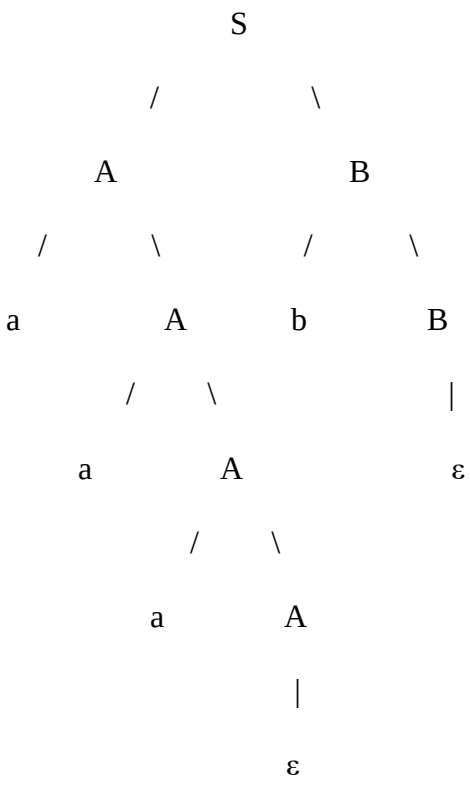
1. **(Problem-solving):** For the grammar:

Step-by-Step Derivation

1. Start with **S**.
2. Expand **S** →**AB**.
3. Expand **A**to get the three 'a's:
    - A →aA
    - A →aA →aaA
    - A →aA →aaA →aaaA
    - Finally, A → ε (the last A becomes empty).
4. Expand **B** to get the single 'b':
    - B →bB
    - B → ε (the last B becomes empty).

Step	stack	input	Action
1.	$	aaab$	start
2.	$a	aab$	shift
3.	$aa	ab$	shift
4.	$aa	b$	shift
5.	$aaab	$	shift
6.	$aaab	$	Reduce A → ε
7.	$aaaAb	$	Reduce A→aA
8.	$aa A b	$	Reduce A → aA
9.	$a A b	$	Reduce A → aA
10.	$A b	$	Reduce B → ε
11.	$A b B	$	Reduce B → bB
12.	$A B	$	Reduce S → AB
13.	$S	$	Accept


S
A
B
a
A
b
B
a
A
ε
a
A
ε