

Given the soil pH level data, let us determine whether or not the data suggests that the true mean soil pH values differ for the two locations.

```
locA = [7.58 8.52 8.01 7.99 7.93 7.89 7.85 7.82 7.80];  
locB = [7.85 7.73 8.53 7.40 7.35 7.30 7.27 7.27 7.23];  
n = length(locA);  
m = length(locB);  
  
K = 10^5;  
s_obs = abs(mean(locA) - mean(locB));  
Z = [locA locB];  
  
count = 0;  
for i = 1:K  
    Z_pi = Z(:,randperm(n + m));  
    s_pi = abs(mean(Z_pi(1:n)) - mean(Z_pi(n+1:2*n)));  
    if s_pi > s_obs  
        count = count + 1;  
    end  
end  
p = count / K;  
disp("Estimate p-value: "); disp(p);
```

```
Estimate p-value:  
0.0339
```

With an estimated p-value of approx. 0.03, there is strong evidence to reject the null hypothesis. This implies that we have strong evidence that the true mean soil pH values differ for the two locations.