Construction of DFA

Learn Vid Fun...
Type-02:

For strings starting with a particular substring

Step-01 - Decide the minimum number of states required in the DFA and draw them.

Rule: All strings starting with a length substring will require minimum \((n+2)\) states in its DFA.
Step-02 - Decide the strings for which you will construct the DFA.

Step-03 - Construct the DFA for the above decided strings.

Remember: Always go with the existing path. Create a new path only when you can't find a path to go with.

Step-04 - After drawing the DFA for the above decided strings, send the left possible combinations to the dead state not over the starting state.
Question - Draw the DFA for the language accepting strings starting with `ab` over input alphabet $\Sigma = \{a, b\}$

Solution - Regular expression for the given language is:

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

Minimum number of states in the DFA = 4

Strings we will check:
- $ab$
- $aba$
- $abab$
Question: Draw the DFA for the language accepting strings starting with 'a' over input alphabets $\Sigma = \{a,b\}$.

Solution:

Regular expression for the given language is:

$$a(a+b)^*$$

Minimum number of states in the DFA = 3

Strings we will check:
- $a$
- $aa$
Question-

Draw the DFA for the language accepting strings starting with '101' over input alphabets $\Sigma = \{0, 1\}$

Solution-

Regular expression for the given language is:

$$101(0+1)^*$$

Minimum number of states in the DFA = 5

Strings we will check

- 101
- 1011
- 10110
- 101101
Question - Construct a DFA that accepts a language $L$ over
$\Sigma = \{0, 1\}$ such that $L$ is the set of all strings
starting with '00'.

Solution -

Regular expression for the given language is -

$$00(0+1)^*$$

Minimum number of states in the DFA = 4

Strings we will check
- 00
- 000
- 00000
**Question:** Construct a DFA that accepts a language $L$ over $\Sigma = \{a, b\}$ such that $L$ is the set of all strings starting with `aa` or `bb`.

**Solution:**

Regular expression for the given language is -

$$(aa + bb)(a+b)^*$$

Strings we will check

- `aa`
- `aaa`
- `aaaa`
- `bb`
- `bbb`
- `bbbb`
Question: Construct a DFA that accepts a language \( L \) over \( \Sigma = \{a, b\} \) such that \( L \) is the set of all strings starting with \( \text{aba} \).

Solution: The regular expression for the given language is:
\[
\text{aba}(a+b)^* \]

Minimum number of states in the DFA = 5

Strings we will check:
- \text{aba}
- \text{abaa}
- \text{abaab}
- \text{abaaba}