

Name: \_\_\_\_\_  
Section: \_\_\_\_\_ Schedule: \_\_\_\_\_

Class number: \_\_\_\_\_  
Date: \_\_\_\_\_

**Lesson Title:** Programming Languages and Compilers

**Lesson Targets:**

At the end of this module, students will be able to:

1. Enumerate the contemporary programming languages.
2. Distinguish between the different categories of programming languages.
3. Interpret the characteristics of Python programming.

**Materials:**

SAS

**References:**

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[https://www.tutorialspoint.com/basics\\_of\\_computer\\_science/basics\\_of\\_computer\\_science\\_programming\\_languages.htm](https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_programming_languages.htm)

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[https://www.tutorialspoint.com/compiler\\_design/index.htm](https://www.tutorialspoint.com/compiler_design/index.htm)

**A. LESSON PREVIEW/REVIEW**

**Introduction**

Good day, everyone!

You were briefly explained on the algorithms, pseudocode, and flowcharts during our prior meeting. We'll examine modern programming languages and compilers today. Since a computer system is only a machine and cannot do any work, numerous languages—also referred to as programming languages or just computer languages—have been created in order to make computers operate. Numerous computer languages have been created over the past twenty years. Each of these languages has its own lexicon and syntax. Furthermore, compilers are specialized software tools that convert the source code of one programming language into machine code, bytecode, or another programming language. Usually, the source code is created in a high-level, readable language for humans, such as Python, Java or C++.

So, let's get started!

**B. MAIN LESSON**

**Content and Skill-Building**



Programmers (developers) can communicate with computers by using a programming language, which is a computer language. It is a set of instructions written in a certain language (such as C, C++, Java, or Python) to carry out a specific activity. Websites, mobile applications, and desktop applications can all be made using a programming language.

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Date: \_\_\_\_\_**Categories of Programming Languages**

- **Machine Language** – This is the language designed specifically for computer hardware. The central processing unit (CPU) of a computer system directly affects such language.
- **Assembly Language** – It is a language for simplifying and making readable machine code.
- **High Level Language** – Algorithm to insert item in a data structure. The high level language is straightforward, simple to understand, and close to English. High-level languages are important because they facilitate the creation of complicated software and offer the following benefits:
  1. Users do not need to master the high-level language in order to work with it, unlike assembly language or machine language.
  2. High-level languages are simple to learn and comprehend because they resemble real languages.
  3. High-level languages are created in a way that makes faults easy to see.
  4. High-level language is simple to maintain and is simple to change.
  5. A high-level language speeds up development.
  6. High-level languages are more affordable to create.
- **System Language** – A system programming language is a programming language that is used to create systems. These languages are made for creating systems, which typically demand different development methodologies than application software.
- **Scripting Language** – Programming languages that use high-level constructs to comprehend and carry out one command at a time are referred to as scripting languages. Scripting languages, as opposed to more structured and compiled languages like C and C++, tend to be faster to learn and to learn to code in.

**Common Programming Languages**

1. **Python - Guido van Rossum** developed the straightforward language Python in 1991. Because it is an interpreted language, it does not require compilation before usage. Many features are available in Python, such as support for various programming paradigms (imperative, object-oriented, etc.), exception handling (try/except/finally), dynamic typing (dynamic type checking), a very small runtime environment with fewer dependencies than other languages, full Unicode support, and much more.
2. **Java - James Gosling, Mike Sheridan, Chris Warth, Ed Frank, and Patrick Naughton** started it in June 1991. However, after going through several name changes, it was first made available at Sun Microsystems in 1996. (Oak, Green, and Java from Java coffee). Java is a platform for computers as well as a programming language. Java can be used by programmers to create applications for mobile devices, laptops, tablets, and wearables. Additionally, many of its instructions are identical due to the syntax's C/C++ foundation. Java was created for high-level app development, in contrast to C/C++ which allows programmers to write low-level code for systems programming.
3. **TypeScript** - Microsoft created and maintains TypeScript, an object-oriented language that is open-source. With the addition of types, classes, and modules, this superset of JavaScript enables programmers to create programs that run on any platform or browser without the need for further compilation. Large-scale web apps and well-known libraries like AngularJS use it. Additionally, TypeScript is very compatible with the majority of existing JavaScript codebases because it is built on ECMAScript 6th Edition (ES6).
4. **C#** - Microsoft created the object-oriented programming language C# (C Sharp) as part of the .NET project. Strong typing, imperative, declarative, functional, generic, object-oriented (class-based), and component-oriented programming paradigms are all covered by the language, which is a cross between C and C++.
5. **JavaScript** - A simple programming language used in web browsers is called JavaScript. It is a

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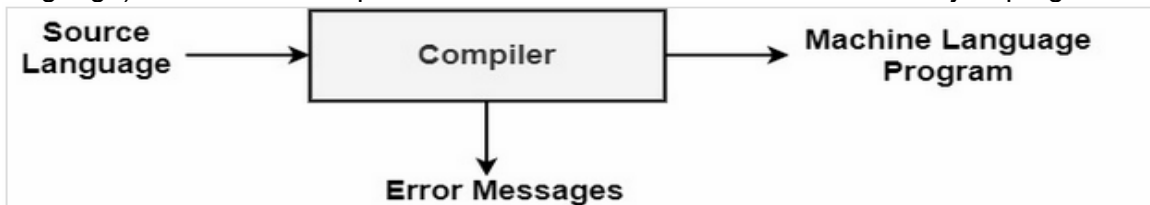
scripting language that may be used for client-side (web-based) and server-side (web server-based) applications. It makes it possible for websites to store and use data, access so-called "components" of pages, alter the information in those components, perform functions whenever an event occurs on a website, make pages more interactive, and so forth.

Additionally, it is supported by all major browsers, making it accessible to almost all users across a variety of devices (Windows PCs, Macs, Linux computers). In the current era of online development, JavaScript is without a doubt one of the most significant programming languages.

### What is compiler?

A compiler is a program that converts a high-level language (such as C, C++, or Java) to a low-level language (object program or machine program). The compiler also detects numerous problems that occur during the compilation of a program. Various phases are used by the compiler to transform high-level language to low-level language. A character stream entered by the customer is compiled through several stages before providing the destination language.

The compiler's job is to translate a program written in one language into another without altering its meaning. A program written in the HLL programming language is divided into two sections when it is implemented. The source code is compiled and converted into object code in the first component (low-level language). The second component uses the assembler to translate the object program into the target code.



### Types of Compiler

1. **One-Pass Compiler.** A single-pass compiler only reads the code once before translating it. Each component of each compilation unit is only once processed by the one-pass compiler. Each component is converted into the final machine program. When the line source is processed in the one-pass compiler, it is scanned and the token is extracted.
2. **Multi-Pass Compiler.** The first changed form is produced once the compiler has once again scanned the input source, and it continues to do so until the object form is created. A multi-pass compiler is one that creates many passes.

### What is python?



### Characteristics of Python Programming Language

1. **Python is Interpreted.** The interpreter processes Python while it is being used. Your software does not need to be compiled before running. This is comparable to PHP and PERL.



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2. **Python is Interactive.** When writing programs, you can actually sit at a Python prompt and communicate with the interpreter directly.
3. **Python is Object-Oriented.** Python supports the Object-Oriented programming style or approach, which encapsulates code within objects.
4. **Python is a Beginner's Language.** Python is a great language for novice programmers and facilitates the creation of a variety of programs, including simple text editors, web browsers, and games.

**Sample Code:**

```
print "Hello, Python!"
```

**Output:**

```
Hello, Python!
```

**Check for Understanding**

Identify the following statements.

1. This scripting language can be applied to both client-side (web-based) and server-side (web server-based) applications.

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2. Any set of rules that convert strings into various outputs of machine code, or graphical program elements in the case of visual programming languages

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3. It is task to transform a program written in one language into another without changing the meaning of the program.

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4. Guido van Rossum developed it as a high-level, object-oriented, general-purpose, interactive, and interpreted programming language.

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5. This implies that you can actually use a Python prompt to interact with the interpreter directly when building programs.

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6. The code is just read once before being translated.

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7. It is an open-source object-oriented language that is a superset of JavaScript with the addition of types, classes, and modules.

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8. Programmers can use it to make apps for smartphones, computers, tablets, and wearables; many of its instructions are similar because the syntax is based on C/C++.

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9. These languages were designed for system development, which usually calls for different development approaches than application software.

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\_\_\_\_\_ 10. This is the language created especially for hardware in computers.  
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### **Thinking about Learning**

Tell us about your learning experience today. Which parts of the lesson still feel confusing to you even after checking the answer keys and reviewing the content? List them below and tell your teacher.

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