Mathematical Methods in Linguistics

Exercise 1.
Write a negative grammar G_1 with alphabet $\{a, b, c\}$ such that $L(G)$ contains all strings that start and end with an a. Then write a another grammar G_2 over the same alphabet that only generates strings where each a is immediately followed by a b. After that, write another grammar G_3 over the same alphabet that requires b to only occur in clusters of the form bba. So a string like *aaaabbaaabba* is well-formed, but *aaaaba* or *bb* is not. Finally, construct a combined grammar $G_{1,2,3}$. What is the language generated by this grammar?

Exercise 2.
Continuing the previous exercise, fill in the cells in the table below with Y or N depending on whether the grammar generates the string. The first row has already been completed as an example.

	G_1	G_2	G_3	$G_{1,2,3}$
a	Y	N	Y	N
b				
aab				
aabba				
abbba				
aaaaaa				
aabbab				