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Question 2:

Given recursive definition

Rule 1: a, b, Λ are in x

Rule 2: If T is in x , so are Taa, TOb, Tba and Tbb

Solution:

$x \rightarrow \Lambda$ (empty string)

$x \rightarrow a$

$x \rightarrow b$

$x \rightarrow Taa$

$x \rightarrow Tab$

$x \rightarrow Tba$

$x \rightarrow Tbb$

Above are the some of possible combinations

Rule 1: language consists of strings containing a 's and b 's and empty string ' Λ '

~~Rule~~ This can be represent by $(a+b)^*$

Rule 2: Concatenate any string from x with one of four possible combinations can be represented as

$(aa + bb + ab + ba)$

By combining base case and recursive part

$(a+b)^* (aa + ab + ba + bb)$, which is represented by the language ' x '