Experiment-12

November 2, 2025

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

[2]:
```
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])
```

[3]:
```
population_mean = 150
```

[4]:
```
sample_mean = np.mean(sample_data)
sample_std = np.std(sample_data, ddof=1)
```

[5]:
```
n = len(sample_data)
```

[6]:
```
z_statistic = (sample_mean - population_mean) / (sample_std /np.sqrt(n))
```

[7]:
```
p_value = 2 * (1 - stats.norm.cdf(np.abs(z_statistic)))
```

[8]:
```
print(f"Sample Mean: {sample_mean:.2f}")
print(f"Z-Statistic: {z_statistic:.4f}")
print(f"P-Value: {p_value:.4f}")
```

```
Sample Mean: 150.20
Z-Statistic: 0.6406
P-Value: 0.5218
```

[9]:
```
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 nosignificant␣
 ↪difference in average weight from 150 grams")
```

```
Fail to reject the null hypothesis: There is nosignificant difference in average
weight from 150 grams
```

[ ]:
```

```