**Python Basics Notes**

* **What is Python?**
  + **Python is a high-level, interpreted programming language known for its readability and simplicity.**
  + **It supports multiple programming paradigms, including procedural, object-oriented, and functional programming.**
* **Installation**
  + **Download from the official website:** [**python.org**](https://www.python.org/)
  + **Use package managers like**

**pip**

**to install additional libraries.**

* **Comments**
  + **Single-line comments:**

**# This is a comment**

* + **Multi-line comments:**
  + **"""**
  + **This is a**
  + **multi-line comment**
  + **"""**
* **Variables and Data Types**
  + **Variables are created by assignment:**

**x = 5**

* + **Common data types:**
    - **Integers:**

**int**

* + - **Floating-point numbers:**

**float**

* + - **Strings:**

**str**

* + - **Booleans:**

**bool**

**Example:**

**name = "Alice"**

**age = 30**

**is\_student = True**

* **Lists**
  + **Ordered, mutable collections of items.**

**Example:**

**fruits = ["apple", "banana", "cherry"]**

**fruits.append("orange") # Add an item**

* **Tuples**
  + **Ordered, immutable collections of items.**

**Example:**

**coordinates = (10.0, 20.0)**

* **Dictionaries**
  + **Unordered collections of key-value pairs.**

**Example:**

**person = {"name": "Alice", "age": 30}**

**print(person["name"]) # Access value by key**

* **Sets**
  + **Unordered collections of unique items.**

**Example:**

**unique\_numbers = {1, 2, 3, 3, 4} # {1, 2, 3, 4}**

* **Conditional Statements**

**Example:**

**if age >= 18:**

**print("Adult")**

**else:**

**print("Minor")**

* **Loops**
  + **For Loop**

**Example:**

**for fruit in fruits:**

**print(fruit)**

* **While Loop**

**Example:**

**count = 0**

**while count < 5:**

**print(count)**

**count += 1**

* **Defining Functions**

**Example:**

**def greet(name):**

**return f"Hello, {name}!"**

**print(greet("Alice"))**

* **Lambda Functions**
  + **Anonymous functions defined with the**

**lambda**

**keyword.**

**Example:**

**add = lambda x, y: x + y**

**print(add(5, 3))**

* **Try and Except Blocks**

**Example:**

**try:**

**result = 10 / 0**

**except ZeroDivisionError:**

**print("Cannot divide by zero!")**

* **Reading and Writing Files**

**Example:**

**# Writing to a file**

**with open("example.txt", "w") as file:**

**file.write("Hello, World!")**

**# Reading from a file**

**with open("example.txt", "r") as file:**

**content = file.read()**

**print(content)**

* **Importing Modules**

**Example:**

**import math**

**print(math.sqrt(16)) # Output: 4.0**

* **Using External Libraries**
  + **Install libraries using**

**pip**

**, e.g.,**

**pip install numpy**

**.**

* **Classes and Objects**

**Example:**

**class Dog:**

**def \_\_init\_\_(self, name):**

**self.name = name**

**def bark(self):**

**return "Woof!"**

**my\_dog = Dog("Buddy")**

**print(my\_dog.bark())**

* **Python is versatile and widely used in various fields, including web development, data analysis, artificial intelligence, and more.**
* **Practice is key to mastering Python. Utilize online resources, tutorials, and projects to enhance your skills.**