

To: Dr. Barrett Bryant
From: Taylor Spencer
Date: March 2, 2015
Re: Proposal for New Undergraduate Computer Science Course in Python

Introduction

As a senior studying to be a computer programmer at UNT, I have had the chance to take many courses and learn many programming languages. However, I noticed there was one thing missing from the curriculum: A Python programming course. Now why should the University of North Texas offer a Python programming course? Several major technology companies use Python, and Python is the most discussed programming language on the Internet (King, 2011). However, no university in Texas teaches Python. By introducing a Python programming course, UNT could improve the prospects of its graduates for jobs both inside and outside of Texas. This paper will discuss the case for teaching Python, and detail a possible Python course that could be taught at the University of North Texas in the future.

The Case for Teaching Python Python in the Workplace

Several major technology companies use Python, including Google, YouTube, Facebook, Instagram, Dropbox, Disqus, and Spotify. Google uses Python for Google Groups and Google Code (Leung, 2005; Stein, 2005). Additionally, Google has lots of internal tools written in Python, including wrappers for version control, the build system, the packaging system, network infrastructure, monitoring of production servers, and log reporting and analysis (Leung, 2005; Stein, 2005). Also, most of Google subsidiary YouTube's infrastructure, in lines of code, is built in Python (*Scalability at YouTube*, 2012). A lot of YouTube systems start as one Python file and become some large ecosystem after many years (*Scalability at YouTube*, 2012).

Over at Facebook, Python is the 3rd most used language, where Python is used for numerous internal operations, including scaling server loads, provisioning servers, monitoring defense systems, performing load tests, and analyzing user data (*Python@Facebook*, 2014). Additionally, Facebook's internal build system is written in Python (*Python@Facebook*, 2014). Also, Python powers Facebook subsidiary Instagram's server-side applications (Peng, Sun, & Tsai, 2014, p. 5; "What Powers Instagram," n.d.).

Additionally, Yelp is powered by over 180k lines of Python code (*Building a Python Service Stack*, 2014). For the longest time, this was one big codebase, but Yelp is consolidating to smaller, condensed codebases (*Building a Python Service Stack*, 2014). Yelp is using `virtualenv` to isolate its dependencies to one single binary (*Building a Python Service Stack*, 2014). Meanwhile, Dropbox had originally implemented both its client and its server in Python (*Keynote*, 2013). While the server side has moved away from Python to C++ due to scalability, the client side continues to use Python in conjunction with third-party libraries like `libsync` (Drago et al., 2012; *r | p 2012*, 2012). Another user of Python is Disqus, which powers the commenting section of many web sites, which is almost entirely written in Python as a Django app (*Making DISQUS Realtime*, 2013). Lastly, Spotify uses Python, mostly for backend services and data analysis, but also for other random tasks (Meer, 2013).

However, none of this matters if there are no Python jobs in the DFW metroplex. On Dice.com, there are at least 9 jobs for Python-knowledgeable workers in or near Dallas, TX, including a Python developer at Glaman Tech in Dallas, TX; a Python developer at Oxford International in Dallas, TX; a senior Python architect at Providence Partners in Dallas, TX; a Python developer at Xoriant in Richardson, TX; a front-end software developer at Xoriant in Richardson, TX; and a Python/OpenStack developer at EPSG in Plano, TX (“Front-End SW Developer,” 2015, “Python Developer,” 2015a, “Python Developer / Openstack,” 2015, “Python Developer,” 2015b, “Python Developer,” 2015c, “Sr. Python Architect,” 2015). All these jobs are out of reach to UNT students because UNT doesn’t teach Python.

Schools Teaching Python

A few schools teach Python, however, they are all outside of the state of Texas. The University of Washington offers a certificate in Python programming, which includes courses on Internet programming and system development in Python (Jacky, n.d.; “Python Programming Certificate,” 2015). The University of California Berkley offers a course in Python programming (“Python Programming Course,” n.d.). DePaul University offers a course on web development with Python (“Web Development with Python,” n.d.).

However, no Texas schools currently teach Python. This wasn’t always the case. Until 2014, UT Austin taught a CS105 Programming in Python course (Bishop, n.d.), but since a graduate student was teaching this course, it was discontinued in the Spring 2014 semester. The lack of a Python course from a Texas school means that graduates from out-of-state schools must fill these jobs.

Python Programming Course Course Content

To solve this problem and improve the job prospects of UNT graduates, UNT should introduce a Python programming course. As Python is a versatile language used in everything from small scripts to large web sites, instructors could teach this course from several angles. The structure I am proposing is based off of the University of Washington's Python certificate program.

Topic	Specifics
Scripting	The instructor will start the course off by having students write Python scripts to accomplish basic tasks so they can learn the language.
Web Development	Next, the instructor will introduce students to web development through Python. Instructors will need to choose a framework for web development; possible candidates include Django and Web2py. The course instructor should choose whichever framework he/she is most familiar with.
System Development	Last, the instructor will instruct students to develop an application using Python of the instructor's choice.

Figure 1: Course Plan

While based on the University of Washington's Python certificate program, it is not designed to go into depth into any of the areas of Python use, but rather focus on mastery of the Python language. Like with other language and focus-specific programming courses, CSCE 2100 will be a prerequisite for this course. The structure of this course is a basic plan, and instructors may need to tweak it through the development of the course to allow for more focus in one area or another.

Cost

Amongst the Computer Science and Engineering staff, I have found three professors who would be qualified to teach this course: Song Fu, Enkh-Amgalan Baatarjav, and Prakash Kolan (“Enkh-Amgalan Baatarjav,” n.d., “Prakash Kolan,” n.d., “Song Fu,” n.d.). Should the university find none of these professors suitable or available to teach another course, they could hire another professor. Based on data from the AAUP Salary Survey for the 2013-2014 semester, the average salary for a professor at the University of North Texas was \$127,007, while the average salary for an associate professor was \$85,590 (Curtis, Thornton, Benedict, & Benedict, 2014, p. 24).

Conclusion

Currently, no university in Texas teaches Python. By introducing a Python programming course, UNT could improve the prospects of its graduates for jobs both inside and outside of Texas. Much more planning will need to go into such a course for it to be successful. The information laid out in this proposal is simply a starting point.

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