Comparison of Programming Languages: Review

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Comparison of Programming Languages: Review

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Abstract: In this article, we are rationalize concerning the programming languages which are effective for the controlling the behavior of a machine(frequently Computer).Like natural languages ,programming languages explain to rules for syntax and semantics. There are hundred thousand of programming languages and fashionable ones are created per annum. Few languages ever become satisfactory popular that they are used by more than a few people ,but professional programmers may use dozens of languages in a career. In this review I am going to compare the runtime speed ,memory utilization, applications and the main advantages and disadvantages of the Notable standized programming language include java, PHP, JavaScript, python, objective-C, ruby, Perl , C, C++, C# ,SQL ,swift.
Keywords: Run time speed, memory utilization, programming languages.

1.   INTRODUCTION

A programming language is a formal language that specefies a set of directions that is used to deliver different kinds of output.Programming languages unremarkably contains of instructions for a Computer.It canbe used to create programs that implement paticular algorithm's.There are programmable machines that use a limited set of definate directions,instead of the general programming languages of trendy computers. Early ones preceded the invention of the digital computers the first probably being the automatic flute player described in the 9th century by the brothers Musa in Baghdad, throughout the Islamic golden age.From the early 1800s,programs were used to direct the conduct of machines such as Jacquard looms, music boxes and player pianos. However, their programs could not produce different behavior in response to some input or condition.Thousands of newlanguages has beeninvented, mainly in the computer field, and much morelanguages arestill being created every year.programming languadges require computation to be described in an imperative form (i.e sequence of operations to perform) while other languages use other forms of program descrpition such as the declarative form (i.e the desired result is specified,not how to achieve it.The description of a programming language is usually divided into the two components,i.e syntax and semantics.Some languages are defined by a identification document (for example, the Cprogramming language is specified by an ISO Standard) while other languages (such have both,with the language defined by a standard and extensions taken from the dominant excustion being same.

2. CODING LANGUAGES
Java
Java could be a general-purpose computer programming language that's synchronous ,class-based ,object-orientated and specially designed to possess as few implementation dependencies as potential. It is considered as the perfect language for the developers and programmers to learn. The run time for compiling the program is 1.89 sec and the memory used per second is 6.01mb.Currently, it's the top-most programming language and has

grabbed the very best position with Android OS yet again, though it was a bit down a few years ago. Java is used for mobile-based applications, enterprise-level purpose, for making desktop applications, and for establishing Android apps on tablets and Smartphone's.

Advantages	Disadvantages
It was designed to be straightforward to use ,write, compile ,debug than alternative language.	considerably additional memory consumption than C or C++.
To create standard program and reusable code.	The default look and feel of GUI applications.
It has ability to move simply from one automatic data Processing system to another.	Single paradigm languages.

A sample program on java to print Hello World.

```
Class helloworld app
{
public static void main(String[ ] args)
 {
     System.out.println("Hello World!");
 }
}
```

Output

Hello World!

PHP

PHP is additionally referred to as hypertext preprocessor could be a service-side scripting language designed for internet development, however it's is also used as a general-purpose programming language. It had been created by Rasmus Lerdorf in 1994.The web developers ought to study Hypertext Preprocessor, a widely known programming language. With the assistance of PHP, you can enlarge a web app terribly quickly and effortlessly. The run time employed by the compiler to execute the logic is 27.64 secs and the memory used is 2.57mb.PHP is that the actual foundation of many strong content management systems, as an instance Word Press.

Advantages	Disadvantages
User friendly interference	Desire a lot of manual work
Fast access to data base	Additional storage is required
Extremely helpful text process options	It has no formal error handling mechanisms

A simple program on PHP to print Hello world

```
<?php
 echo "Hello World!";
 ?>
```

Output
Hello World!

JavaScript

JavaScript could be a high-level ,understood programming language .It's a language that is additionally characterized as dynamic, weakly typed ,prototype-based and multi-paradigm .While you are expandilllng your web site, JavaScript is extraordinarily practical as this language can immensely assist you in generating the communication for your website .You can utilize various in style frameworks in JavaScript for constructing the superb user interface. It is a object oriented scripting language for compiling it's take 6.52 secs the memory used by the complier is 4.59 mb. once you're into web development, it's terribly vital to understand regarding JavaScript for making interactive web ,pages. JavaScript is applied for including animations on the web pages, loading contemporary pictures, scripts or objects on web page, and craft massively responsive user interfaces.

Advantages	Disadvantages
Easy to make an web page.	It takes lot of time to create anything that even Resembles a web page.
Fast to transfer as a result of the text is Compressible	It 's not as flexible as alternative WebPages developers like Dreamweaver.

A simple program on JavaScript to print Hello world!

```
<!DOCTYPE HTML>
<html>
<body>
<p>before the script….</p>
<script>
alert('Hello world!');
</script>
<p>…after the script.</p>
</body>
<html>
```

Output
Hello World!

Python

Python is an understood high-level programming language for general-purpose programming. It's a style philosophy that emphasizes code readability ,notable using significant white space. It constructs clear programming on each tiny and enormous scales. It is a object oriented scripting language ,the run time speed of this language is 71.90secs and the memory utilized is 2.80mb/sec. For turning into good at all-in-one language, you ought to begin learning Python language that has the power to expand internet apps, information analysis, user interfaces, and for additional frameworks are also accessible for these tasks. Python is employed by larger firms principally which will appraise that can evaluate huge data sets.

Advantages	Disadvantages
Extensive libraries	Speed limitations.
Improved productivity.	Undeveloped data base access layer.
Free and open source.	Design restrictions.

A simple program on Python to print Hello World

print("Hello World!")

Output

Hello World

Objective-C

Objective –C could be a general-purpose ,object-oriented programming language that adds tiny talk-style electronic messaging to the c programming language employed by Apple for the OS X and IOS operating systems. The most foremost most popular selection for all the web developers is Objective-C. once you have learned Objective-C, you will able to begin applying XCode that's known to be the licensed software system development tool from Apple. therefore you will be able to quickly produce an IOS app which will be noticeable in App Store.

Advantages	Disadvantages
It is terribly sensible and transportable language.	It doesn't support oops options like in heritance and Polymorphism that why C++ is developed.
Complex data promptly processed	It doesn't use name space mechanism
Single level memory	The first version of objective c doesn't support garbage collection.

A simple program on objective-C to print Hello World!

```
#import<foundation.h>
int main
{
@autoreleasepool
{
NSLog(@"Hello world!");
}
Return 0;
}
  puts("Hello World!");
  return 0;
}
```

Output

Hello World!

Ruby

Ruby could be a understood ,dynamic ,reflective and general purpose scripting programming language. It supports multiple programming paradigms, including practical ,object-oriented

and imperative. It's automatic memory management. The run time speed for executing the logic is 59.34secs and therefore the memory used by the complier is 3.97mb/sec. This be learned simply, and also very strong and clear-cut. If you've less time in hand and still wish to craft any project, then you can definitely use Ruby language. This programming language is applied massively for web programming and hence turned out to be the ideal selection for the beginner firms.

Advantages	Disadvantages
Rails provides fantastic tooling that helps you deliver more option in less time.	Runtime speed on ruby on rails is slow.
The ruby community is huge in to testing and test automation	Active record is used heavily with in ruby on rails world and is hard dependedency for many of the ruby gems.
There's a gem for just about anything you can think of.	It can be hard to find to find smart documentation.

A simple program on Ruby to print Hello World
puts 'Hello World!'
Output
Hello World!
Perl
 Perl could be a family of two high-level ,general-purpose ,interpreted , scripting programming language. Perl is additionally a well-accepted programming language that provides numerous tools for numerous obscure drawbacks corresponding to system programming. Though this programming language could be a bit puzzling, it's really a strong, the runtime speed is 65.79 secs and therefore the memory employed by the compiler is 6.62 mb. Perl is especially used for sites and web app expansion, desktop app development and system administration, and test automation that can be applied to testing databases, web apps, networking devices, and far additional.

Advantages	Disadvantages
It runs on all platforms and is way additional transporta ble than C.	We will not simple produce a binary image from a Perl File.
It is greatly economically in TEXT and STRING Manipulation	Perl is an interpretative language ,so it's relatively Slower to alternate compiling languages like C
Dynamic memory allocation is very straightforward in Perl	It's not feasible to use in real time environment like In fight simulation.

A simple program on Perl to print Hello World!

print "Hello, World!\n";
Output
Hello World!

C

C is an important procedural language. It had been designed to be compiled employing a comparatively simple compiler, to provide low-level access to memory, to produce language constructs that map efficiently to machine instructions, and to require minimal run-time support with 1.00 secs .the memory accessed by the complier is incredibility i.e. 1.17 mb. Despite its low-level capabilities, the language was designed to encourage cross-platform programming. A standards-compliant and portably written C program can be compiled for a very wide variety of computer platforms and operating systems with few changes to its source code. The language has become available on a very wide range of platforms, from embedded microcontrollers to supercomputers.

Advantages	Disadvantages
C programming language is a building block for many other currently known languages	It doesn't support object oriented programming Such as inheritance ,encapsulation ,polymorphism etc.
It has the ability to extend itself.	It does not offer data security
C programming language is easy to learn	It does not support reusability of source code.

A simple program on C to print Hello World
#include <stdio.h>

```
int main
{
    printf("Hello World!\n");
}
```
Output
Hello World!

C++

C++ is a general-purpose object oriented programming language. It is imperative and generic programming features and also gives low-level memory manipulations .the processing speed of the complier is 1.56 secs and the memory usage of the compiler is 1.34 mb. It is a bit more progressive than C, and utilized immensely in forming hardware speeded games. It is an unique selection for strong desktop software as well as apps for mobiles and desktop. Known to be the strongest language, C++ is applied in vital operating systems, such as Windows.

Advantages	Disadvantages
Portability allows developing programs irrespective of Hardware	When C++ used for web applications complex and difficult to debug
C++ is an object oriented embedded language.	C++ can't support garbage collection
It allows moving the program development for one Platform to another platform.	It has no security.

A simple program on C++ to print Hello World!
#include <iostream.h>

```
int main()
```

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```
{
cout <<"Hello, world!\n";
   return 0; }
```

Output
Hello World!

C#

C#(pronounced as c-sharp) is a multi-paradigm programming language encompassing strong typing ,imperative ,declarative ,functional ,generic ,object-oriented and component-oriented programming language. It is a relatively new programming language designed by Microsoft for a wide range of enterprises applications that run on the .Net frame works. The run time speed for compelling is 3.14 secs and memory utilized by the compiler is 2.85mb.An evolution of C and C++ the C# language is simple , modern ,type safe and object orientate using System;

Advantages	Disadvantages
The .net class library will allows for rapid prototype development ,it will do a ton of things for you	C# is less flexible than C++.C# depends greatly on .NET Frame works.
Automatic garbage collection	C# is slower to run.
Strong memory backup	.NET application needs a window platform to execute.

A simple program on C sharp to print Hello World!

```
class Program
{
   static void Main(string[] args)
   {
      Console.writeLine("Hello world!");
}}
```

Output
Hello World!

SQL

When you are executing on databases such as Microsoft SQL Server, Oracle, My SQL, etc, you should be aware of SQL programming language or Standard Query Language. From this language, you can achieve the proficiency of acquiring the needed data from big and multifaceted databases.

Advantages	Disadvantages
SQL can be used to retrieve large amount of records From a database quickly and efficiently.	Interfacing an SQL database is more complex than adding a few line code.
It joins two or more tables and show it as one object .	It is an object son it occupies space.
It is used to view the data without storing the data into the object.	When the table is dropped view become inactive. It depends on the table objects.

A simple program onSQLto print Hello World
BEGIN
dbm
s_output.put_line ('Hello World..');
END:
/
Output
Hello World
Swift
Swift reveal upon the up-to-date program language for expanding apps for Apple products. These language can be operate by you for building up apps for IOS activated devices and Apple's MAC in a smart and simple method .the run time exuction speed is 4.20 secs and the memory utilized is 2.71.When you are enthusiastic to expand a superb IOS application, then it enhanced for you to gain knowledge of Swift programming language.

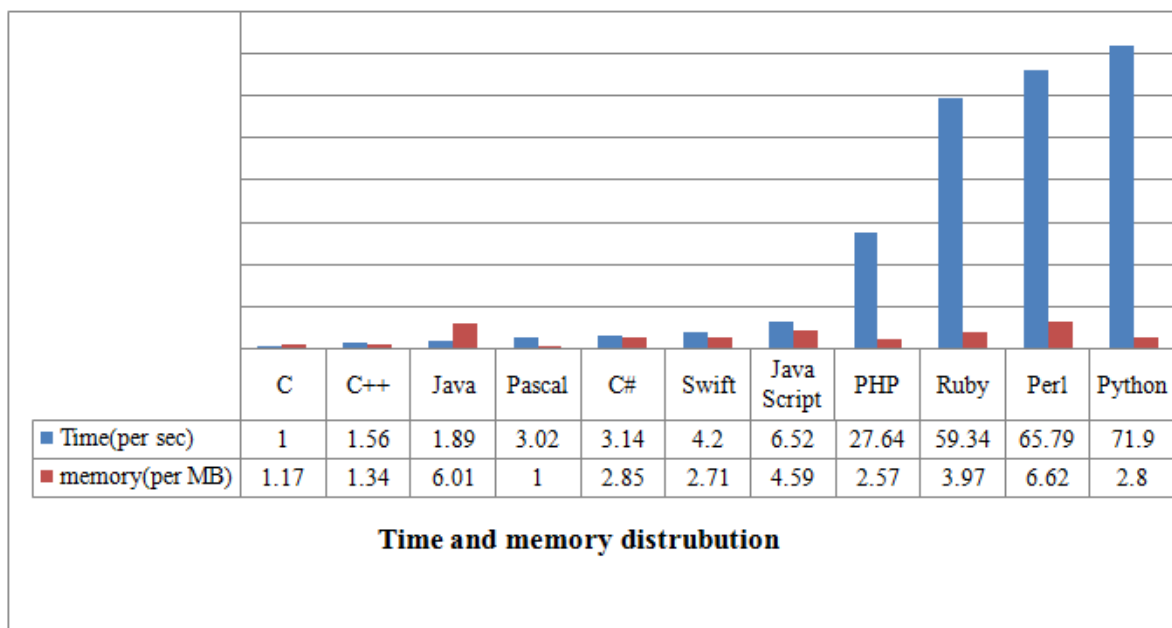| Advantages	Disadvantages
Strong typing.	Resources is quite little.
More simple syntax than objective C.	Developers have to start new things.
Fewer lines code than objective C.	Make apple application environment slower.

A simple program on swift to print HelloWorld
println("Hello world!")
Output
Hello World!

2. RESULT

	C	C++	Java	Pascal	C#	Swift	Java Script	PHP	Ruby	Perl	Python
■ Time(per sec)	1	1.56	1.89	3.02	3.14	4.2	6.52	27.64	59.34	65.79	71.9
■ memory(per MB)	1.17	1.34	6.01	1	2.85	2.71	4.59	2.57	3.97	6.62	2.8

Time and memory distrubution

- It is based on the solid theoretical foundations, all while providing a wide range of programming prototypes. If one adds the straightforward interface with the language which the top level supports ,that makes it a language perfectly familiarize for teaching.
- Structured types and abstract types support approaching algorithmic problems and their complex data structures, all while abstracting away from problems of memory representation and distribution.
- The operational theoretical model trigger the language supplies a particular introduction to the notions of calculation and typing which, as a "true programmer ",one owes it to oneself to be taught.
- The various programming models can be approached induadually of one another: from modular or object-oriented program structure to low-level systems programming, there are areas where Objective Caml is not effective.
- The run time speed of the Python is relatively more compared to C and other languages.
- Finally by considering the memory utilization Pascal is better when compared to other languages the memory used is less.

4. CONCLUSIONS

The technology world is expanding extremely with each passing year and months .As they are coming with new up-to-date handsets and tablets every other day and the opposition too has growth high in the market to stand at the highest position. that's the region programmer's and web developers are in the tremendous demand currently because they have a good knowledge of programming languages are available and each of them as well-defined function.

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