**Problem 2**

Regex from FSM = (abb|bba)+

**Problem 3**

L = {ae bf cg de | 1<= e, f g}

Assume z ∈ L, z = an b2 c3 dn

|uvw| = n  
|uv| < n  
|v| >= 1

u = aa  
v = ab  
w = ac b2 c3 dn

a + b + c =n

By Pumping Lemma,  
uv2w

u = aa  
v2 = a2b  
w = ac b2 c3 dn

uv2w = aa ab ab ac b2 c3 dn

a + b + b + c =/= n

**In the original language, it requires a balance, that the number of “a” has to be the same as the number of “d” on the string, and by pumping lemma, we proved that the language is not regular because the after pumping it, the number of “a” does not equals to the number of “d”**