Assignment 2

1. A finite-state automaton (FSA) is a five-tuple (Q, Σ, δ, q₀, F), where:
   - Q is a finite set of states.
   - Σ is a finite set of input symbols.
   - δ is a transition function that maps each state and input symbol to a new state.
   - q₀ is the initial state.
   - F is a set of final states.

2. A pushdown automaton (PDA) is a seven-tuple (Q, Σ, Γ, δ, q₀, Z₀, F), where:
   - Q is a finite set of states.
   - Σ is a finite set of input symbols.
   - Γ is a finite set of symbols that can be pushed onto the stack.
   - δ is a transition function that maps each state, input symbol, and stack symbol to a new state, stack symbol, and stack operation.
   - q₀ is the initial state.
   - Z₀ is the initial stack symbol.
   - F is a set of final states.

3. A context-free grammar (CFG) is a quadruple (V, T, P, S), where:
   - V is a set of variables.
   - T is a set of terminals.
   - P is a set of production rules.
   - S is a start symbol.

4. A regular expression (RE) is a string that describes a set of strings.

5. A finite-state transducer (FST) is a six-tuple (Q, Σ, δ, Λ, q₀, F), where:
   - Q is a finite set of states.
   - Σ is a finite set of input symbols.
   - δ is a transition function that maps each state, input symbol, and output symbol to a new state.
   - Λ is a set of output symbols.
   - q₀ is the initial state.
   - F is a set of final states.