COSC341 TUTORIAL 4

The theme of this tutorial is to get some hands-on experience with the various concepts we've introduced so far. Unless otherwise specified use the alphabet $\Sigma = \{a, b\}$.

1. The language EVEN consists of all strings of even length. Design a DFA that accepts it, a regular grammar that generates it, and a regular expression that describes it.

2. The language HAS-$abba$ consists of all strings that contain $abba$ as a consecutive substring. Describe a simple regular expression for it, and a simple NFA that accepts it. Can you find a DFA that accepts it?

3. The language EVEN-EVEN consists of all strings containing both an even number of a's and an even number of b's. Design a DFA that accepts it, a regular grammar that generates it, and a regular expression that describes it.

4. The language MULTI-6-b (I'm open to better names) consists of all strings with the following property: for some a in the string, the number of b's that follow it is a multiple of 6. Describe an NFA that accepts this language. Try to describe a DFA or regular expression for it.

5. Is there a DFA over the one-letter alphabet $\{a\}$ that accepts all, and only, those strings whose length is a power of two?