Consider the following knowledge based that maybe used for recommending friends **[3 Marks]**

(deffacts friendship

(good-person John)

(friends John Sandy Mike Fred)

(friends John Jack))

(defrule one

?found <- (friends John ?x)

=>

(retract ?found)

(printout t “John has a friend” ?x crlf))

(defrule two

?found <- (friends John $?x)

(good-person john)

=>

(printout t “John has many friends” crlf))

(defrule three

?found <- (friends ?x $?persons)

=>

(retract ?found)

(printout t ?x “s friends are ” $?persons crlf))

1. What is the output of this code when applying the following commands, considering that CLIPS is applying the **Specificity** conflict resolution strategy

CLIPS > reset

CLIPS > run

1. Show the status of the working memory as well as agenda in each cycle when applying the above commands assuming that the watch fact and watch rules commands are activated

|  |  |  |
| --- | --- | --- |
|  | **Fact base** | **List of activated rules** |
| **Cycle-1** |  |  |
| **Cycle-2** |  |  |
| **Cycle-3** |  |  |
| **…….** |  |  |

B) Assume that you have the following rules and facts with the shown certainty factors **(3 marks)**

F1: cow gives milk: 0.9

F2: cow eats meat: 0.8

F3: cow has hoof: 0.7

Rules:

* R1: If ?X gives milk, then ?X is a mammal (CF:0.6)
* R2: If ?X is a mammal and X eats meat, then ?X is carnivore(CF: 0.5)
* R3: If ?X has hoofs, then ?X is carnivore: (CF:0.4)
* **What is the certainty of having cow is carnivore using R2?**

R1: 0.6 \* 0.9 = 0.54

R2: 0.54 \* 0.5 = 0.27

**Certainty Factors = 0.27**

* **What is the certainty of having cow is carnivore using R3?**

**Certainty Factors** = 0.4 \* 0.7 = 0.28

* **What is the certainty of having cow is carnivore using both R2 and R3?**

**Certainty Factors = cf1 + cf2 (1-cf1)**

**= (R1 + R2) – (R1 \* R2)**

**= (0.28 + 0.27) - (0.28 \* 0.27)**

**= 0.4744**