

Output tables for 1xN statistical comparisons.

June 6, 2025

1 Average rankings of Friedman test

Average ranks obtained by each method in the Friedman test.

Friedman statistic (distributed according to chi-square with 17 degrees of freedom): 342.757193.

P-value computed by Friedman Test: 0.

Iman and Davenport statistic (distributed according to F-distribution with 17 and 408 degrees of freedom): 100.023004.

P-value computed by Iman and Daveport Test: 0.

Algorithm	Ranking
BestCyclicAssignment	13.12
BestNearest	7.1
CLARA	12.72
CoefficientPropagation	12.36
CyclicAssignment	14.84
Farthest-First	5.42
KMEANS	5.78
NearestByCustomer	6.88
NearestByDepot	10.68
PAM	1
Parallel	6.88
RandomByElement	18
RandomSequentialCyclic	15.96
SequentialCyclic	15.96
Simplified	5.88
Sweep	5.74
ThreeCriteriaClustering	4.92
UPGMC	7.76

Table 1: Average Rankings of the algorithms (Friedman)

2 Post hoc comparison (Friedman)

P-values obtained in by applying post hoc methods over the results of Friedman procedure.

<i>i</i>	algorithm	$z = (R_0 - R_i)/SE$	<i>p</i>	Holm	Hochberg	Hommel	Holland	Rom	Finner	Li
17	RandomByElement	11.258325	0	0.002941	0.003013	0.003094	0.003013	0.003013	0.003013	0.052135
16	RandomSequentialCyclic	9.907502	0	0.003125	0.003201	0.003288	0.006016	0.006016	0.006016	0.052135
15	SequentialICyclic	9.907502	0	0.003333	0.003414	0.003507	0.009011	0.009011	0.009011	0.052135
14	CyclicAssignment	9.165764	0	0.003571	0.003657	0.003757	0.011996	0.011996	0.011996	0.052135
13	BestCyclicAssignment	8.026666	0	0.003846	0.003938	0.004046	0.014973	0.014973	0.014973	0.052135
12	CLARA	7.76176	0	0.004167	0.004265	0.004383	0.017941	0.017941	0.017941	0.052135
11	CoefficientPropagation	7.523344	0	0.004545	0.004652	0.004782	0.020899	0.020899	0.020899	0.052135
10	NearestByDepot	6.410737	0	0.005116	0.00526	0.005326	0.023849	0.023849	0.023849	0.052135
9	UPGMC	4.476919	0.000008	0.005556	0.005683	0.005844	0.02679	0.02679	0.02679	0.052135
8	BestNearest	4.039824	0.000053	0.006225	0.006391	0.006574	0.029722	0.029722	0.029722	0.052135
7	NearestByCustomer	3.894125	0.000099	0.007143	0.007301	0.007513	0.032645	0.032645	0.032645	0.052135
6	Parallel	3.894125	0.000099	0.008333	0.008512	0.008764	0.035559	0.035559	0.035559	0.052135
5	Simplified	3.231859	0.00123	0.01	0.010206	0.010515	0.038465	0.038465	0.038465	0.052135
4	KMEANS	3.165632	0.001547	0.0125	0.012741	0.013109	0.041362	0.041362	0.041362	0.052135
3	Sweep	3.139142	0.001694	0.016667	0.016952	0.016667	0.044225	0.044225	0.044225	0.052135
2	Farthest-First	2.927217	0.00342	0.025	0.025321	0.025	0.047129	0.047129	0.047129	0.052135
1	ThreeCriteriaClustering	2.596083	0.009429	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Table 2: Post Hoc comparison Table for $\alpha = 0.05$ (FRIEDMAN)

Bonferroni-Dunn's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002941 .

Hochberg's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.05 .

Hommel's procedure rejects all hypotheses.

Rom's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.05 .

Li's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.05 .

3 Adjusted P-Values (Friedman)

Adjusted P-values obtained through the application of the post hoc methods (Friedman).

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	$p_{Hochberg}$	p_{Hommel}
1	RandomByElement	0	0	0	0	0
2	RandomSequentialCyclic	0	0	0	0	0
3	SequentialCyclic	0	0	0	0	0
4	CyclicAssignment	0	0	0	0	0
5	BestCyclicAssignment	0	0	0	0	0
6	CLARA	0	0	0	0	0
7	CoefficientPropagation	0	0	0	0	0
8	NearestByDepot	0	0	0	0	0
9	UPGMC	0.000008	0.000129	0.000068	0.000068	0.000068
10	BestNearest	0.000053	0.000909	0.000428	0.000428	0.000345
11	NearestByCustomer	0.000099	0.001675	0.00069	0.000591	0.000591
12	Parallel	0.000099	0.001675	0.00069	0.000591	0.000591
13	Simplified	0.00123	0.020908	0.006149	0.005083	0.00369
14	KMEANS	0.001547	0.026307	0.00619	0.005083	0.004642
15	Sweep	0.001694	0.028805	0.00619	0.005083	0.005083
16	Farthest-First	0.00342	0.058142	0.00684	0.00684	0.00684
17	ThreeCriteriaClustering	0.009429	0.160298	0.009429	0.009429	0.009429

Table 3: Adjusted p -values (FRIEDMAN) (I)

i	algorithm	unadjusted p	$p_{Holland}$	p_{Rom}	p_{Finner}	p_L
1	RandomByElement	0	0	0	0	0
2	RandomSequentialCyclic	0	0	0	0	0
3	SequentialCyclic	0	0	0	0	0
4	CyclicAssignment	0	0	0	0	0
5	BestCyclicAssignment	0	0	0	0	0
6	CLARA	0	0	0	0	0
7	CoefficientPropagation	0	0	0	0	0
8	NearestByDepot	0	0	0	0	0
9	UPGMC	0.000008	0.000068	0.000065	0.000014	0.000000
10	BestNearest	0.000053	0.000428	0.000407	0.000091	0.000000
11	NearestByCustomer	0.000099	0.00069	0.000562	0.000152	0.000000
12	Parallel	0.000099	0.00069	0.000562	0.000152	0.000000
13	Simplified	0.00123	0.006134	0.005083	0.001608	0.001000
14	KMEANS	0.001547	0.006175	0.005083	0.001879	0.001000
15	Sweep	0.001694	0.006175	0.005083	0.00192	0.001000
16	Farthest-First	0.00342	0.006829	0.00684	0.003633	0.003000
17	ThreeCriteriaClustering	0.009429	0.009429	0.009429	0.009429	0.009000

Table 4: Adjusted p -values (FRIEDMAN) (II)