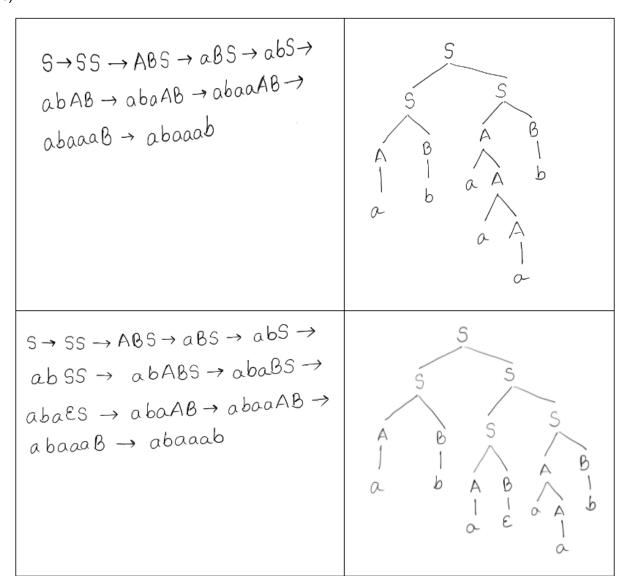
Take a look at the grammar below and solve the following problems.

$$\begin{split} S &\to AB \mid \mathtt{b}AA \mid SS \\ A &\to \mathtt{a} \mid \mathtt{a}A \\ B &\to \mathtt{b} \mid \varepsilon \end{split}$$

- (a) Give a leftmost derivation for the string abaaab. (3 points)
- (b) Sketch the parse tree corresponding to the derivation you gave in (a). (2 points)
- (c) **Demonstrate** that the given grammar is ambiguous by showing two more parse tree (apart from the one you already found in (b)) for the same string. (4 points)
- (d) Find a string w of length five such that w has exactly one parse tree in the grammar above. (1 point)

## a, b)

Leftmost derivation	Corresponding Parse Tree
S -> SS -> SSS -> ABSS -> aBSS -> abSS -> abABS -> abaBS -> abaES  -> abaSS -> abaABS -> abaABS -> abaaES -> abaaAB -> abaaaB -> abaaab	5 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 7 8 7 8 8 8 8 8 8 8 8 8 8 8



d) abbaa, baaab