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Question- 1:

Given Input $\Sigma = \{0, b\}$

all words that have "a" as the 2nd letter and

"a" as the 2nd lat letter over given input

Possible Combinations = $\{aa, aaa, aab, baa, bab, aaaa\}$

Regular Expression:

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

* Using this regular expression we can form the given string examples

* With this regular expression, string can start with 2nd letter & a's and last 2nd letter is a's.

* The second letter can be followed by any number of a's so that given regular expression passes with all the Combinations

Examples

1. aa   = $(a+b)^* \ a \ (a+b)^* \ (ab+aa)$

        = $(a+b)' \ a$ (valid)

2. aaa   = $(a+b)^* \ a \ (a+b)^* \ (ab+aa)$

        = $(a+b)' \ a \ (a+b)'$ (valid)

3. baa   = $(a+b)^* \ a \ (a+b)^* \ (ab+aa)$

        = a (valid)