

**#Biologist Analytic Toolkit (BIOL 483M)**  
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**#Wilcoxon Rank Sum/Mann-Whitney test for two populations**

**#Data Set:**

Brand X		Brand Y	
Rating	Rank	Rating	Rank
5	5.5	9	11
2	1.5	7	9
6	7.5	5	5.5
2	1.5	10	12
4	4	6	7.5
3	3	8	10

**#The above table can be saved in MS Word and used directly in R. Here it is saved as "Brand.txt"**

**#Assumption:**

Observed values  $X_{rating,1}, X_{rating,2}, \dots$  are of random sample.  
 Observed values  $Y_{rating,1}, Y_{rating,2}, \dots$  are of random sample  
 Underlying distributions within data are continuous.  
 Variables X and Y are independent.  
 Underlying distributions are continuous.  
 Measurement scale is ordinal and data can thus be ranked.

**#Hypotheses:**

$H_0: \Delta = 0$  <- No population ordinal difference in median.

**#This refers to the null hypothesis.**

$H_1: \Delta \neq 0$  <-Two sided test.

**#This refers to the alternative hypothesis.**

Test statistics:

```
> X=read.table("Brand.txt",header=T)
```

**#Here we assign X with the data within the Brand.txt file.**

X

**#This should produce the result below:**

Rating Rank Brand

```
1 5 5.5 X
2 2 1.5 X
3 6 7.5 X
4 2 1.5 X
5 4 4.0 X
6 3 3.0 X
7 9 11.0 Y
8 7 9.0 Y
9 5 5.5 Y
10 10 12.0 Y
11 6 7.5 Y
12 8 10.0 Y
attach(X)
```

**#paired: This indicates whether the test will be paired or unpaired**  
**#alternative: This describes the result of the alternative hypothesis. It must be either “two.sided,” “greater” or “less.”**  
**#exact: This indicates whether or not R should compute an exact p-value for the calculation.**  
**#The x and y values describe the separate sets of values. The actual titles can be given in the R calculation. Here they are “Rating” and “Brand.”**

```
wilcox.test(Rating~Brand,paired=FALSE,exact=T,alternative="two.sided")
```

Wilcoxon rank sum test with continuity correction

data: Rating by Brand

W = 2, p-value = 0.01259

alternative hypothesis: true location shift is not equal to 0

**#Conclusion:**

**#Since p-value is 0.01259 and is less than alpha which 0.05, then we reject the null hypothesis.**