Python in science and engineering and its integration in higher education curricula

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Abstract

An increasing number of scientists and engineers today abandon the use of proprietary closed source software for their work and transition to platforms based on free software. One of the prime reasons behind this paradigm shift is the unanimity of the core values of open science and those of the free software movement built by Richard Stallman. Indeed, the four freedoms defined by the Free Software Foundation effectuate the creation and advancement of technology through the joint efforts of the whole of humanity.

Spearheading this transition is the Python phenomenon. Originally created as a general purpose programming language by Guido Van Rossum, Python has grown to be the core of a powerful scientific/engineering ecosystem. This environment can be used for a host of applications ranging from statistical analysis, linear algebra, signal (image, audio, speech and video) processing, mathematics, machine learning, and artificial intelligence. In fact, in the hot topic of deep learning, all of the state-of-the-art platforms backed by the largest IT corporations, are based on Python. The adoption of Python in the scientific/engineering world has also been reflected in its integration in education curricula, especially in higher education.

The talk will give a brief summary of the use of free software in science/engineering, and then give an overview of the development of Python and its scientific ecosystem. Finally, we will discuss the adoption of Python in the higher education curriculum in Macedonia, our region, as well as worldwide.

Keywords: Python; education; free software; electrical engineering.