

Assignment Title: Introduction to Programming and Tools

Part 1: Introduction to Programming

1. What is programming?

Programming is the process of writing instructions for a computer to follow. These instructions, written in programming languages, tell the computer how to perform specific tasks.

2. Why is programming important in today's world?

Programming is essential today because it powers nearly all modern technology. From mobile apps to websites and automation tools, programming helps create software that solves problems, improves productivity, and connects the world.

3. List at least 3 real-life applications of programming.

- **Mobile apps:** Apps like WhatsApp and Instagram are built with programming.
- **Banking systems:** ATM operations and online banking depend on code.
- **Healthcare:** Software for medical imaging or patient records uses programming.

4. What are programming languages? Mention at least 5 popular languages and one use case for each.

Programming languages are tools developers use to write code.

- **Python** – Used in data science and automation.
- **Java** – Used for building Android applications.
- **JavaScript** – Powers interactive features on websites.
- **C++** – Common in game development and system software.
- **PHP** – Often used for server-side web development (e.g., WordPress).

Part 2: Introduction to Python

1. What is Python?

Python is a high-level, general-purpose programming language known for its simplicity and readability. It is widely used for automation, data analysis, and web development.

2. Who developed Python and when?

Python was created by **Guido van Rossum** and was first released in **1991**.

3. What are the main features of Python?

- Easy to read and write
- Open-source and free to use
- Large community and library support
- Portable across platforms
- Supports object-oriented and procedural programming

4. Mention at least 3 areas where Python is widely used:

- **Data Science**
- **Web Development**
- **Machine Learning**

5. What makes Python a beginner-friendly language?

Python has a simple and clean syntax that is easy to understand. It reads like English, which makes it perfect for beginners who are new to coding.

Part 3: Python IDEs

1. What is an IDE (Integrated Development Environment)?

An IDE is a software application that provides tools like a code editor, debugger, and compiler to help programmers write and test their code efficiently.

2. List at least 3 popular IDEs or code editors used for Python development:

- **PyCharm**
- **VS Code** (Visual Studio Code)
- **Jupyter Notebook**

3. Mention one advantage and one disadvantage of each IDE:

IDE	Advantage	Disadvantage
PyCharm	Smart code completion and debugging tools	Can be heavy on system resources

IDE	Advantage	Disadvantage
VS Code	Lightweight and supports many languages	Needs extensions for some features
Jupyter Notebook	Great for data analysis and visualization	Not ideal for building full software apps

Part 4: Git and GitHub

1. What is Git?

Git is a version control system that helps developers track changes in their code over time.

2. Why do developers use Git?

Developers use Git to manage their code, revert to previous versions, and collaborate with others without overwriting each other's work.

3. What is GitHub?

GitHub is a web-based platform where developers can store and share their Git repositories online.

4. What is the difference between Git and GitHub?

- **Git** is the tool for version control.
- **GitHub** is a hosting service for Git repositories.

5. How does GitHub help in collaboration?

GitHub allows multiple developers to work on the same project by using features like pull requests, issue tracking, and branching, making team collaboration easier.

6. What is version control and why is it important in software development?

Version control is the practice of tracking and managing changes to code. It is important because it allows developers to experiment, fix bugs, and work in teams without losing previous work or causing conflicts.

Part 5: Introduction to Google Colab

1. What is Google Colab?

Google Colab is a free cloud-based coding environment that allows users to write and run Python code in a web browser.

2. How is Google Colab different from other IDEs?

Unlike traditional IDEs that run locally, Google Colab runs entirely in the cloud and doesn't require installation. It can be accessed from anywhere using a browser.

3. What are its key features?

- Free access to GPUs and TPUs
- No installation needed
- Real-time collaboration
- Saves work directly to Google Drive
- Supports Markdown and code cells

4. What are the common use cases of Google Colab, especially in machine learning or data analysis?

Google Colab is widely used in:

- **Machine Learning model training**
 - **Data cleaning and analysis**
 - **Natural Language Processing (NLP)**
 - **Deep Learning experiments using TensorFlow or PyTorch**
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