# B.tech. IV Sem (C) (CSE), 2019-20

Theory of Computation, Assignment # 1

February 3, 2020

1. All the exercises/problems which were solved in the class, forms the part of home work. They needs to be completed and submitted as home work along with this.

2. For each of the following regular expressions construct the DFAs recognizing the corresponding languages. Also, find out the values of $\Sigma, Q, s, \delta$ and $F$.

   (a) $(a+b)^* aab^*$
   (b) $(aa+ab)^*$

3. Construct the deterministic finite automaton for each of the following languages:

   (a) $\{w \mid w \in \{a,b\}^*, |w| > 3\}$.
   (b) $\{w \mid w \in \{a,b\}^*, \text{every run of } a \text{ has even length}\}$.

4. Answer the followings in brief:

   (a) Define indistinguishable states.
   (b) Define reachable state.
   (c) Define unreachable states.
   (d) What is dead state?
   (e) What is maximum number of states in an equivalent DFA for an NFA of 4 states?

5. For each of the following regular expressions construct the NFAs and minimize each.

   (a) $(0+1)^* 01011 (0+1)^*$
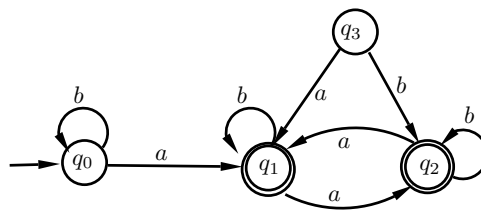   (b) $(0+1)^* 001 (0+1)^2$



Figure 1: FA with $\Sigma = \{a,b\}$

6. The minimized version of the FA shown in Fig. 1 has following number of states:
   (A) 1  (B) 2  (C) 3  (D) 4

   **Submission deadline: 10-02-2020. The assignment must be done in a register and be submitted in the class. The same will be returned after checking.**