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|  | **Q.No.** | **Question** | ***ExpectedTime***  ***to complete*** |  |
|  | 1 | Lab 7: Error Debugging with AI – Systematic Approaches to Finding and Fixing Bugs  Lab Objectives:   * To identify and correct syntax, logic, and runtime errors in Python programs using AI tools. * To understand common programming bugs and AI-assisted debugging suggestions. * To evaluate how AI explains, detects, and fixes different types of coding errors. * To build confidence in using AI to perform structured debugging practices.   Lab Outcomes (LOs):  After completing this lab, students will be able to:   * Use AI tools to detect and correct syntax, logic, and runtime errors. * Interpret AI-suggested bug fixes and explanations. * Apply systematic debugging strategies supported by AI-generated insights. * Refactor buggy code using responsible and reliable programming patterns.   **Task Description #1:**  • Introduce a buggy Python function that calculates the factorial of a number using recursion. Use Copilot or Cursor AI to detect and fix the logical or syntax errors.    **Expected Outcome #1:**  **•**Copilot or Cursor AI correctly identifies missing base condition or incorrect recursive call and suggests a functional factorial implementation.    **Task Description #2:**  **•**Provide a list sorting function that fails due to a type error (e.g., sorting list with mixed integers and strings). Prompt AI to detect the issue and fix the code for consistent sorting**.**    **Expected Outcome #2:**  **•**AI detects the type inconsistency and either filters or converts list elements, ensuring successful sorting without a crash.    **Task Description #3:**  **•** Write a Python snippet for file handling that opens a file but forgets to close it. Ask Copilot or Cursor AI to improve it using the best practice (e.g., with open() block).  **Code1**    **Code2**    **Code3**    **Code4:**    **Expected Outcome #3:**  **•** AI refactors the code to use a context manager, preventing resource leakage and runtime warnings.     * **File one**      * **File Two**     **Task Description #4:**  **•** Provide a piece of code with a ZeroDivisionError inside a loop. Ask AI to add error handling using try-except and continue execution safely.    **Expected Outcome #4:**  **•** Copilot adds a try-except block around the risky operation, preventing crashes and printing a meaningful error message.    **Task Description #5:**  **•** Include a buggy class definition with incorrect \_\_init\_\_ parameters or attribute references. Ask AI to analyze and correct the constructor and attribute usage.  class StudentRecord:  def \_\_init\_\_(self, name, id, courses=[]):  self.studentName = names  self.student\_id = id  self.courses = courseList  def add\_course(self, course):  self.courses.append(course)  def get\_summary(self):  return f"Student: {self.studentName}, ID: {self.student\_id}, Courses: {', '.join(self.courses)}"  class Department:  def \_\_init\_\_(self, deptName, students=None):  self.dept\_name = deptName  self.students = students  def enroll\_student(self, student):  self.students.append(student)  def department\_summary(self):  return f"Department: {self.dept\_name}, Total Students: {len(self.student)}"    s1 = StudentRecord("Alice", 101, ["Math", "Science"])  d1 = Department("Computer Science")  d1.enroll\_student(s1)  print(s1.get\_summary())  print(d1.department\_summary())  **Expected Outcome #5:**  **•** Copilot identifies mismatched parameters or missing self references and rewrites the class with accurate initialization and usage. | Week4 - Thursday |  |