STAT 32672 Non-parametric Statistics
Academic Year 2022/2023
Department of Statistics & Computer Science
Tutorial - 01

1. The following data represents the number of hours of flight training received by 18 student pilots from a certain instructor prior to their first solo flight: 9 12 18 14 12 14 12 10 16 11 9 11 13 11 13 15 13 14 Perform a sign test at the 0.02 level of significance to test the instructor's claim that the median time required before his students' solo is 12 hours of flight training.

2. It is claimed that a new diet will reduce a person's weight by 4.5 kilograms, on average, in a period of 2 weeks. The weights of 10 women were recorded before and after a 2-week period during which they followed this diet, yielding the following data:

Women	Weight Before	Weight After
Tisha	58.5	60
Gayani	60.3	54.9
Taniya	61.7	58.1
Nimna	69	62.1
Sakya	64	58.5
Chamudi	62.6	59.9
Desh	56.7	54.4
Randima	63.6	60.2
Sara	68.2	62.3
Kasuni	59.4	58.7

   Use the sign test at the 0.05 level of significance to test the hypothesis that diet reduces the median weight by 4.5 kilograms against the alternative hypothesis that the median weight loss is less than 4.5 kilograms.

3. A researcher wanted to determine whether the ability of people to identify objects with their right eye differs from their ability to identify objects with their left eye. 16 subjects were presented with a series of images and were scored on their abilities to identify objects with each eye. The results are given below:

Person	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Right	50	45	33	22	99	79	4	36	62	51	2	15	26	83	86
Left	47	45	31	24	78	76	13	46	45	44	23	14	34	79	81

Determine whether there is a difference between the identification of objects with the two eyes of a person using the Wilcoxon Signed-Ranked test.

4. A company has introduced a new productivity tool and wants to evaluate its impact on employees' task completion times. Thirty employees are randomly selected, and their task completion times (in minutes) are recorded before and after using the tool. Using the Wilcoxon signed-rank test, test if the new tool significantly reduces task completion time. Use a significance level of $\alpha = 0.05$.

Employee	Time Before (minutes)	Time After (minutes)
1	46	46
2	59	56
3	68	67
4	54	49
5	50	46
6	47	44
7	68	68
8	60	60
9	46	44
10	65	63
11	58	57
12	62	59
13	50	47
14	50	45
15	63	58
16	60	55
17	43	41
18	47	44
19	63	60
20	42	42
21	61	59
22	60	56
23	41	39
24	63	59
25	51	51
26	69	68
27	45	42
28	41	41
29	67	64
30	60	55