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Incorporating Open-source Physical Computing Tools into an Introductory Computational Physics Course RONALD E. KUMON, Kettering University — *Physical computing* is the building of interactive physical systems by the use of hardware and software to sense and respond to the world. I have introduced open-source physical computing into our introductory computational physics course at Kettering University via the Arduino Uno microcontroller and Arduino C/C++. Based on an Advanced Laboratory Physics Association (ALPhA) workshop on Arduino, I wrote a chapter to introduce students to analog and digital data types, simple digital input and output and analog input, basic programming constructs, rapid prototyping, and the engineering design process. For formative assessment, I required students to record results from exercises in the chapter in a LabArchives electronic laboratory notebook and then provided feedback. For summative assessment, I assessed a report and presentation of a device of the students' own design to acquire data and perform hardware control. I discuss basic and advanced examples of student work. Based on 5 teams with 10 students over two terms, I have observed that students like to use Arduino and can generally implement their designs into a practical device. In most cases, the final projects indicated mastery of the intended learning objectives.

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