Logic Programming– Laboratory 9

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1 Exercises

1. Write the corresponding program in Prolog for:

```
?- truthtable(A,B, A /\ (A \/ B)).
true true true
true fail true
fail true fail
fail fail fail

?- truthtable(A,B, A /\ B) .
true true true
true fail fail
fail true fail
fail fail fail

?- truthtable(A,B, A xor B).
true true fail
true fail true
fail true true
fail fail fail

?- truthtable(A,B, A \/ B).
true true true
true fail true
fail true true
fail fail fail

?- truthtable(A,B, A nor B).
true true fail
true fail fail
fail true fail
fail fail true

?- truthtable(A,B, A <-> B).
true true true
true fail fail
fail true fail
fail fail true
```

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?- truthtable(A,B, A -> B) .
true true true
true fail fail
fail true true
fail fail true

?- truthtable(A,B, (A -> B) \/ (~A)) .
true true true
true fail true
fail true true
fail fail true

?- distributivity((a /\ d) \/ (b /\ c), F).
    F = (a \/ b /\ c) /\ (d \/ b /\ c)

?- distributivity(X \/ (Y /\ Z),(X \/ Y) /\ (X \/ Z)).
   true

?- the_fomula_is(A,B,(A-> B) \/ (~A), V).
true true true
true fail true
fail true true
fail fail true
V = the formula is valid, therefore is satisfiable

?- the_fomula_is(A,B, A-> B, V) .
true true true
true fail fail
fail true true
fail fail true
V = the formula is satisfiable, therefore is invalid

?- the_fomula_is(A,B, A /\ (~A), V).
true true fail
true fail fail
fail true fail
fail fail fail
V = the formula is unsatisfiable, therefore is invalid

?- conjNormForm((a /\ d) \/ (b /\ c), CNF).
CNF = (a \/ b) /\ (a \/ c) /\ (d \/ b) /\ (d \/ c)

?- transform(for_all(X, p(X) \/ q(X) -> exists(Y, r(X,Y))),[],F),
conjNormForm(F, CNF).

X = arb_but_fixed(x0)

Y = skolem_const(y0)
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F = (~ p(arb_but_fixed(x0)) /\ ~ q(arb_but_fixed(x0))) \/
r(arb_but_fixed(x0),skolem_const(y0))

CNF = (~ p(arb_but_fixed(x0)) \/ r(arb_but_fixed(x0), skolem_const(y0)))
/\ (~ q(arb_but_fixed(x0)) \/ r(arb_but_fixed(x0), skolem_const(y0)))
```

2. Write a program in Prolog that returns the number of occurrences of a word in a big text like:

6 MB The Sherlock Holmes's adventures
11 MB - Russian novels
5.3 MB The complete Shakespeare's creation

3. Create a txt file which contains big numbers. Write a program in Prolog that returns the number of occurrences of a subsequence.