**Practice Sheet 1: Computer Fundamentals & Data Conversion**

* Types of Programming Languages
* Interpreters vs Compilers
* File extensions: .png, .jpg, .csv, .txt, .py, .ipynb etc.
* Data types : int(), float(), str(), bool(), etc.
* Number systems: Binary, Decimal, Hexadecimal, Octal
* ASCII & Unicode
* Type Casting

**Practice Sheet 2: Python Basics & Operators**

* Python installation & syntax
* Python IDE’s like Jupyter Notebook, Spyder, VS Code, PyCharm
* Virtual Environment in Python
* Variables and Keywords
* Data types overview
* Operators: Arithmetic, Relational, Logical, Assignment, Membership, Identity
* input() and print()
* Comments and indentation

**Practice Sheet 3: Strings & Console I/O**

* String creation and methods (upper(), lower(), find(), replace(), slicing, etc.)
* String formatting: f-strings, .format()
* Escape characters and raw strings
* Taking formatted input
* I/O using input() and print()

**Practice Sheet 4: Control Flow (If, Loops)**

* Conditional statements: if, if-else, elif
* Loops: for, while
* break, continue, pass
* range() function
* Nested loops
* Simple pattern printing

**Practice Sheet 5: Lists and Tuples**

* List operations and methods
* Nested lists
* Tuples and immutability
* Tuple unpacking
* Memory representation: list vs tuple
* List comprehension

**Practice Sheet 6: Sets and Dictionaries**

* Set operations: union, intersection, difference
* Set methods
* Dictionary creation, access, and methods
* Looping through dictionaries
* Nested dictionaries
* get(), setdefault(), fromkeys() methods

**Practice Sheet 7: Comprehensions, Memory & Copying**

* List, Set, Dictionary comprehensions
* Shallow Copy vs Deep Copy
  + Using copy() and deepcopy()
  + is vs ==
* Memory allocation: id(), mutability
* del statement

**Practice Sheet 8: Functions and Recursion**

* Defining functions
* Parameters and return values
* Default & keyword arguments
* Variable-length arguments: \*args, \*\*kwargs
* Scope: local vs global
* Recursion basics and examples

**Practice Sheet 9: Functional Programming & Modules**

* map(), filter(), reduce()
* lambda expressions
* Introduction to Python Libraries like numpy, pandas, matplotlib
* Importing modules: import, from
* Built-in modules: math, random, datetime
* Writing your own module

**Practice Sheet 10: OOP in Python**

* Classes and Objects
* \_\_init\_\_ method
* Self and instance attributes
* Encapsulation and abstraction
* Inheritance (single, multiple)
* Method overriding
* Composition

**Practice Sheet 11: File I/O & UNIX Commands**

* File handling: open(), read(), write(), close()
* File modes: r, w, a, rb, etc.
* Exception handling: try, except, finally, raise
* **UNIX topics:**
  + Basic commands: ls, cd, pwd, mkdir, rm, touch, cat
  + File permissions: chmod, chown
  + Piping & redirection
  + Navigating folders and environment variables

**Practice Sheet 12: Copilot and LLMs for Coding**

* Use of Copilot and AI
* What are LLMs?
* How to give prompts to perform any task?
* Algebra and Numerical Analysis (Use of Automatic Differentiation, integration, etc)
* System of linear equations – code of Gaussian Elimination

## Practice Sheet 1

Write Python code for each question given below :

Level 1 :

1)

2)

3)

4)

5)

Level 2 :

1)

2)

3)

4)

5)

Level 3 :

1)

2)

3)

4)

5)