Z-Test

Program:

```python
import numpy as np
from scipy.stats import norm
population_mean = 50
population_std = 10

 sample = np.array([48, 52, 49, 51, 50, 47, 53, 54])
sample_size = len(sample)
sample_mean = np.mean(sample)
z_stat = (sample_mean - population_mean) / (population_std / np.sqrt(sample_size))
p_value = 2 * (1 - norm.cdf(abs(z_stat)))

print(f"Sample Mean: {sample_mean:.2f}")
print(f"Z-Statistic: {z_stat:.2f}")
print(f"P-Value: {p_value:.4f}")
alpha = 0.05  # Significance level
if p_value < alpha:
    print("Reject the null hypothesis: There is a significant difference.")
else:
    print("Fail to reject the null hypothesis: No significant difference.")
```

Output:

```
Sample Mean: 50.50
Z-Statistic: 0.14
P-Value: 0.8875
Fail to reject the null hypothesis: No significant difference.
```