

Over the alphabet $\Sigma = \{a, b\}$ design dfa for the following.

- 1) Set of all strings with exactly one a.
- 2) Set of all strings with atleast one a.
- 3) Set of all strings with atmost one a.
- 4) $L = \{w_1 ab w_2 \mid w_1, w_2 \in (a, b)^*\}$

Dr. Sandeep Rathor

OR
containing substring ab

- 5) Set of all strings starting with ab.
- 6) Set of all strings ending with ab.
- 7) Set of all strings containing exactly 2 a's.
- 8) Set of all strings with exactly 2 a's and exactly 2 b's.
- 9) Set of all strings with exactly 1 a and atleast 2 b's.
- 10) Set of all strings with atleast 1 a and atleast 2 b's.
- 11) Set of all strings with exactly 2 a's and atmost 2 b's.
- 12) $L = \{w \mid |w| \bmod 3 = 0\}$
- 13) $L = \{w \mid |w| \bmod 3 > 0\}$
- 14) $L = \{w \mid |w| \bmod 3 \neq 0\}$
- 15) $L = \{w \mid |w| \bmod 5 \neq 0\}$
- 16) $L = \{w \mid n_a(w) \bmod 3 > 1\}$
- 17) $L = \{w \mid |w| \geq 4\}$
- 18) Set of all strings w such that $n_a(w)$ is divisible by 3.
- 19) Set of all strings w such that $n_a(w) = 3$.
- 20) $L = \{(ab)^i (b)^{2j} \mid i \geq 1, j \geq 1\}$
- 21) ODD no. of a's.
- 22) Even no. of a's.
- 23) starting with a and ending with b.
- 24) Even no. of a's and Even no. of b's.
- 25) Even no. of a's and odd no. of b's.

- 26] Even no. of a's and no. of b's is divisible by 3.
- 27] Not containing aa as substring.
- 28] $L = \{w \mid \text{2nd last symbol must be 'a'}\}$
- 29] $L = \{w \mid \text{3rd last symbol must be 'a'}\}$
- 30] Set of all strings that begin and end with the same letter.
- 31] $L = \{w \mid \text{second last symbol should be different from first symbol}\}$ $|w| \geq 3$

~~32]~~ For $\Sigma = \{0,1\}$ design dfa for the following

- 32] Set of all binary number whose decimal Equivalent is divisible by 3.
- 33] Set of all binary number whose decimal Equivalent is divisible by 4.
- 34] For $\Sigma = \{0,1,2\}$ design a dfa that will accept all ternary numbers divisible by 2.
- 35] For $\Sigma = \{0,1,2\}$ design a dfa that will accept all ternary no. divisible by 4.
- 36] ~~36]~~ $\Sigma = \{0,1\}$ design dfa for accepting all those strings in which number of 0's is divisible by 2 and number of 1's is divisible by 3.
- 37] $\Sigma = \{0,1\}$, dfa for all strings not containing 00.
- 38] $\Sigma = \{0,1\}$ design a dfa that will accept all those binary numbers whose decimal equivalent is divisible by 2 but not divisible by 3.
- 39] $\Sigma = \{0,1\}$. Design a dfa to accept all those strings not containing 101 as substring.
- 40] $\Sigma = \{0,1\}$. Design a dfa to accept all those binary number whose decimal Equivalent is divisible by 2 or divisible by 3.