19/7/2016 EX2

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Exercise 2 Given the following ASP program P:

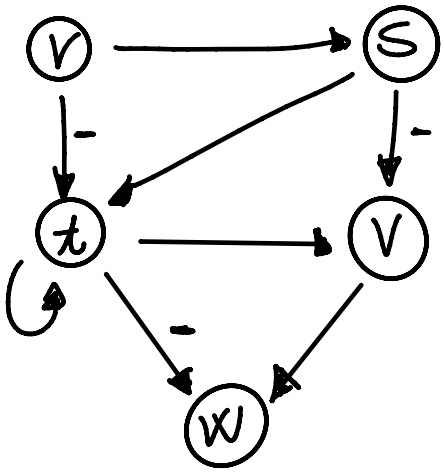
```
r(x,y) :- p(y,x).
s(x,y) :- r(x,y).
s(x,z) :- r(x,y), r(y,z).
t(x,y) :- s(x,y), not r(x,y).
t(x,y) :- t(y,x).
v(x,y) :- t(x,y), not s(x,y).
w(x,z) :- v(x,y), not t(x,y).
p(a,b). p(b,c). p(c,d). p(e,f). p(f,g)
```

(a) tell whether P is stratified;

(b) compute the answer sets of P.

a)

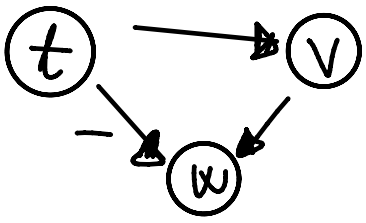
IDB = {r/2, s/2, t/2, v/2, w/2}
EDB = {p/2}



P is stratified because the precedence graph does not contain cycles with negated edge.

b)

S1 = {r,s}



S2 = {t,v}

S3 = {w}

MM0 = EDB(P) = {p(a,b), p(b,c), p(c,d), p(e,f), p(f,g)}
P(S1) = {
    r(x,y) :- p(y,x).
    s(x,y) :- r(x,y).
    s(x,z) :- r(x,y), r(y,z).
}

MM1 = MM0 union {r(b,a), r(c,b), r(d,c), r(f,e), r(g,f), s(b,a), s(c,b), s(d,c), s(f,e), s(g,f),
                 s(d,b), s(g,e)}

P(S2) = {
    t(x,y) :- s(x,y), not r(x,y).
    t(x,y) :- t(y,x).
    v(x,y) :- t(x,y), not s(x,y).
}

MM2 = MM1 union {t(d,b), t(g,e), t(b,d), t(e,g), v(b,d),v(e,g)}

P(S3) = {
    w(x,y) :- v(x,y), not t(x,y).
}

MM3 = MM2 union {}

MM(P) = {p(a,b), p(b,c), p(c,d), p(e,f), p(f,g),
         r(b,a), r(c,b), r(d,c), r(f,e), r(g,f),
         s(b,a), s(c,b), s(d,c), s(f,e), s(g,f), s(d,b), s(g,e),
         t(d,b), t(g,e), t(b,d), t(e,g),
         v(b,d),v(e,g)}