Aufgabe 4.1. [Construction of DFTA] (10 points)
(TATA Ex. 1.8) Given the alphabet \( \text{or}/2, \text{and}/2, \text{not}/1, \text{true}, \text{false}, x \) representing Boolean formula over variable \( x \).

1. Specify a DFTA that recognizes the set of satisfiable formulas.

2. Extend the alphabet to variables \( x_1, \ldots, x_n \). Again, specify a DFTA that recognizes the set of satisfiable formulas.

Aufgabe 4.2. [Leaf language] (10 points)
Consider a nondeterministic word automaton \( A = (Q, \Sigma, I, Q_f, D) \) with states \( Q \), alphabet \( \Sigma \), initial states \( I \), final states \( Q_f \) and rules \( D \). Consider the tree alphabet \( F = f/2, x/0 \) for \( x \in \Sigma \). We define a function \( \text{flat} : T(F) \to \Sigma^* \), which returns the string of leafs, in left to right order:

\[
\text{flat}(x) = x \\
\text{flat}(f(t_1, t_2)) = \text{flat}(t_1)\text{flat}(t_2)
\]

Construct an NFTA that accepts the language \( L = \{ t \mid \text{flat}(t) \in L(A) \} \). Prove your construction correct.