Quiz 1

1 Hour

**Question 1**

Each of the following languages is the union of two simpler languages. In each part, construct NFAs for the simpler languages, then combine them using the construction to give the state diagram of an NFA for the language given. In all parts alphabets is {a, b}.

Now repeat the same using DFAs. Compare on the complexity of the steps involved.

L1={w | w contains the substring 0101, i.e., w = x0101y for some x and y}

L2= {w| w doesn't contain the substring 1101}

**Question 2**

Prove that every NFA can be converted to an equivalent one that has a single accept state.

Also, show that the same cannot be done in DFA.

**Question 3:**

Is L = {ak | w is {a, b}\*, |w| = k} Regular—if so, draw an DFA

If not, show by pumping lemma.

Question 4:

Is L = {ak bk | k <=30} regular ?

Draw a DFA / NFA for the same.

Use pumping lemma and show pumping can be done for few cases of “p,x,y,z”