**Assignment#2**

**THEORY of AUTOMATA & FORMAL LANGUAGE**

**#** Question based upon designing of **Finite Automata (Deterministic Finite Automata)**:

1. Design a FA recognizing the language over {a,b,c,d} which shall accept only those strings in which no symbol appear in consecutives position.(2008-09)

2. Construct a DFA for the following language: $\left\{a^{m}b^{n}\right.$ | m is divisible by 2 and n is divisible by 4.}.

 3. Draw the DFA that accepts set for all strings of 0 and 1 that end in the last two same symbols.

4. Draw the DFA that accepts the language $L=\left\{a^{2n}|n\geq 1\right\}.$

5. Design a DFA which accepts all those string of a’s and b’s in which number of a’s is even and number of b’s is divisible by 3.

6. Draw the finite automata which accept all the strings containing both 11 and 010 as substrings.

7. Construct a DFA for the following language that contains the strings ending with 0.

8. Draw the DFA of the following language over {0,1}:

(i). All strings with Even no. of 0’s and even no. of 1’s.

(ii). All strings of length at most 5.

9. Draw the DFA for the following over the set $∑$ = {0,1}

(i) L = $\left\{w :\left|w\right|mod 3=0\right\}$

(ii) L = $\left\{w :\left|w\right|mod 3>1\right\}$

10. Design a FA to accept the string that always ends with 00.

11. Give the DFA accepting the following language over the alphabet $\sum\_{}^{}=\{a,b\}:$

(i) $L=\left\{w\in \left\{a,b\right\}^{\*} | w=a^{m}b^{n} for m,n>0\right\}$

(ii)$ L=\left\{w\in \left\{a,b\right\}^{\*} | w is the string representation of a floating point number\right\}.$

**##**Question based upon designing of **Non Deterministic Finite Automata (NDFA**):

1. Construct an NFA which recognizes a set of strings Containing three consecutive 0’s and three consecutive 1’s. Also Correct (convert) this NFA into equivalent DFA . (2008-09)

2. Draw the NFA that accepts set for all strings of 0 and 1 containing 111 as substring and hence convert this NFA intoDFA.(2009-10)

3. Construct a NFA for the language L which accepts all the strings in which the third symbol from right end is always ‘a’ over the $\sum\_{}^{}=\{a,b\}$.

**###**Question based upon **Conversion of NDFA into DFA**:

1.Convert the following NFA having r as final stateta a DFA:(2010-11)

|  |  |
| --- | --- |
| **Present State** | **Next State** |
| **a** | **b** | **c** | $$ϵ$$ |
| $\rightarrow $**p** | **{p}** | **{q}** | **{r}** |  |
| **q** | **{q}** | **{r]** |  | **{p}** |
| **r** | **{r}** |  | **{q}** | **{p}** |

2. Convert the following NFA to equivalent DFA:

|  |  |  |
| --- | --- | --- |
| $\rightarrow $**p** | **q,s** | **q** |
| **\*q** | **r** | **q,r** |
| **r** | **s** | **p** |
| **\*s** | $$∅$$ | **p** |

3. Convert the following NFA to a DFA and informally describe the language it accepts:

|  |  |  |
| --- | --- | --- |
|  | **0** | **1** |
| **p** | **p,q** | **p** |
| **q** | **r,s** | **t** |
| **r** | **P,r** | **t** |
| **s** | $$∅$$ | $$∅$$ |
| **t** | $$∅$$ | $$∅$$ |