CS/IS F214 - Logic in Computer Science
Assignment
Due Date: 29 – November – 2016 (11:00 PM) **Marks: 26**

Form teams of 2 or 3 and solve the following problems (take-home) and upload on Nalanda.

Question-1 **[10 Marks]**

Consider the problem of simplifying algebraic expressions involving algebraic identities.

(a) Formulate the representation for algebraic expressions and write prolog clause(s) to simplify to its normal form (an expression in which cannot be simplified by further application of algebraic identities).

(b) Also write clauses which compare two expressions for equality.

Following are some of the algebraic identities for your reference.

X+0 = X X*1 = X X*0 = 0 X/1 = X	0/X = 0 X –X = 0 X * X = 2X

[Extension (for 3-person teams):
Add rules to handle rational numbers where the normal form would be m/n where gcd(m,n)=1.
Following are the algebraic identities for your reference:
m1/n1 = m2/n2 if gcd(m1,n1)=d and m1=d*m2 and n1=d*n2
m1/n1 + m2/n1 = (m1+m2)/n1
m1/n1 - m2/n1 = (m1-m2)/n1
m1/n1 * m2/n2 = (m1*m2)/(n1*n2)
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Question-2 **[16 Marks]**

You are provided with the academic regulations of our BITS. Express the academic regulations rules 3.1 t0 3.20 (refer section-3 of the academic regulations) in prolog such that your program answers possible queries on regulations such as

a) Is a student eligible for doing PS course?
b) Is a first degree student eligible for doing a higher degree course?
c) Is a duel degree student eligible for doing a core course on his second degree?
d) Is there a conflict in the list of courses scheduled for a student?

[Extension (for 3-person teams):
Include clauses 6.15 and 6.16(a) to 6.16(e) in your encoding. Include two more queries e.g.

e) Given the number of courses (and units) excluding Thesis/PS a student has completed, decide whether a student will graduate. Note that the student may be a dual degree student.

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