Lexical Analysis

Exercise 1

For the given regular expression:

$$(a \mid bc) * d*$$

1. draw NFA (Non-deterministic Finite Automaton).

2. transform NFA to DFA (Deterministic Finite Automaton).

Exercise 2

Explain why there are no regular expressions which can express the language $a^n b^m$ where $n = m$. This means language over the alphabet a, b where there is the same number of as as bs.

Exercise 3

Write a regular expression that matches:
soul, sound, south, sauce, course

But does not match:
soup, sour, source, curse

Try to optimize (make the expression smaller — the number of characters).

Exercise 4

Write a regular expression for an integer number of time units (take into account only milliseconds, seconds, minutes, hours and days). You can write a separate regex for each unit, but it is recommended to merge expressions if it is more readable.
Match:
256ms
5s
32m
16h
4d
Don't match:
05ms
100s
26h