Jonathan Lawrence

11/27/2018

DSC510-T301

# Assignment: Programming Concepts

## Give three reasons why you think a data scientist would choose to use Python instead of Java or C/++.

1. Python is easier to learn and use than Java or C/++. It was designed with the idea of “readable code” in mind. This comes in handy when companies hire new programmers who have to quickly understand code from former employees.
2. Python is more efficient than compiled languages. The code is significantly smaller meaning less time required to manage or debug, and can run faster due to its independence of a compiler. This produces a much faster turnaround time. Companies may first build their programs in Python in order to gage speed of development.
3. Python has a vast selection of libraries backed by a large community. Some incredibly helpful data science tools have been built on the Python framework.
4. Give three reasons a data scientist might choose to use a language like C or Java instead of a language like Python or R.
5. Python’s execution speed is generally slower than fully compiled programs.
6. Since Python is open-source, it can sometimes fall susceptible to community-introduced bugs. For example, Python 3.2.0 released with a broken input function for Windows.
7. Another detriment of open-source, Python can potentially be pushed in a direction that steers away from the commercial needs, and more towards the developers’ personal preferences.

## What is the difference between a CPU and a GPU? What advantages does a CPU have over a GPU? What advantages does a GPU have over a CPU?

* Difference:
  + CPU stands for “central processing unit” and handles logical computing. GPU stands for “graphics processing unit” and handles visual computing.
* CPU Advantages:
  + A CPU can handle tasks of a much wider variety along with any associated exceptions, while GPUs are trained to focus on a specific task. CPUs are also cheaper to acquire than GPUs.
* GPU Advantages:
  + A GPU is built to handle large quantities of data faster than a CPU. It is designed to process three dimensional images more efficiently than a CPU. They are also specialized at parallel processing for large regions of data.

## Most programming languages, including Python, Java, C, and R, are Turing-Complete. Using your own words, explain in a few sentences what it means for a programming language to be Turing-complete.

1. To be classified as “Turing-complete” a computer program must be able to do what a Turing machine can do. A Turing machine is a theoretical device that is capable of performing any computation possible by looking at items on a tape, one item at a time, and generating an instruction from what it sees. Therefore, a programming language is considered “Turing-complete” if it is likewise able to perform any kind of computation.