

Programming Project:

Instructions:

- The project is due by **December 03, 2025**.
- Your objective is to develop a DFA (deterministic finite automaton) simulator application [read chapter 1.1 for details].
- The application must support and have a prompt command for the following operations:
 - Read in a DFA (from a file).
 - Read in a string.
 - Display the formal DFA as a list.
 - Display a state transitions visualization of the DFA computing the string.
- The format of the DFA file must be:
 1. Q as a space-delimited list
 2. Σ as a string
 3. q_0 [must be one of the states in Q]
 4. F as a space-delimited list
 5. δ such that each rule is on a separate line and in the format `start symbol(s) state`where each component is on separate lines.
- The application must validate the read DFA. It must indicate if the content of the file represents a DFA or does not exist.
- The symbols can only be lowercase letters and digits.
- The state can only be a string of letters, digits, and underscores.
- The Q , Σ , F , and δ must behave as sets and ignore repeating values.
- All classes that display content must inherit the `Object` class from '`Object.h`'.
- All classes must be defined in header files and have a unique test C++ file.
- The source codes can only use the libraries `iostream`, `fstream`, `vector`, `string`, `sstream`, `cctype`, `iomanip`, `cmath`, '`Object.h`', and any header file your define.
- Your final submission must be a report that should include:
 - a summary of the deterministic finite automaton:
 - a description of what it does
 - a list of data structures it uses
 - the source codes.
 - documentation file (.pdf or .md) that contains:
 - a description of each class that includes:
 - the class name
 - the name and type of each public field.
 - the pseudocode for each method that begins with the preconditions (what must be true before the call).
 - the pseudocode for each function that begins with the preconditions (what must be true before the call).
 - a flowchart or instructions on how to run your program.
- Cheating of any kind is prohibited and will not be tolerated.
- **Violating and/or failing to follow any rules will result in an automatic zero (0) for the project.**