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A framework for lab work management in mass courses. Application to Low Level Input/Output without hardware.

This paper describes a complete lab work management framework designed and developed in the authors' department to help teachers to manage the small projects that students are expected to complete as lab assignments during their graduate-level computer engineering studies. The paper focuses on an application example of the framework to a specific lab work related to Low Level Input/Output. Special emphasis is laid on the most complex aspects of such environments. The management framework provides specific tools for dealing with these issues: the management of student work delivery and evaluation results accessibility, automatic or semi-automatic assessment of student work, and detection of lab assignments that are highly suspect of having been copied. Additionally, the lab work framework represents a method through which a closer peer-to-peer or one-to-many communication with students can be attained. The lab work described in the paper is a small project based on a specification document. It is designed to get students to gain an in-depth knowledge of the computer Input/Output subsystem. While the framework has been in use for over 10 years, the specific Input/Output lab work has been managed by the framework tool-chain for the last 6 years, and used by over 2000 students. The lab work management framework is a step towards the feasibility of a closer-to-the-student higher education system, where the main interaction between students and teachers can be based on individual or on small group tutorials. Using the tool-chain, the academic load of teachers in mass course environments can be kept at acceptable levels, making for higher quality education.