**CHIDI - Week 3: Daily Morning Challenge, Day 2: Thursday 9th January 2020**

Question 1: Provide an illustration on the advancement of computing over the last 2 decades

Computers have evolved and advanced significantly over the decades since they originated. Many years ago, in their most rudimentary form, computers were very large and slow. Gradually, computers have become smaller and faster, enabling people to use them virtually anywhere. New computer technology has enabled more advanced business tasks as well. For example, as [contact lists](https://www.bookyourdata.com/) have grown, a professional can now use a [business email list](https://www.bookyourdata.com/ready-made-list/ceo) to reach more potential customers.

* **2000**: A Japanese company introduced the [first camera phone](http://static1.1.sqspcdn.com/static/f/1133095/22632080/1367892313823/camphones.okabeito.pdf?token=qrGdg8i4EfXmiu%2FrfOZK%2BzZ2whU%3D). This camera's resolution was 0.11 megapixels.
* **2002**: The Japanese government created the [Earth Simulator](http://www.eecg.toronto.edu/~amza/ece1747h/papers/earth-sim-nec.pdf), which was a supercomputer. This computer reigned as the world's fastest computer between 2002 and 2004.
* **2005**: The Chinese company [Lenovo acquired IBM's PC business](http://www.mi.rei.ase.ro/Site%20MI/Materiale%20MI%202015/Application%206_Lenovo-IBM.pdf). The main reason for the purchase was to get access to the ThinkPad computer line.
* **2007**: [Amazon released the Kindle](http://www.mcafee.cc/Classes/BEM106/Papers/2008/Kindle.pdf), a new electronic reading system. The design featured an SD card slot for storage expansion.
* **2007**: [Apple introduced the iPhone to the world](http://www.augie.edu/sites/default/files/u57/pdf/jaciel_subdocs/iPhone.pdf). This cell phone offered multiple features, such as Internet browsing, music, and a phone.
* **2008**: [The MacBook Air hit stores](http://www.isaca.org/Groups/Professional-English/iso-9000/GroupDocuments/30year.pdf), featuring many new capabilities. Apple succeeded in reducing the overall size of the unit by making the hard drive smaller.
* **2010**: [Apple's Retina Display](https://support.apple.com/en-us/HT202471) features advanced graphics and display technology. Retina Display involves a pixel density that is higher than the eye's ability to pick out individual pixels.
* **2010**: [Apple released the first iPad](http://www.acu.edu/technology/mobilelearning/documents/research/student/ipad-inkling-finalmarketingpresentation.pdf). This mobile device offered a larger screen without phone capabilities.
* **2012**: [Raspberry Pi launched a computer](https://www.raspberrypi.org/wp-content/uploads/2012/12/quick-start-guide-v1.1.pdf) the size of a credit card. This tiny computer weighed in at 45 grams.
* **2015:**Apple reduced its computer size even further with the launch of the [Apple Watch](http://albionk12.org/forum/Applewatch.pdf). This device is compatible with both iPhones and MacBooks.

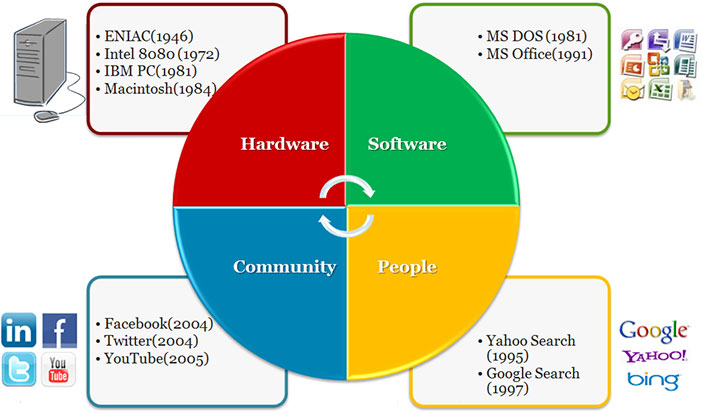


Figure 1: The four stages of computing

Question 2: What is the difference between R and Python

1. Data Collection

Python supports all kinds of different data formats. You can play with comma-separated value documents (known as CSVs) or you can play with JSON sourced from the web. You can import [SQL tables directly into your code](http://stackoverflow.com/questions/32912373/importing-multiple-sql-tables-using-pandas). You can get any kind of data with Python. If you’re ever stuck, google Python and the dataset you’re looking for to get a solution.

You can import data from [Excel, CSV, and from text files into R](http://www.r-tutor.com/r-introduction/data-frame/data-import). Files built in Minitab or in SPSS format can be turned into R data frames as well. While R might not be as versatile at grabbing information from the web like Python is, it can handle data from your most common sources. Many modern packages for R data collection have been built recently to address this problem. [Rvest](https://github.com/hadley/rvest) will allow you to perform basic web scraping, while [magrittr](https://github.com/smbache/magrittr) will clean it up and parse the information for you.

1. Data Modeling

For python, you can do numerical modeling analysis with [Numpy](http://www.numpy.org/). You can do scientific computing and calculation with [SciPy](http://www.scipy.org/). You can access a lot of powerful machine learning algorithms with the [scikit-learn](http://scikit-learn.org/) code library. scikit-learn offers an intuitive interface that allows you to tap all of the power of machine learning without its many complexities.

In order to do specific modeling analyses in R, you’ll sometimes have to rely on packages outside of R’s core functionality. There are plenty of packages out there for specific analyses such as the [Poisson distribution and mixtures of probability laws](http://www.revolutionanalytics.com/r-language-features-applications-and-extensions#datamining).

C. R was built as a statistical language, it suits much better to do statistical learning. It represents the way statisticians think pretty well, so anyone with a formal statistics background can use R easily. Python, on the other hand, is a better choice for machine learning with its flexibility for production use, especially when the data analysis tasks need to be integrated with web applications.

D. In conclusion, Python is a powerful, versatile language that programmers can use for a variety of tasks in computer science. Learning Python will help you develop a versatile data science toolkit, and it is a versatile programming language you can pick up pretty easily even as a non-programmer.

On the other hand, R is a programming environment specifically designed for data analysis that is very popular in the data science community. You’ll need to understand R if you want to make it far in your data science career.

Question 3: What is the difference between Functional and Event-based programming

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| --- | --- |
| FUNCTIONAL PROGRAMMING | EVENT-BASED PROGRAMMING |
| Provides command writing in modules. | Provides graphical user interface to create the programs. |
| Functions are prepared for interraction to perform specific tasks. | Actions are defined on events. These events could be occurred by mouse clicking and moving or keyboard stokes. |
| Focuses on data and facilitates to secure it from unauthorized access. | Focuses on selection user interface. |

Question 4: What do you understand to be ethical hacking

Ethical hacking refers to the act of locating weaknesses and vulnerabilities of computer and information systems by duplicating the intent and actions of malicious hackers. Ethical hacking is also known as *penetration testing*, *intrusion testing*, or *red teaming*. An ethical hacker is a security professional who applies their hacking skills for defensive purposes on behalf of the owners of information systems. By conducting penetration tests, an ethical hacker looks to answer the following four basic questions [1] :

1. What information/locations/systems can an attacker gain access?
2. What can an attacker see on the target?
3. What can an attacker do with available information?
4. Does anyone at the target system notice the attempts?

An ethical hacker operates with the knowledge and permission of the organization for which they are trying to defend. In some cases, the organization will neglect to inform their information security team of the activities that will be carried out by an ethical hacker in an attempt to test the effectiveness of the information security team. This is referred to as a [*double-blind environment*](http://en.wikipedia.org/wiki/Double_blind#Double-blind_trials). In order to operate effectively and legally, an ethical hacker must be informed of the assets that should be protected, potential threat sources, and the extent to which the organization will support an ethical hacker's efforts