**LAB ASSIGNMENT-01**

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**Batch – 04 (DS)**

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| **Q.No.** | **Question** |
| 1 | Lab 1: Environment Setup – GitHub Copilot and VS Code Integration  **Lab Objectives:**   * To install and configure GitHub Copilot in Visual Studio Code. * To explore AI-assisted code generation using GitHub Copilot. * To analyze the accuracy and effectiveness of Copilot's code suggestions. * To understand prompt-based programming using comments and code context   **Lab Outcomes (LOs):**  After completing this lab, students will be able to:   * Set up GitHub Copilot in VS Code successfully. * Use inline comments and context to generate code with Copilot. * Evaluate AI-generated code for correctness and readability. * Compare code suggestions based on different prompts and programming styles.   Task 0   * Install and configure GitHub Copilot in VS Code. Take screenshots of each step.   Expected Output   * Install and configure GitHub Copilot in VS Code. Take screenshots of each step. * A screenshot of a computer    AI-generated content may be incorrect.   Task 1: Factorial without Functions   * Description: Use GitHub Copilot to generate a Python program that calculates the factorial of a number without defining any functions (using loops directly in the main code). * Expected Output:   + A working program that correctly calculates the factorial for user-provided input.   + Screenshots of the code generation process.   + A screenshot of a computer      AI-generated content may be incorrect.   Task 2: Improving Efficiency   * Description: Examine the Copilot-generated code from Task 1 and demonstrate how its efficiency can be improved (e.g., removing unnecessary variables, optimizing loops). * Expected Output:   + Original and improved versions of the code.   + Explanation of how the improvements enhance performance.   + A screenshot of a computer      AI-generated content may be incorrect.   Task 3: Factorial with Functions   * Description: Use GitHub Copilot to generate a Python program that calculates the factorial of a number using a user-defined function. * Expected Output:   + Correctly working factorial function with sample outputs.   + Documentation of the steps Copilot followed to generate the function.   + A screenshot of a computer      AI-generated content may be incorrect.   Task 4: Comparative Analysis – With vs Without Functions   * Description: Differentiate between the Copilot-generated factorial program with functions and without functions in terms of logic, reusability, and execution. * Expected Output:   + A comparison table or short report explaining the differences.   + A screenshot of a computer      AI-generated content may be incorrect.   Task 5: Iterative vs Recursive Factorial   * Description: Prompt GitHub Copilot to generate both iterative and recursive versions of the factorial function. * Expected Output:   + Two correct implementations.   + A documented comparison of logic, performance, and execution flow between iterative and recursive approaches.   + A screenshot of a computer      AI-generated content may be incorrect.   **Submission Requirements**   1. Generate code for each task with comments. 2. Screenshots of Copilot suggestions. 3. Comparative analysis reports (Task 4 and Task 5). 4. Sample inputs/outputs demonstrating correctness.   **Note: Report should be submitted a word document for all tasks in a single document with prompts, comments & code explanation, and output and if required, screenshots**  **Evaluation Criteria:**   | **Criteria** | **Max Marks** | | --- | --- | | Successful Setup of Copilot | 0.5 | | Comparative Analysis – With vs Without Functions | 1 | | Iterative vs Recursive Factorial | 1 | | **Total** | **2.5 Marks** | |