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**[B] Python Research Activity**

**1. What is Python?**

Python is only one of several programming languages. Computer languages, like human languages, come in a variety of flavors, such as Java, LISP, PHP, and Perl. Most languages excel at at least one feature; for example, Java excels in writing readily portable programs as well as accessing and splicing databases into webpages. But, at the core concept level, all of these languages are pretty similar - most have data in variables and functions (procedures, methods) to do something with that data.

Python is a strong, elegant programming language that is simple to learn and use. It demonstrates the majority of the capabilities found in many other languages and is also suitable for real-world applications! It's also free software with a single standard implementation and a vast and welcoming hacker community. After learning Python, you should be able to learn any other language you wish.

**2. What are the uses of Python?**

Python's adaptability allows it to be utilized in a wide variety of applications across multiple sectors.

* Data Science: Analytics and Visualization
  + Data scientists don't have time to waste on compilation and difficult syntax when it comes to extracting insights from data. Python's straightforward syntax and wide range of third-party libraries make it an excellent choice for anyone interested in a career in data research.
* Machine Learning
  + Machine learning involves training systems to learn independently by using algorithms that constantly update themselves based on input data. These systems gradually learn to handle new situations by generating an output based on past datasets. Then, based on the outcome of this new situation, they update themselves to deal with the new variables, thus constantly evolving.
* Web Development: Websites and Web Apps
  + Python is also extensively used for back-end development, where it runs in a web application's server and interacts with databases and APIs when a user requests data from the app's front-end in the browser.
* Financial Analysis
  + Python was the most sought-after programming language by FinTech firms when hiring developers. However, Python code is used by more than just FinTech companies. Python is widely used in the financial industry because to its data processing capabilities and a wide range of third-party modules designed for financial analysis.
* Desktop Applications
  + Python can also be used to create desktop applications. Python is used in many Linux and open-source desktop apps. Furthermore, with GUI frameworks such as Tk, wxWidgets, and Qt, Python may be used to create cross-platform apps that run on Windows, Mac, or Linux.
* Business Applications
  + Accounting, inventories, customer relationship management, and other duties can be performed using these systems, which are employed for corporate development. Python is used by many firms to handle the heavy lifting. As a result of Python's simplicity of use and scalability, an increasing number of entrepreneurs are incorporating it into their tech stacks.
* Scripting and Utility Software
  + Python began as a programming language for creating utility scripts, and it is still commonly used for this purpose. As a result, Python is the language of choice for automating tasks in an engineer's daily work.

**3. Comparison between Python and Java.**

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| **Java** | **Key Differences** | **Python** |
| Java is a concurrent object-oriented programming language with statically typed objects. | **Typing** | Java is an object-oriented concurrent programming language with statically typed objects. |
| Java is a compiled programming language. | **Compiling** | Python is an interpreted programming language. |
| The Java syntax is quite rigorous. Errors occur when a semicolon is omitted at the end of a sentence or when curly braces are mismatched. | **Syntax** | Python's syntax is simpler. Only the indentation is required; no semicolon or curly brackets are required. |
| Java has more code, is statically typed, and is more difficult to use. | **Conveniency** | Python has dynamically typed and smaller code, making it simple to use. |
| Everything in Java begins and ends with the word object. A class is required if you only wish to print "Hello." | **Object Model** | There are objects in Python, but we may also write programs without them. |
| In Java, a simple operation such as writing "Hello, World" will require 5-6 lines of code. In comparison to Python, Java code is extremely verbose. | **Code Readability** | Python applications are tiny in size. If you wish to print "Hello, World," you use a single print statement. |
| Java is faster since it is a more sophisticated language. . | **Speed** | Python is slower because it is an interpreted language with data types that are determined at run time. |
| Java is portable, and the JVM runs on all systems. | **Portability** | Python is more portable than Java, but not by much. |
| Java is extensively used and has robust database access via JDBC. | **Databases** | Python database connectivity is fairly limited and is rarely utilized in enterprise applications. |
| Java has superior performance.  Python outperforms it in terms of speed and efficiency. The efficiency of Java programs is greatly increased with the help of a Just-in-Time (JIT) compiler. Parallel programming also enhances speed, which improves overall performance. | **Performance** | Python is an interpreted programming language. As a result, rather than compiling the complete program, each program statement is interpreted one at a time, slowing down the program. Type checking is also performed at run time, and recognizing items from collections consumes a large amount of memory, limiting performance. |
| Java has been around for a long time, and most businesses prefer Java for development because of the different Java capabilities. So, Java's future is truly bright. | **Future** | Python's popularity has skyrocketed in recent years, thanks in large part to the rise of AI and machine learning. So we can confidently claim that Python has a bright future as well. |

# References

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