Python Learning Summary: From Zero to Core Mastery

1. Setup & Hello World - Installed Python, set up virtual environment in PyCharm - Created and ran your first main.py with print("Hello World") - Understood Python’s clean syntax and dynamic typing model

2. Variables & Data Types - No need for type declarations (like int, String) - Learned types: int, float, str, bool, None - Used type() to inspect variables - Understood Python's dynamic and loosely typed behavior

3. Input & Output - Used input() to get user input (always returns str) - Converted input to int, float using int(), float() - Used print() and f-strings for clean, readable output

4. Operators & Expressions - Arithmetic: +, -, *, /, %, ** - Comparison: ==, !=, <, >, <=, >= - Logical: and, or, not - Assignment: =, +=, -= etc.

5. Conditional Statements - Python if, elif, else syntax (no parentheses, no curly braces) - Nested conditions - Used for decision-making logic (e.g., age check, password validation)

6. Loops - for loop with range() for known iterations - while loop for conditional repetition - Used break, continue for control - Built loops for summing numbers, factorial, tables

7. Functions - Defined functions using def - Parameters and return statements - Default and keyword arguments - Reusability and modular code (like Java methods)

8. Data Structures - list: Ordered, mutable (ArrayList) - tuple: Ordered, immutable (List.of()) - set: Unordered, unique (HashSet) - dict: Key-value pairs (HashMap) - Practiced slicing, set ops, dictionary key/value logic

9. String Manipulation - Methods: .lower(), .upper(), .strip(), .replace() - Slicing and reversing: text[::-1] - Formatting using f"{}" strings - Palindrome check, vowel counter

10. Exception Handling - try, except, else, finally - Caught errors like ValueError, ZeroDivisionError - Wrote crash-proof input code

11. Modules & Imports - Used built-in modules (math, random) - Created and used your own module - import, from, as

12. File I/O - Opened, read, wrote files using open() and with - Read line-by-line with .strip() - Modes: 'r', 'w', 'a' - Handled FileNotFoundError

Completion Level: 100% Python Core Mastery - Full CLI-capable Python skillset - Ready for AI/ML, data science, and automation projects