

## Introducing Computer Programming into a Projectile Motion Lab

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Understanding what computers can do for us has become an important part of our world. Computers can save us time and allow us to calculate things that were impossible a few decades ago. However many students reach college and even graduate without any idea how to harness their power. I have experienced multiple instances of intelligent undergraduate research students wasting many hours manually doing something that could (and should) have been completed with a simple for-loop. While we cannot teach introduction to computer science within physics class, we can make students a little less afraid of programming and a little more aware of what computers can do by incorporating some programming concepts into our classes. I plan to present a portion of a projectile motion lab, which introduces students to a short program, arrays, and a for-loop. In this program they plot the location of a projectile at a sequence of times, read the maximum height, maximum horizontal displacement from the graph and use kinematics to derive these values. Versions of the programs are freely available on-line written in MATLAB and Python (free) along with an accompanying handout.