PIAIC Sunday Class 04 - Bahria Auditorium - 18th August 2024

1. Software Defined Networking (SDN)

- SDN stands for Software Defined Networking. It's a method of managing networks that uses software to control the hardware, allowing for more flexible and efficient network management.

2. Python as an Interface Language

- Python is commonly used as an interface language, meaning it serves as a bridge between different systems, allowing them to communicate effectively. It's versatile and used in various domains.

3. Applications of Python

- *Web Development*: Python is widely used to create websites, often with the help of frameworks like Django.

- Desktop Applications: Python is also utilized for developing desktop applications.

- *Command Line Interface (CLI):* Python is capable of creating CLI tools, which allow users to interact with programs through text commands.

- *Cloud Toolkits:* Python can be used to develop toolkits for managing cloud-based services and infrastructures.

- *User-Friendly Language*: Python is known for its easy-to-read syntax, making it an accessible language for beginners and experts alike.

4. FastAPI

- FastAPI is a modern web framework for building APIs with Python. It's fast, easy to use, and supports asynchronous programming, which is crucial for high-performance applications.

5. Creating Interfaces

- HTML, CSS, JavaScript, JSON: These are essential technologies used for creating user interfaces on the web. Python can be integrated with these technologies to create dynamic web applications.

- ***Streamlit***: This is a Python library that allows you to create custom web apps for machine learning and data science projects easily.

6. Large Language Models (LLMs) and Deep Learning

- *LLMs* are advanced AI models built using deep learning techniques. They are capable of understanding and generating human-like text.

- *Meta and PyTorch*: Meta (formerly Facebook) developed PyTorch, a popular deep learning framework. The note "meta > pytorch" suggests that Meta is a significant contributor to PyTorch's development.

- *Python as the Default Language for AI*: Python is the go-to programming language for artificial intelligence (AI) due to its simplicity and the vast ecosystem of AI libraries and frameworks.

7. The Zen of Python

- The Zen of Python is a collection of guiding principles for writing Python code. It emphasizes simplicity, readability, and elegance in code design.

8. Compiler vs. Interpreter

- *Compiler*: A compiler translates the entire program's source code into binary code (machine code) before running it. This process is done all at once.

- *Interpreter*: An interpreter translates and executes the code line by line, converting it to binary as it goes. Python is an interpreted language, meaning it executes code line by line, making it easier to test and debug.

9. Hello World in Python

- *Google Colab*: This is a free cloud service provided by Google that allows you to write and run Python code in a browser, especially useful for machine learning and data science.

- Writing 'Hello World' in Python Using VS Code:

```
# app.py

print("Hello, World!")
```

10. Creating a Dockerfile

- *Dockerfile*: A script that contains a series of instructions to build a Docker image, which is a packaged environment that includes everything needed to run a specific application.

- Explanation of the Dockerfile Code:

- FROM python:3.9-slim: This line tells Docker to use an official Python 3.9 image (a lightweight version) as the base for your container.

- WORKDIR /app: Sets the working directory inside the container to `/app`.

- COPY . /app: Copies all the files from your current directory on your machine to the `/app` directory in the container.

- CMD ["python", "app.py"]: This command tells Docker to run `app.py` using Python whenever the container is launched.

11. Building and Running the Docker Image

- *Building the Docker Image*:

- *Command*: `docker build -t hello-world-app .`

- This command builds the Docker image and tags it as `hello-world-app`.

- Running the Docker Container:

- Command: `docker run hello-world-app`

- This command runs a container from the `hello-world-app` image. The result will display "Hello, World!" in the terminal.