

## EXPERIMENT-23

### 23.Scenario:

You are a researcher working in a medical lab, investigating the effectiveness of a new treatment for a specific disease. You have collected data from a clinical trial with two groups: a control group receiving a placebo, and a treatment group receiving the new drug. Your goal is to analyze the data using hypothesis testing and calculate the p-value to determine if the new treatment has a statistically significant effect compared to the placebo. You will use the matplotlib library to visualize the data and the p-value...

### Code:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from scipy import stats
data = pd.read_csv("clinical_trial.csv")
control = data[data["group"] == "control"]["outcome"].astype(float)
treatment = data[data["group"] == "treatment"]["outcome"].astype(float)
t_stat, p_value = stats.ttest_ind(treatment, control, equal_var=False)
print("Control Group Mean:", round(control.mean(), 3))
print("Treatment Group Mean:", round(treatment.mean(), 3))
print("t-statistic:", round(t_stat, 4))
print("p-value:", round(p_value, 4))
plt.boxplot([control, treatment], labels=["Control", "Treatment"])
plt.title(f"Clinical Trial Outcome (p-value = {round(p_value,4)})")
plt.ylabel("Outcome")
plt.grid(axis='y', linestyle='--', alpha=0.6)
plt.show()
```

### Output:

```
[Running] python -u "c:\Users\karan\OneDrive\Desktop\New folder (2)\23.py"
Control Group Mean: 15.771
Treatment Group Mean: 18.396
t-statistic: 6.7519
p-value: 0.0
```

