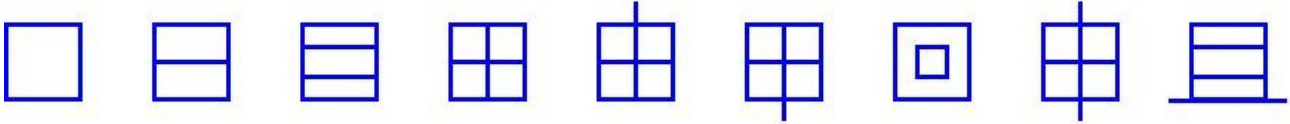


Fuzzy relations. Japanese characters

Classify 9 japanese characters:



Proximity-relation initial matrix $R(0)$:

	1	2	3	4	5	6	7	8	9
1	1	0.8	0.6	0.5	0.4	0.4	0.6	0.3	0.5
2	0.8	1	0.9	0.7	0.7	0.7	0.4	0.4	0.6
3	0.6	0.9	0.3	0.3	0.3	0.2	0.3	0.3	0.9
4	0.5	0.7	0.3	1	0.9	0.9	0.1	0.8	0.4
5	0.4	0.7	0.3	0.9	1	0.9	0.3	0.8	0.3
6	0.4	0.7	0.2	0.9	0.9	1	0.2	0.9	0.3
7	0.6	0.4	0.3	0.1	0.3	0.2	1	0.2	0.1
8	0.3	0.4	0.3	0.8	0.8	0.9	0.2	1	0.2
9	0.5	0.6	0.9	0.4	0.3	0.3	0.1	0.2	1

Proximity-relation matrix:

- for max-min after last iteration $R(4)$

	1	2	3	4	5	6	7	8	9
1	1	0.8	0.7	0.5	0.4	0.3	0.6	0.3	0.4
2	0.7	1	1	0.6	0.6	0.7	0.5	0.4	0.6
3	0.6	0.7	0.3	0.3	0.3	0.2	0.3	0.2	0.8
4	0.4	0.7	0.3	1	0.9	0.8	0.1	0.8	0.4
5	0.4	0.7	0.3	0.9	1	0.9	0.2	0.8	0.2
6	0.3	0.5	0.2	0.9	0.8	1	0.2	0.8	0.3
7	0.6	0.4	0.2	0.1	0.3	0.2	1	0.2	0.1
8	0.2	0.4	0.8	0.7	0.6	0.9	0.1	1	0.1
9	0.5	0.5	0.6	0.4	0.3	0.1	0.1	0.1	1

- for max-prod after last iteration $R(4)$

	1	2	3	4	5	6	7	8	9
1	1	0.6	0.7	0.5	0.3	0.4	0.4	0.3	0.2
2	0.6	1	1	0.5	0.7	0.6	0.1	0.1	0.6
3	0.4	0.9	0.3	0.3	0.3	0.2	0.3	0.3	0.9
4	0.5	0.7	0.1	1	0.6	0.7	0.1	0.8	0.1
5	0.4	0.5	0.1	0.6	1	0.7	0.3	0.7	0.3
6	0.2	0.7	0.2	0.9	0.9	1	0.1	0.8	0.1
7	0.3	0.4	0.1	0.1	0.3	0.2	1	0.2	0.1
8	0.3	0.4	0.7	0.6	0.7	0.8	0.1	1	0.1
9	0.5	0.3	0.6	0.2	0.3	0.3	0.1	0.2	1

- for max-avg after last iteration $R(4)$

	1	2	3	4	5	6	7	8	9
1	1	0.7	0.7	0.5	0.4	0.2	0.5	0.3	0.5
2	0.7	1	1	0.6	0.6	0.6	0.4	0.2	0.6
3	0.7	0.9	0.1	0.4	0.1	0.2	0.3	0.3	0.9
4	0.5	0.5	0.3	1	0.9	0.9	0.1	0.6	0.3
5	0.3	0.7	0.3	0.9	1	0.9	0.2	0.8	0.3
6	0.4	0.7	0.1	0.8	0.7	1	0.2	0.8	0.3
7	0.6	0.4	0.2	0.1	0.3	0.3	1	0.2	0.3
8	0.3	0.2	0.9	0.6	0.8	0.9	0.1	1	0.1
9	0.3	0.6	0.4	0.4	0.1	0.4	0.1	0.2	1

Let's take $\alpha=0.5$. So we will get clusters by the algorithm:

- for max-min

$C1 = \{4, 5, 6, 8\}$

$C2 = \{1, 2, 7\}$

$C3 = \{3, 9\}$

- for max-prod

$C1 = \{1, 2, 3, 9\}$

$C2 = \{4, 5, 6, 8\}$

$C3 = \{7\}$

- for max-avg

$C1 = \{4, 5, 6, 8\}$

$C2 = \{2, 3, 9\}$

$C3 = \{1, 7\}$