Characteristics of a Good Programming Language

There are various factors why the programmers prefer one language over another, and some of very good Characteristics of a Good Programming Language are

1) **Clarity, Simplicity, and Unity**: A programming language provides both a conceptual framework for algorithm planning and means of expressing them. It should provide a clear, simple, and unified set of concepts that can be used as primitives in developing algorithms.

   - Minimum No. of different concepts
   - With Rules for their combination being simple and regular

   This attribute is called **Conceptual Integrity**.

2) **Orthogonality**: It is one of the most important feature of a programming language. Orthogonality is the property that means "Changing A does not change B".

   If I take a real-world example of an orthogonal system...

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would be a **radio**, whereas changing the **volume** and vice versa.

When the features of a language are orthogonal, language is **easier to learn** and programs are easier to write—because only few exceptions and special cases to be remembered.

3) **Support for Abstraction:** There is always found that a substantial gap remaining between the abstract data structure and operations that characterize the solution to a problem and the particular data structure and operations built into a language.

4) **Programming Environment:**

An appropriate programming environment adds an extra utility and makes language to be implemented easily like

- Reliable
- Efficient
- Well-documented

**Speeding up Creation of Testing by Testing packages**

Facility of **maintaining** and **modifying** multiple versions of program or software.

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5) **Ease of Program Verification:** - *Reusability*

The reusability of programs written in a language is always a central concern.

A program is checked by various testing techniques like:

- **Formal Verification Method**
- **Desk Checking**
- **Input - Output test checking**

We verify the program by many more techniques.

A language that makes program verification difficult may be far more troublesome to use.

Simplicity of semantics and syntactic structure is a primary aspect that tends to simplify program verification.

6) **Portability of Programs:**

Programming language should be

*portable* means it should be easy to transfer a program from one computer to the other computer.

A program whose definition is independent of features of a particular machine forms can only support *portability.*

Eg.: Ada, FORTRAN, C, C++, C#, Java.