CS836 Rough Sets and Applications
Assignment 3
Available on February 16, 2018
Due date: March 8, 2018

1. Consider a finite set U. Give a definition of an equivalence on U. Give a definition of a partition of U. Show that there exists a one-to-one correspondence between the set of all equivalence classes on U and the set of all partitions of U.

2. Give a definition of the refinement-coarsening relation on the set of all partitions on a set U.

3. Give a definition of a consistent and an inconsistent decision table by using the refinement-coarsening relation in the last question.

4. Give a definition of structured rough set approximations. Explain why the structured approximations are useful for rule mining.

5. Discuss three types of rules induced by three regions in rough set theory.

6. Give a definition of the following concepts: superfluous attributes, core attributes.

7. Give a definition of a reduct of an information table.

8. Consider the following information table:

OB	c_1	c_2	c_3	c_4	c_5	c_6
x_1	1	1	1	1	1	1
x_2	1	0	1	0	1	1
x_3	0	1	1	1	0	0
x_4	1	1	1	0	0	1
x_5	0	0	1	1	0	1
x_6	1	0	1	0	1	1
x_7	0	0	0	1	1	0
x_8	1	0	1	0	1	1
x_9	0	0	1	1	0	1

(a) Find the set of all superfluous attributes.

(b) Find the set of all core attributes.

(c) Find the set of all reducts of the table.

9. Give a definition of a reduct of a decision table.

10. Consider the following decision table:

OB	c_1	c_2	c_3	c_4	c_5	c_6	d
x_1	1	1	1	1	1	1	1
x_2	1	0	1	0	1	1	1
x_3	0	1	1	1	0	0	2
x_4	1	1	1	0	0	1	2
x_5	0	0	1	1	0	1	2
x_6	1	0	1	0	1	1	3
x_7	0	0	0	1	1	0	3
x_8	1	0	1	0	1	1	3
x_9	0	0	1	1	0	1	3

(a) Find the set of all superfluous attributes with respect to $D = \{d\}$.

(b) Find the set of all core attributes with respect to $D = \{d\}$.

(c) Find the set of all reducts of the decision table.