different from 100.")
else:
    print("Fail to reject the null hypothesis: There is no significant difference in average IQ score from 100.")
```

```
Fail to reject the null hypothesis: There is no significant difference in average IQ score from 100.
```

Result:

Thus, the Python code to hypothetical testing -T test in Jupyter Notebook has been successfully executed.