

Assignment 2

*Handed Out: Dec 1 2023**Due: Dec 8 2023*

- Feel free to talk to other students in the class when doing this assignment. You should, however, write down your solution yourself.
- Only homeworks **submitted in the tutorial of week 4** are graded.
- Tables for the corresponding test statistics can be found in the separate file.

Task 1. A charter bus line has 48-passenger buses and 38-passenger buses. With X and Y denoting the number of miles traveled per day for the 48-passenger and the 38-passenger buses, respectively, the bus company is interested in testing the equality of the two distributions

$$H_0 : F(z) = G(z).$$

The company observed the following data on a random sample of $n_1 = 10$ buses holding 48 passengers and $n_2 = 11$ buses holding 38 passengers.

X : 104 252 300 308 315 323 331 396 414 452

Y : 184 196 197 248 260 279 355 386 393 432 450.

What conclusion can you make about the equality of the two distribution functions? Run a Wald-Wolfowitz runs test. Note that $n_1, n_2 \geq 10$.

Task 2. Recall that in the Rock-Paper-Scissors game, rock beats scissors which beats paper which beats rock. We collect the choices made by 119 players on the first turn of the game. A player gains an advantage in playing this game if there is evidence that the choices made on the first turn are not equally distributed among the three options. Use a goodness-of-fit test to see if there is evidence that any of the proportions are different from $1/3$.

Option Selected	Frequency
Rock	66
Paper	39
Scissors	14
Total	119

Task 3. The table below shows the hours of relief provided by two anagelsic drugs in 12 patients suffering from arthritis. Is there any evidence that one drug provides longer relief than the other? Run a Wilcoxon signed-rank test. Note that $n \geq 10$.

Case	Drug A	Drug B
1	2.0	3.5
2	3.6	5.7
3	2.6	2.9
4	2.6	2.4
5	7.3	9.9
6	3.4	3.3
7	14.9	16.7
8	6.6	6.0
9	2.3	3.8
10	2.0	4.0
11	6.8	9.1
12	8.5	20.9

Grading:

Task	1	2	3	Total
Points	3	2	3	10