University of Sheffield

Department of Computer Science

COM1005: Experimenting with AI Techniques

Assignment 2, 2019

Rule Networks

This assignment counts for 12.5% of the assessment for COM1005

1. Aim

The aim of this project is to complete the implementation of a software package for reasoning in rule networks by token passing, to demonstrate this reasoning and to show that it reduces computational cost in forward chaining.

2. What you must do

Section 5.3 of the lecture notes covers rule networks.

In the archive **RuleNets_Assignment.zip**

on the COM1005 MOLE site is incomplete code for implementing rule nets and token-passing, as described in section 5.3.3 of the lecture notes.

1. Complete the code by writing the **propagate** method of the **RuleNet** class,
2. Test the code by executing **RunRuleNet,** which includes a small rule net.
3. Extend the 'family tree' rule network in **RunRuleNet** by defining rules for brothers, sisters, siblings, aunts, uncles, cousins and nephews
4. Using the extended rule network, show what can be deduced from

   Jill is the mother of David

   Jill is the mother of Shula

   David is the father of Pip

   Shula is the mother of Daniel
5. Implement the same rule set for forward chaining (code in java\FChain, section 5.2.1 of the notes).

6. Compare the time taken to make the same deductions by forward chaining and Rule Nets (use System.currentTimeMillis() or the StopWatch class)

3. Mark Scheme

For parts 1..5 above..

1. 30%
2. 10%
3. 15%
4. 15%
5. 15%
6. 15%

4. What to hand in

Hand in 3 documents, in a single ZIP archive:

1. Your code for the amended **RuleNet** class.
2. The amended **RunRuleNet** with your added rules.
3. Results for parts 4, 5 & 6.

5. How to hand in

Hand in by MOLE

DEADLINE: Tuesday of week 11: 7th May at midnight.