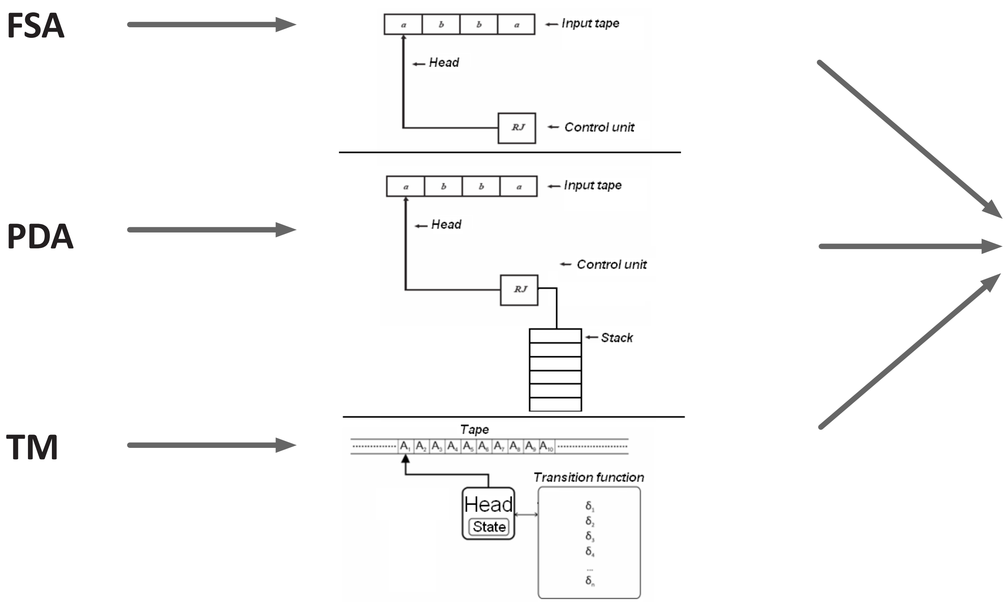
K - I - K Simulator 2009

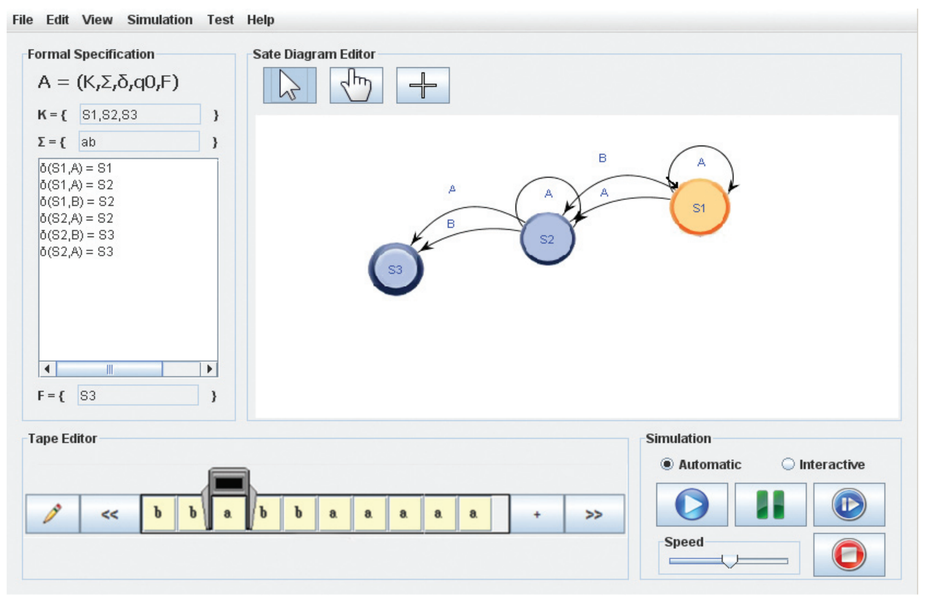
SLOVAK UNIVERSITY OF TECHNOLOGY
Faculty of Informatics and Information Technology

Simulator for Finite State Automaton, Push Down Automaton and Turing Machine

- Do you study Theoretical Computer Science ?
- Do you have to deal with abstract state machines ?
- Do you have problems understanding Finite State Automaton, Push Down Automaton or Turing Machine ?

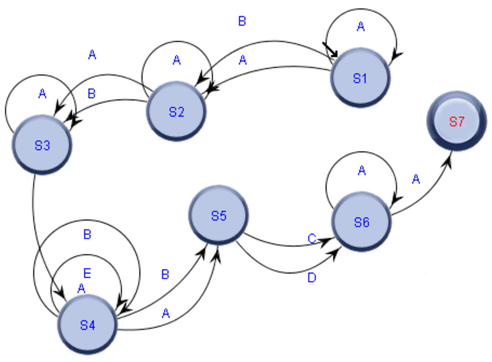
Then come and take a look at our simulator ! It is the right choice for you !

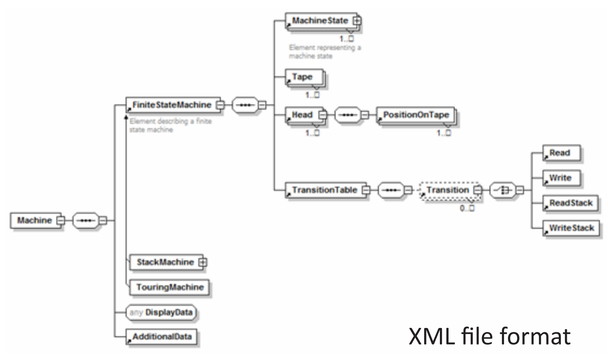




Main features

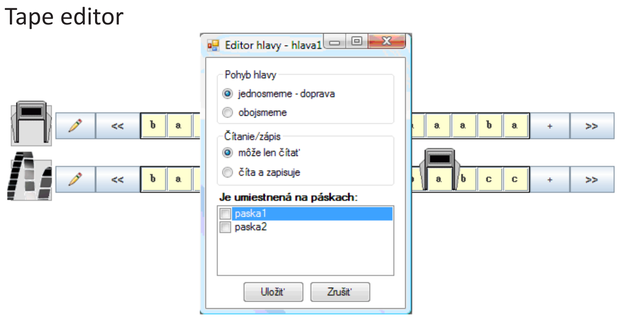
Possibility to design your own automaton



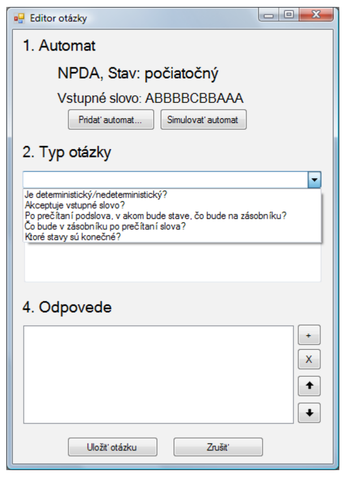


XML file format

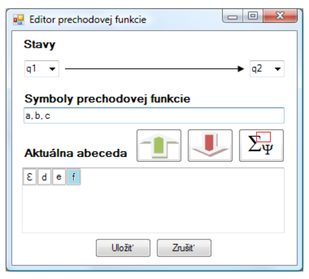
Tape editor



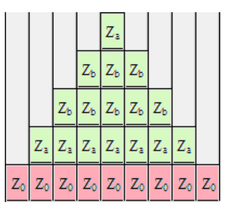
Possibility to test students by generating exemplary issues along with correct answers



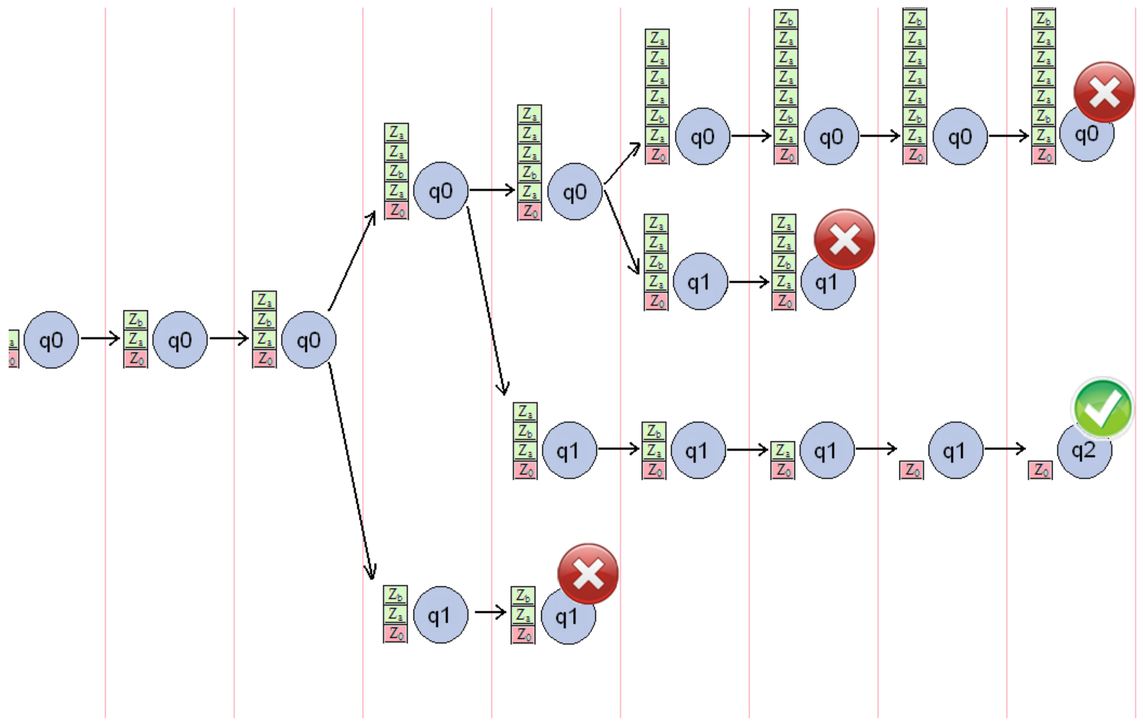
Editor of transition function



Clear Stack Representation



Non-determinism
One of the key problems in abstract automata simulation is nondeterministic computation and its visualization. We have addressed the extensive state space with optimized breadth-first search. Unlike other simulators, we attempt to visualize the computation even when the computation tree contains a large number of nodes. If the number of displayed nodes exceeds the capabilities of graphical visualization, it is possible to switch to textual representation.



Other features:

- easy and user friendly usage
- improved visualization of nondeterministic behaviour
- possibility to import and export the automata
- multilanguage user interface
- virtually infinite tape

What lies behind ?

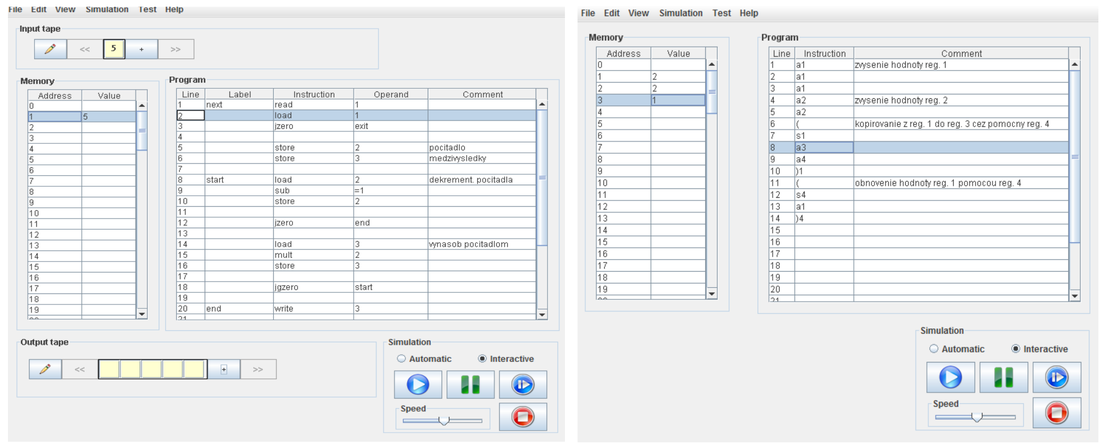
The goal of our simulator is to create a flexible framework that would address different automata types in similar fashion and allow definition of custom automata on end-user level. It is conceived as a Java application to ensure maximum portability and maintainability. The application logic relies on XML technology, utilizing the JAXB API. Automata and simulation settings are stored in XML format and are dynamically converted to Java classes at runtime. The user interface was designed with ease of use and minimization of learning curve in mind. Visualization of state diagrams and computation trees is handled by the JUNG graph framework.

Why choose this simulator ?

A certain number of simulators is already being used in education that enable students to better understand the connection between formal definition, graphical representation and the simulation progress. However, they lack several aspects that would certainly prove to be very useful in education. After reviewing 12 other simulators, we have identified primary features, that would make the understanding as easy as possible. Our simulator has them all !

Next Generation of K-I-K Simulator

As a next step, we are developing integrated simulators for RAM and Abacus Machines. Stay tuned !



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