Q1. Consider the regular grammar G = ({S,A}, {a,b}, P, S) where P consists of the following productions:

1. Describe the language generated by this grammar.
2. Give a minimal regular expression for L(G).
3. Find an equivalent grammar to G.

Q2. Give minimal regular expressions for the following languages:

1. The set of all strings over {a, b, c} that starts and end with the same symbol.
2. The set of all strings over {0, 1} except for the two strings 11 and 111.
3. The set of all strings over {0, 1} that have an even number of 0's or exactly three 1's.
4. The set of all strings over {a, b, c} such that every a is followed by at least two c's.

Q3. Determine whether each of the following statements is true (T) or false (F). In case of being false write a short comment, or give a counter example.

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|  | **Statement** | **T/F** | **Comment / Counter Example** |
| **1)** | a\*(ba\*)\* = (a + b)\* |  |  |
| **2)** | L[a\*b\*] ∩ L[c\*d\*] = { } |  |  |
| **3)** | If L1 and L2 are not regular then L1 ∪ L2 is also not regular. |  |  |
| **4)** | If L1 is regular and L1∪ L2 is also regular, then L2 must be regular. |  |  |