**Name:** Karabi Mandal **Assignment:** 1.2 **Roll:** 2303A51620 **Batch**:25

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| **SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE** | | | | | **DEPARTMENT OF COMPUTER SCIENCE ENGINEERING** | | | | |
| **Program Name:** B. Tech | | | | **Assignment Type: Lab** | | | **Academic Year:**2025-2026 | | |
| **Course Coordinator Name** | | | | Dr. Rishabh Mittal | | | | | |
| **Instructor(s) Name** | | | | |  | | --- | | Mr. S Naresh Kumar | | Ms. B. Swathi | | Dr. Sasanko Shekhar Gantayat | | Mr. Md Sallauddin | | Dr. Mathivanan | | Mr. Y Srikanth | | Ms. N Shilpa | | Dr. Rishabh Mittal (Coordinator) | | Dr. R. Prashant Kumar | | Mr. Ankushavali MD | | Mr. B Viswanath | | Ms. Rapelly Nandini | | Ms. A. Anitha | | Ms. M.Madhuri | | Ms. Katherashala Swetha | | Ms. Velpula sumalatha | | Mr. Bingi Raju | | | | | | |
| **CourseCode** | | | 23CS002PC304 | **Course Title** | | AI Assisted Coding | | | |
| **Year/Sem** | | | III/II | **Regulation** | | R23 | | | |
| **Date and Day**  **of Assignment** | | | **Week1 - Tuesday** | **Time(s)** | | 23CSBTB01 To 23CSBTB52 | | | |
| **Duration** | | | 2 Hours | **Applicable to**  **Batches** | | All batches | | | |
| **Assignment Number:1.2**(Present assignment number)/**24**(Total number of assignments) | | | | | | | | | |
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|  | **Q.No.** | **Question** | | | | | | ***Expected Time***  ***to complete*** |  |
|  | 1 | Lab 1: Environment Setup – *GitHub Copilot and VS Code Integration + Understanding AI-assisted Coding Workflow*  **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.   Task 1: AI-Generated Logic Without Modularization (Factorial without Functions)   * **Scenario**   You are building a **small command-line utility** for a startup intern onboarding task. The program is simple and must be written quickly without modular design.   * **Task Description**   Use GitHub Copilot to generate a Python program that computes a mathematical product-based value (factorial-like logic) directly in the main execution flow, without using any user-defined functions.   * **Constraint:**   + Do not define any custom function   + Logic must be implemented using loops and variables only * **Expected Deliverables**   + A working Python program generated with Copilot assistance   + Screenshot(s) showing:   + The prompt you typed   + Copilot’s suggestions   + Sample input/output screenshots   + Brief reflection (5–6 lines):   + How helpful was Copilot for a beginner?   + Did it follow best practices automatically?   **PROMPT:-** Generate a Python program that calculates the factorial of a number using only loops and variables without defining any functions**.**  **Explaination:-** This program calculates the factorial of a number without using any custom functions. The entire logic is written directly in the main code. It uses a loop to multiply numbers from 1 up to the given number, storing the result in a variable. Finally, it prints the computed factorial**.**    Task 2: AI Code Optimization & Cleanup (Improving Efficiency)   * **Scenario**   Your team lead asks you to **review AI-generated code** before committing it to a shared repository.   * **Task Description**   Analyze the code generated in **Task 1** and use Copilot again to:   * + Reduce unnecessary variables   + Improve loop clarity   + Enhance readability and efficiency   Hint: Prompt Copilot with phrases like *“optimize this code”*, *“simplify logic”*, or *“make it more readable”*   * **Expected Deliverables**   + Original AI-generated code   + Optimized version of the same code   + Side-by-side comparison   + Written explanation:     - What was improved?     - Why the new version is better (readability, performance, maintainability.   **PROMPT:** Optimize this Python code by simplifying variables and improving loop clarity and readability.  **Explaination**: The optimized version removes unnecessary variables, replaces the while-loop with a more readable for-loop, and uses cleaner multiplication syntax.  Task 3: Modular Design Using AI Assistance (Factorial with Functions)   * **Scenario**   The same logic now needs to be reused in **multiple scripts**.   * **Task Description**   Use GitHub Copilot to generate a **modular version** of the program by:   * + Creating a **user-defined function**   + Calling the function from the main block * **Constraints**   + Use meaningful function and variable names   + Include inline comments (preferably suggested by Copilot) * **Expected Deliverables**   + AI-assisted function-based program   + Screenshots showing:   + Prompt evolution   + Copilot-generated function logic   + Sample inputs/outputs   + Short note:   + How modularity improves reusability.   **PROMPT:** Generate a Python program that calculates factorial using a user-defined function with meaningful variable names and inline comments**.**  **Explaination:** Modularity improves reusability because the factorial logic is placed inside a function, which can be called multiple times in different programs without rewriting the code.    Task 4: Comparative Analysis – Procedural vs Modular AI Code (With vs Without Functions)   * **Scenario**   As part of a **code review meeting**, you are asked to justify design choices.   * **Task Description**   Compare the **non-function** and **function-based** Copilot-generated programs on the following criteria:   * + Logic clarity   + Reusability   + Debugging ease   + Suitability for large projects   + AI dependency risk * **Expected Deliverables**   Choose **one**:   * + A comparison table **OR**   + A short technical report (300–400 words).   **PROMPT**: Provide a comparison between non-modular and modular factorial programs in terms of clarity, reusability, debugging, and suitability for large projects.  **EXPLAINATION:** Function-based code is clearer, easier to debug, more reusable, and better suited for large projects compared to non-modular code, which becomes harder to maintain as it grows.    Task 5: AI-Generated Iterative vs Recursive Thinking   * **Scenario**   Your mentor wants to test how well AI understands different computational paradigms.   * **Task Description**   Prompt Copilot to generate:  An **iterative** version of the logic  A **recursive** version of the same logic   * **Constraints**   Both implementations must produce identical outputs  Students must **not manually write the code first**   * **Expected Deliverables**   Two AI-generated implementations  Execution flow explanation (in your own words)  Comparison covering:   * + Readability   + Stack usage   + Performance implications   + When recursion is *not* recommended.   **PROMPT:** Generate both iterative and recursive versions of a factorial program in Python, ensuring both give the same output.  E**XPLAINATION**: The iterative version uses a loop to calculate the factorial step-by-step, while the recursive version repeatedly calls itself until reaching the base case. Iteration is more memory-efficient because recursion uses the call stack for each function call. Recursion becomes less recommended when inputs are large since it can cause stack overflow and slow performance.    **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 as a word document for all tasks in a single document with prompts, comments & code explanation, and output and if required, screenshots.** | | | | | | Week1 - Monday |  |