

CS 444: Assignment 4

Due on Tue, Nov. 27, 2013

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Problem 1

(a)

Problem 2

(a)

(person name: Al gender: male age-LB: 20 age-UP: 20 mother: Mary father: nil)

(person name: Mary gender: female age-LB: 45 age-UP: 45 mother: Mary father: nil)

(b)

Rule for adding a mother WME to WM,

IF (person name:x mother: nil age-LB: y)
-(person name: [Mom(x)])

THEN ADD (person name: [Mom(x)] gender: female age-LB: [y + 18] mother: nil father: nil)
MODIFY 1 (mother: [Mom(x)])

Rule for adding a father WME to WM,

IF (person name:x father: nil age-LB: y)
-(person name: [Dad(x)])

THEN ADD (person name: [Dad(x)] gender: male age-LB: [y + 18] mother: nil father: nil)
MODIFY 1 (father: [Dad(x)])

(c)

We can associate with each production rule a number to indicate the frequency this rule has been fired. Then upon each time that we need to choose a rule to fire, we order all rules by their frequencies. If we consider only these two rules, we always check and see if the smaller number of these two rules has passed a threshold (for example 5 (times)). If yes, we will delete these two production rules from our system; otherwise will keep them.

Another trick we can apply to this rules is that we have a general rule of thumb that people usually do not live more than 100 years. Base on the observation that every time we add in a new WME by firing either one of these two rules, we will increment the age-LB of that newly introduced person. We can keep an eye on this age-LB, if this age-LB \geq 100 we do not fire these two rules. Hence avoid a run-away inference loop.

Problem 3

(a)

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(Define STUDENT inherits-from
  (a PERSON with
    university-attended (a UNIVERSITY with default UR)
    id-number( a STRING)
    degree-sought(a DEGREE)
    expected-year-of-graduation(a YEAR)
```

(b)

(c)