Abstract: Automated Grading of Automata with ACL2s

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Abstract Almost all Computer Science programs require students to take a course on the Theory of Computation (ToC) which covers various models of computation such as finite automata, push-down automata and Turing machines. ToC courses tend to emphasize paper-and-pencil mathematics over programming. As a consequence, students typically receive feedback on their work only after it has been graded, which can take several weeks. We present tools that provide automatic feedback for constructing finite automata, push-down automata and Turing machines. These tools are based on the ACL2s interactive theorem prover, which provides advanced methods for stating as well as proving and disproving conjectures. Since feedback is automatic, our tools can be deployed at scale and integrated into massively open online courses.