EXPERINMENT-20

20. Scenario:
You are a data scientist working for an e-commerce company. The marketing team has conducted an A/B test to evaluate the effectiveness of two different website designs (A and B) in terms of conversion rate. They randomly divided the website visitors into two groups, with one group experiencing design A and the other experiencing design B. After a week of data collection, you now have the conversion rate data for both groups. You want to determine whether there is a statistically significant difference in the mean conversion rates between the two website designs.
Question:
"Based on the data collected from the A/B test, is there a statistically significant difference in the mean conversion rates between website design A and website design B?"

Code:

```
import numpy as np
from statistics import mean
from math import sqrt
A = np.array([0.12, 0.15, 0.11, 0.16, 0.14])
B = np.array([0.18, 0.19, 0.20, 0.17, 0.22])
def t_test_independent(a, b):
    n1, n2 = len(a), len(b)
    mean1, mean2 = mean(a), mean(b)
    var1 = np.var(a, ddof=1)
    var2 = np.var(b, ddof=1)
    se = sqrt(var1/n1 + var2/n2)
    t_value = (mean1 - mean2) / se
    return t_value
t_value = t_test_independent(A, B)
print("t-value:", t_value)
critical_value = 2.306
if abs(t_value) > critical_value:
    print("\nConclusion: There IS a significant difference between A and B.")
    print("Website Design B performs better.")
else:
    print("\nConclusion: There is NO significant difference between A and B.")
```

Output:

```
[Running] python -u "c:\Users\karan\OneDrive\Desktop\New folder (2)\20.py"
t-value: -4.42718872423573

Conclusion: There IS a significant difference between design A and design B.

[Done] exited with code=0 in 0.256 seconds
```