Welcome to Python Programming

In this class we hope to fulfil every requirement that sets you off real good as a python programmer

Programming in Python

Topics to consider for Python Programming:

- Python Introduction
- Data Structures and Algorithms
- Operators and Arithmetics
- Commenting In Python
- Control Flow
- Python Membership
- Concatenation
- File Handling
- Functional Programming
- Inheritance
- Encapsulation
- Python Libraries
- Error Handling

Learning Objectives

At the end of the course, you should be able to explain to anyone, without the help of google;

- Understand the fundamentals of Python programming language, including its syntax, features, and applications.
- Identify and utilize different data types such as integers, floats, strings, lists, tuples, dictionaries, and sets.
- Learn how to use operators for arithmetic operations, comparison, logical operations, and string concatenation.
- Master control flow statements such as if-elif-else for decision-making, and for and while loops for iteration.
- Understand the concept of concatenation and apply it to combine strings and other data structures.
- Learn how to read from and write to files, and manipulate file objects using Python's file handling mechanisms.
- Gain an understanding of functional programming concepts and how to write functions, pass arguments, and return values.
- Explore the concept of inheritance in object-oriented programming and learn how to create and use subclasses.
- Understand the principles of encapsulation and how to implement them in Python classes for data hiding and abstraction.
- Familiarize yourself with commonly used Python libraries for data analysis, visualization, web development, and other domains, and learn how to leverage them in your projects.
- Master error handling techniques such as try-except blocks to gracefully handle exceptions and ensure robustness in your Python programs.

Famous Quote

With python programming, you don’t have to reinvent the wheel. You write once and use many times

Python Introduction

Python is a versatile high level language available in multiple platforms. Areas python is used includes:

1) Web Development
2) Data Analysis/Machine Learning
3) Automation/Shell Scripting
4) Business Forecasting
5) Cyber Security etc.

History of Programming

Charles Barbage at cambridge 1802 was working on calculating devices which at the time was used by ships on sea. Barbage solution to different errors in human calculating was the invention of a difference engine. Difference Engine used mechanical gears with numbers 0-9.

Analytical Engine:

Computer convert decimal codes to binary. They represent the binary codes by using tiny electro conductors called transistors. These transistors are housed in the CPU which is the brain of computer.

Python Introduction

Programming is the ability to provide the computer with a set of instructions in a particular language that it can understand and perform these operation and tasks.

Programming is a creative skill because you can write computer programs to solve problems in different ways. Python works on different platforms. It was designed to be readable ad takes alot of similarities between english language and mathematics. Since it's released, it has gained popularity and supports in frameworks and libraries. Python learns well t the philosophy of write less and do more. Any amount of white space or indentation is fine in python but if you are combining with additional line, then you need clear indicators showing new lines. For example:

```
X = 1 +                    2

X 3

print(x)
```

Output will be 3

Integrated Development Environment

Environment generally in programming provides a cyber-space which allows developers to effectively write, structure and run their codes. There are basically different kinds of environment each environment is based on it's purpose. Examples of environments in programming includes:

System Environment: This is a kind of environment that is inbuilt in a particular Operating System. It contains all the dependencies, libraries, tools necessary to keep an operation system continually function.

Virtual Environment: This is a kind of environment that provides a space whereby developers can install and run various dependencies without it clashing with the system dependencies.

Integrated Development Environment(IDE): This is a kind of environment that enables developers to write, run, and build their codes effectively. These kinds of environment very useful because it equips developers with necessary tools required during development. Some IDE have marketplace whereby developers can effectively purchase various dependencies that can be effective when developing a code project. Examples of IDEs are Virtual Studio, VSCode, Bracket, Sublime Text etc.

Since IDEs are used for writing, developing and building codes, it is widely used, and because vscode provides multiple tools that enables developers to effectively get their codes running, vscode will be chosen for this lecture.

Setting Up VSCode and Python

To set up vscode, we will navigate to code.studio.org, then select the code according to your operating system, then you download it. After downloading, navigate to python.org, click on your operating system and download a version for your operating system. After download, ensure to add python to system environment path, this enables you to effectively run python codes at when due. After this process, your python is up and ready.

Data Structures And Algorithms

Data Structures: It can be seen as how data types are being arranged and utilized in programming while algorithms talks about combinations of various data structures and logics arranged in a semantic way that forms a program. This program is then executed based on the logic and data structure utilized.

With data structures, we consider data types, and these data types will be studied closely during the length of this study. Lets consider data types, data types in simple term is an attribute associated with the piece of data that tells the computer systems how to interpret it's values. Knowing what data to use ensures data is collected in preferred format. It also ensures the value of each property is as expected.

Types of Data Types:

Numeric: Numeric is a kind of data type that is represent with whole numbers as their values being stored in a variable. The types of numerics used in python includes:

Int: They are also known as integers and they are whole numbers.

Floats: They contain decimals and are represented by float class.

Complex Numbers: These are classes used to represent numbers made up of real and imaginary number.