Seminar 5: Context-free Grammar

1. Give three strings that can be derived from S and show the derivations of each. (3 marks)

a, aa, aaa,… and b, bb,bbb, .., aab, aaab, …

1. Give three strings that cannot be derived from S using the context-free grammar . What is the language of this grammar? (5 marks)

Epsilon, ab, aabb, abab, and many more.

The language is.

1. Convert the following regular expression to a context-free grammar.

R:

can be replaced with, and is . The union will become a bar. So the context free grammar equivalent to the regular expression R is

1. Design a context-free grammar whose language is .

We have three cases:

* Strings starting with *a*: then at some point we have to match a *b* with this *a.* Therefore, the string must be *aUbV*, where U and V are in This means we have a recursion
* Strings starting with *b*: then at some point we have to match an *a* with this *b.* Therefore, the string must be *bUaV*, where U and V are in This means, again we have a recursion
* Epsilon. So we have