Course Unit 3: Week 4

Introduction to Python

Topics

- Basic Elements of Programming
- Programming Structure
- **Programming Environments**
- Programming Languages
- Python

Objectives

1. Describe python language.

2. Discuss the different programming elements, structure and environments.

3. Differentiate the different programming languages.

What is Computer Programming?

Computer programming is the act of writing computer programs, which are a **sequence of instructions** written using a **Computer Programming Language** to perform a specified task by the computer.

What is Computer Program?

A **computer program** is a **sequence of instructions** written using a **Computer Programming Language** to perform a specified task by the computer.

A **computer program** is also called a **computer software**, which can range from two lines to millions of lines of instructions.
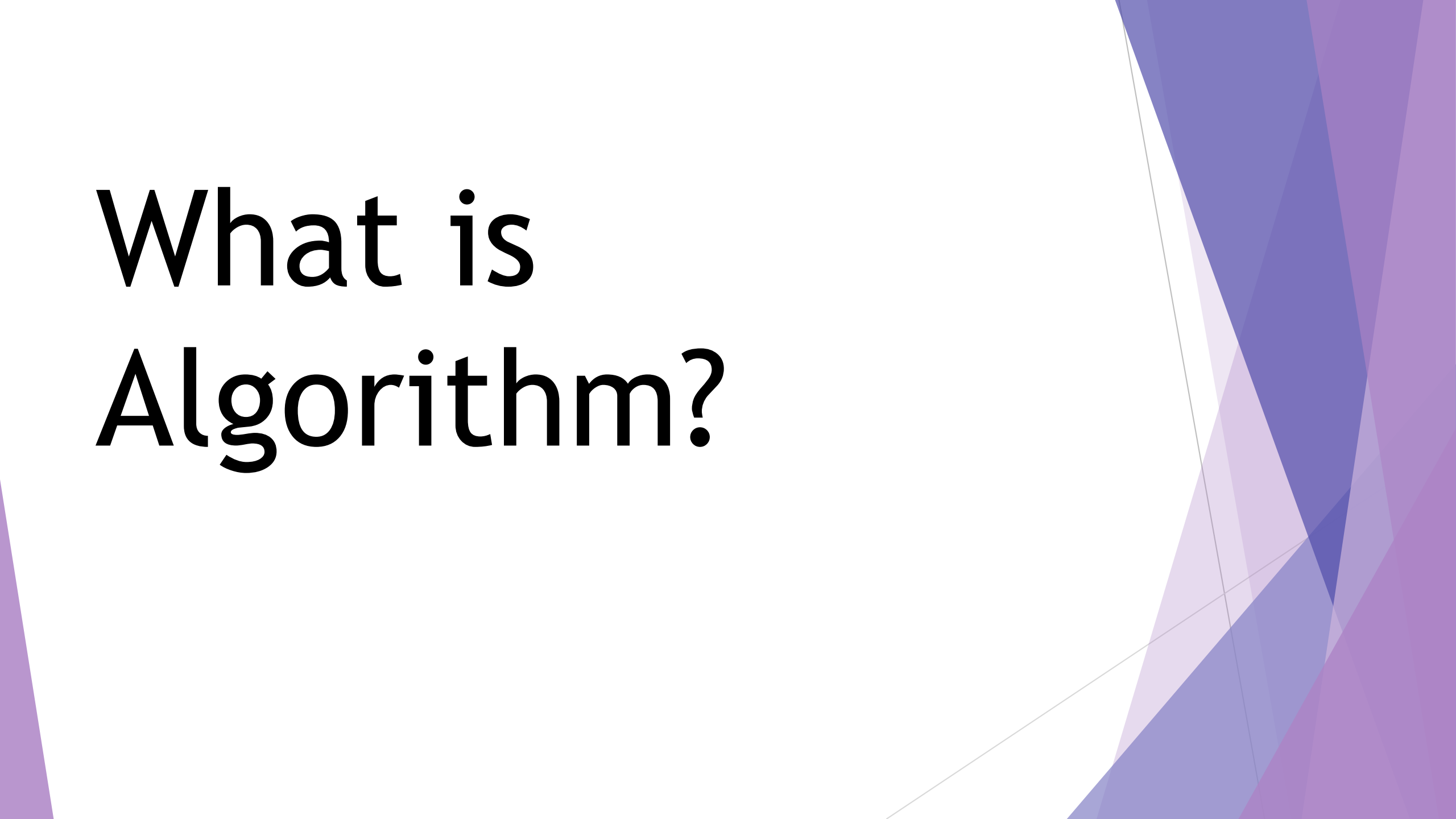
Computer program instructions are also called **program source code** and **computer programming** is also called **program coding.**

A computer without a computer program is just a dump box; it is programs that make computers active.

What is Algorithm?

An **algorithm** is a **step-by-step procedure** to resolve any problem. An algorithm is an effective method expressed as a finite set of well-defined instructions.

Behind all of the software we use on a daily basis, there's a code being run with all sorts of terms and symbols.

What is Human Interface Language?

Human Interface Language

- English Language, which is a well-known Human Interface Language
- English has a predefined grammar, which needs to be followed to write English statements in a correct way. Likewise, most of the Human Interface Languages (Hindi, English, Spanish, French, etc.) are made of several elements like verbs, nouns, adjectives, adverbs, propositions, and conjunctions, etc.

- Similar to Human Interface Languages, Computer Programming Languages are also made of several elements.
- These basic elements include –

Programming Environment	Basic Syntax
Data Types	Variables
Keywords	Basic Operators
Decision Making	Loops
Numbers	Characters
Arrays	Strings
Functions	File I/O

Let's watch a video first!!!

Computer Science Basics: Programming Languages
Computer Science Basics: Programming Languages - YouTube

What is Programming Environment?

Programming Environment

Environment Setup

- a base on top of which we can do our programming.
- Thus, we need to have the required software setup, i.e., installation on our PC which will be used to write computer programs, compile, and execute them.

Programming Environment

- A text editor to create computer programs.
- A compiler to compile the programs into binary format.
- An interpreter to execute the programs directly.
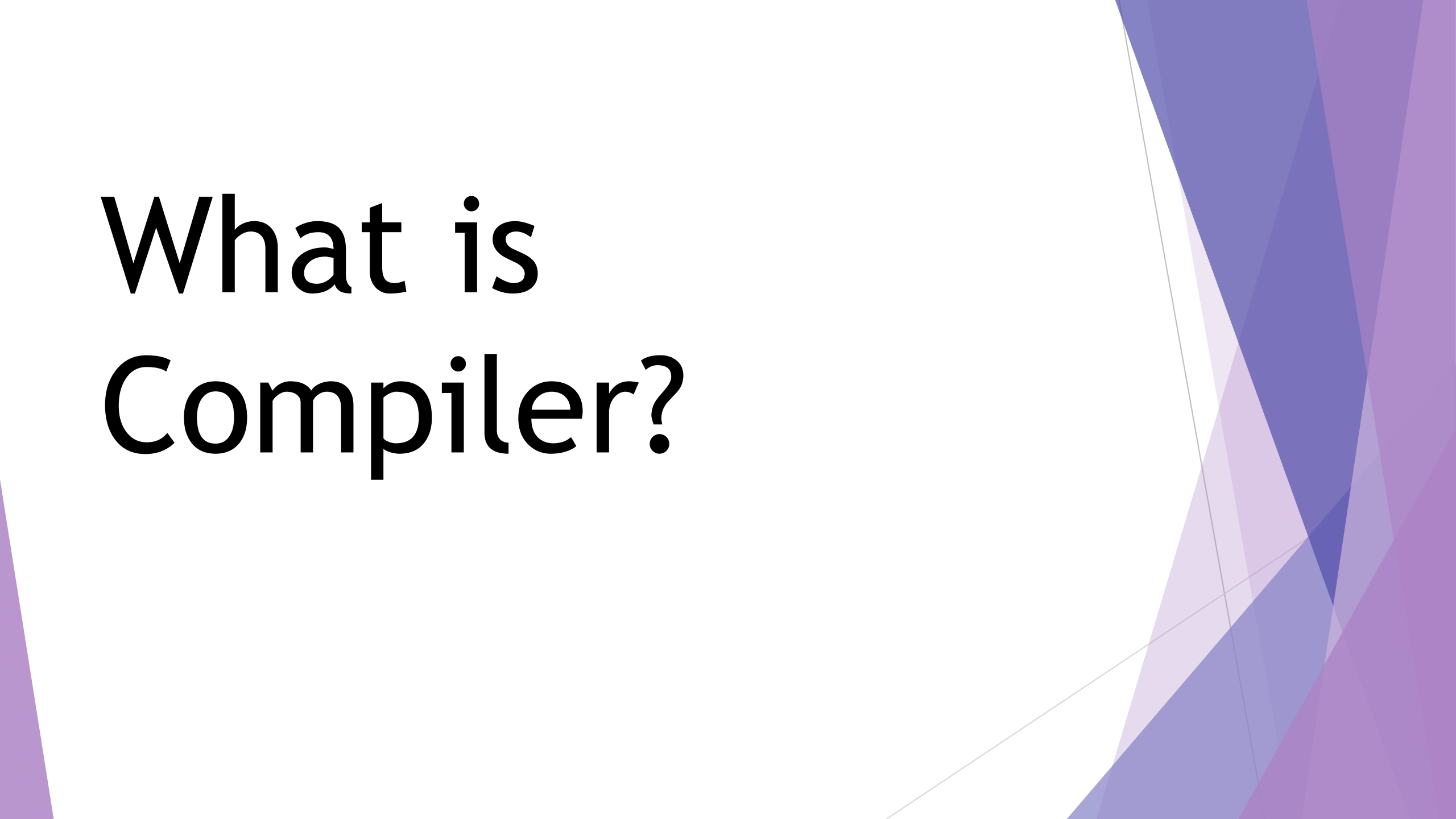
What is Text Editor?

Text Editor

- A text editor is a software that is used to write computer programs.

Example: Notepad, which can be used to type programs.

Write your computer program using your favorite programming language and save it in a text file called the program file.

What is Compiler?

The computer cannot understand your program directly given in the text format, so we need to convert this program in a binary format, which can be understood by the computer.

Compiler

- The conversion from text program to binary file is done by another software called Compiler and this process of conversion from text formatted program to binary format file is called program compilation.

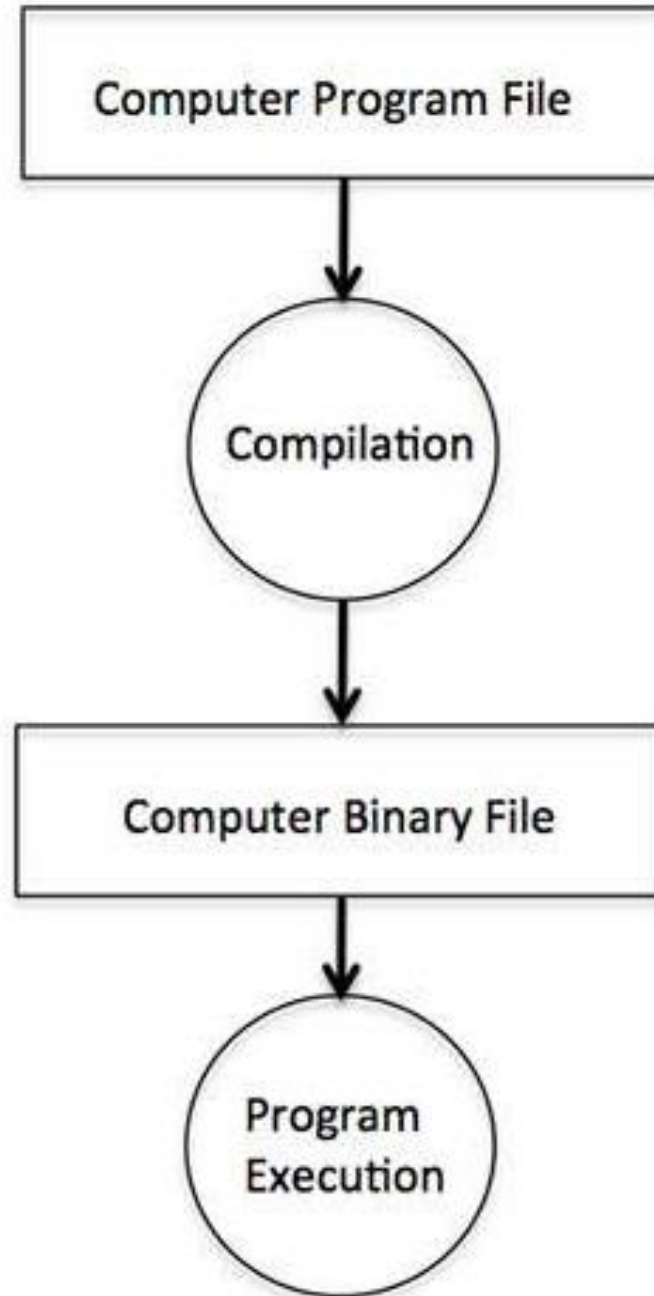Code::Blo...   Dev-C++   Microsoft Visual Studio   Microsoft Visual C++   Borland C++   Anjuta

Compiler

```
┌─────────────────────────────┐
│   Computer Program File      │
└─────────────────────────────┘
              │
              ▼
        ╭───────────╮
        │ Compilation │
        ╰───────────╯
              │
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┌─────────────────────────────┐
│   Computer Binary File       │
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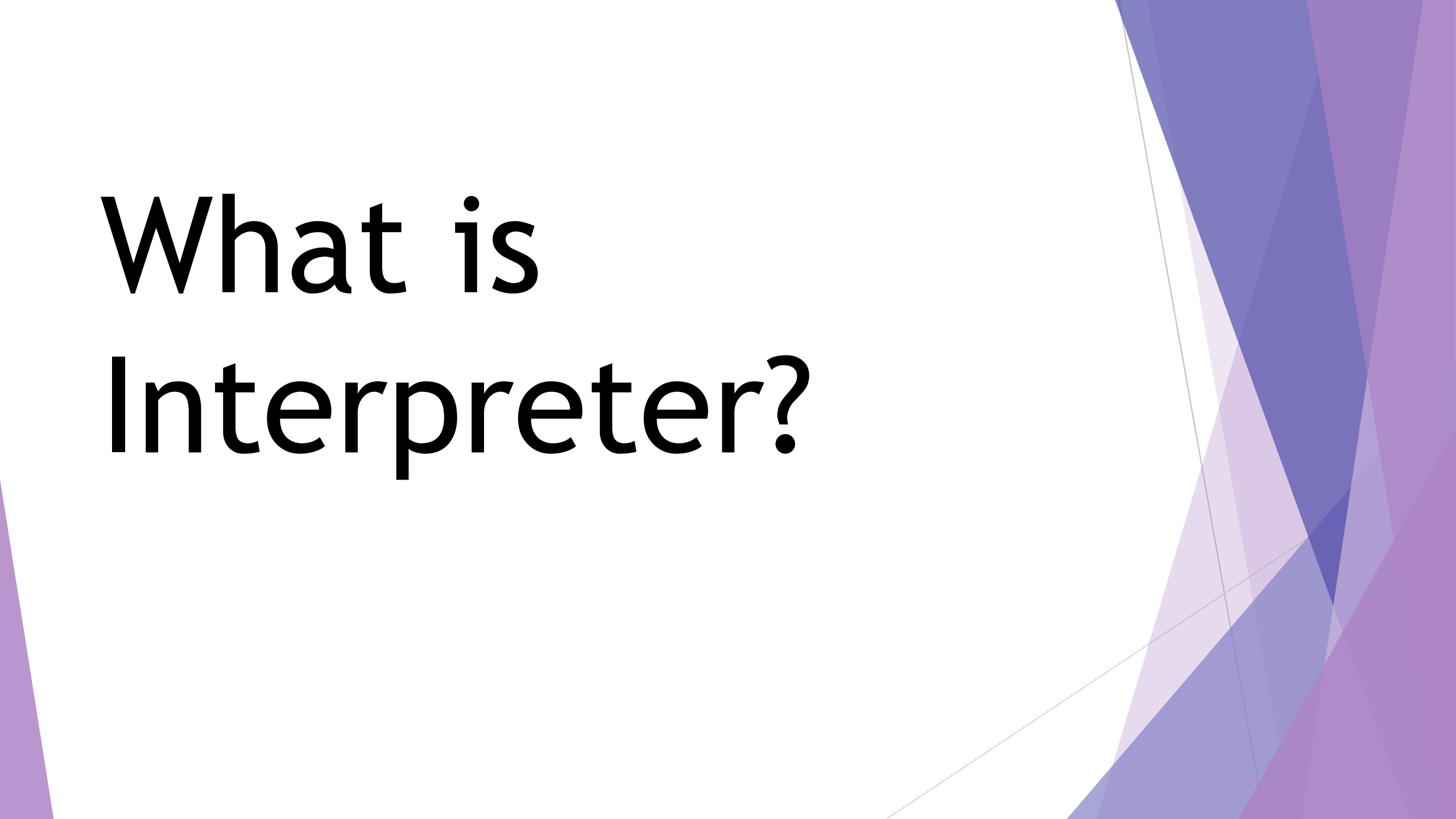
Compilers are required in case you are going to write your program in a programming language that needs to be compiled into binary format before its execution.
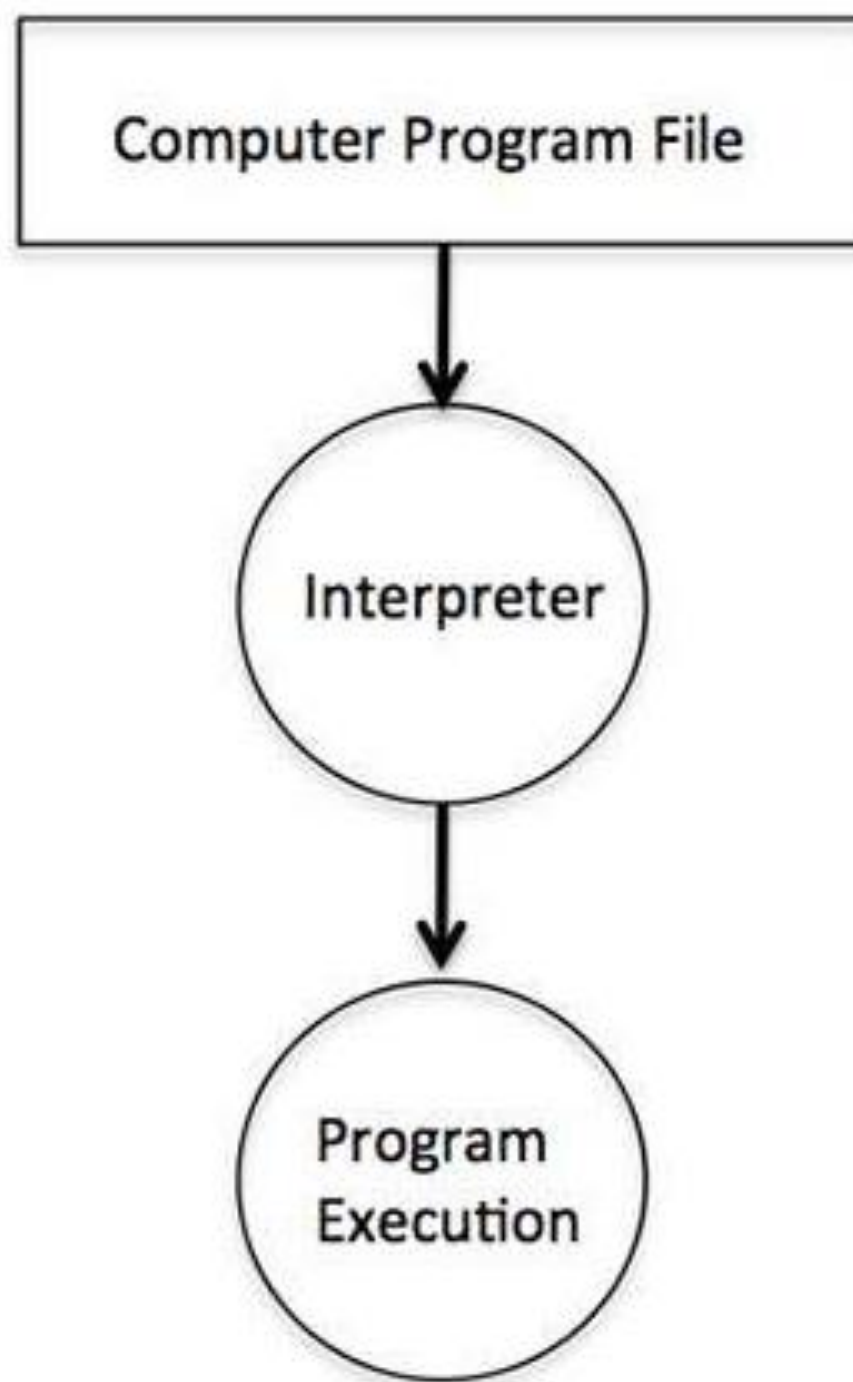
What is Interpreter?

Interpreter

- an interpreter can be used to read such programs line by line and execute them directly without any further conversion. PHP, Python, Perl etc.

Computer Program File

Interpreter

Program Execution

Online Compilation

- GDB online Debugger | Compiler - Code, Compile, Run, Debug online C, C++ (onlinegdb.com)
- C, C++, Java, Python, PHP Online IDE and Compliers - Coding Ground (tutorialspoint.com)

Topics

- Basic Elements of Programming
- Programming Structure
- Programming Environments
- **Programming Languages**
- Python

Programming Languages

- [Top Programming Languages and Their Uses - Kdnuggets](#)
- [Quick Guide to Top Coding Languages 2023 | What to Learn, Why, and How (computerscience.org)](#)

Topics

➢ Basic Elements of Programming

➢ Programming Structure

➢ Programming Environments

➢ Programming Languages

➢ **Python**

What is Python?

Python

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:
- web development (server-side),
- software development,
- mathematics,
- system scripting.

What can Python do?

What can Python do?

- ➢ used on a server to create web applications.
- ➢ used alongside software to create workflows.
- ➢ connect to database systems. It can also read and modify files.
- ➢ used to handle big data and perform complex mathematics.
- ➢ used for rapid prototyping, or for production-ready software development.

Why Python?

Why Python?

➢ works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
➢ a simple syntax similar to the English language.
➢ syntax that allows developers to write programs with fewer lines than some other programming languages.
➢ runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
➢ treated in a procedural way, an object-oriented way or a functional way.

Python Syntax compared to other programming languages

Python Syntax compared to other programming languages

➢ Python was designed for readability, and has some similarities to the English language with influence from mathematics.

➢ Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.

➢ Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

Any questions???

REFERENCES:

➢ 5 Basic Elements of Programming. (2021). https://www.assignmenthelp.net/assignment_help/elements-of-programming

➢ Busbee and Braunschweig. (n.d.). Structured Programming. https://press.rebus.community/programmingfundamentals/chapter/structured-programming/

➢ Computer Programming Tutorial. (n.d.). https://www.tutorialspoint.com/computer_programming/index.htm

➢ Costa, C. (2022). Top Programming Languages and Their Uses. https://www.kdnuggets.com/2021/05/top-programming-languages.html

➢ Python Introduction. (n.d.). https://www.w3schools.com/python/python_intro.asp

➢ Simmons, L. (2023). 2023 Guide to the Top 12 Coding Languages. https://www.computerscience.org/resources/computer-programming-languages/