VPython for Physics Students

Shared by David Crowley, EAO at the 2019 CEMC Conference for CS Teachers

Background

I am a converted physics and science teacher. This year I will be teaching my first computer science and robotics courses. The resource I am sharing is one that I found when trying to implement some elements of coding into my SPH3U physics classes. It is authored by Rhett Allain (@rjallain), a physics professor at Southeastern Louisiana University, a popular columnist at Wired.com (often doing video analysis of movies to test the physics) and a consultant for the new McGyver TV series.

Coding resources

The code uses a modified version of Python called **VPython** that makes 3D modeling fairly straightforward. It can be run locally, but is often used entirely online (see: Glowscript.org or Trinket.io). All the links in Mr. Allain's public resource are for Trinket.io.

Teaching methodology

Since the resource is geared towards physics students and teachers, it is based on editable code and starter code. Students are then asked a variety of physics-related questions that make them engage with the code in increasingly more complex and complete ways. The goal is both a better physics understanding and a better grasp of basic coding ideas (such as declaring variables, arrays [VPython has a special array of size 3 called `vec` that is used for 3-dimensional vectors], loops, vector and scalar arithmetic, displaying results, real time interactivity).

Resource

The Google document by Mr. Allain is found at the following address:
https://docs.google.com/document/d/1nlBFBYzzRdop1Z6JvCIlb0c5EXjKSXRwoIwMnY2Szjk/view