Name:B.NITHIIN H.No:2303A51803 Batch:26

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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. Sujitha Reddy | | Ms. A. Anitha | | Ms. M.Madhuri | | Ms. Katherashala Swetha | | Ms. Velpula sumalatha | | Mr. Bingi Raju | | Mr. G. Kranthi | | | | | | | |
| **Course Code** | | | 23CS002PC304 | **Course Title** | | AI Assisted Coding | | | |
| **Year/Sem** | | | III/I | **Regulation** | | R23 | | | |
| **Date and Day**  **of Assignment** | | | Week 4 - Thursday | **Time(s)** | | 23CSBTB01 To 23CSBTB52 | | | |
| **Duration** | | | 2 Hours | **Applicable to**  **Batches** | | All Batches | | | |
| **AssignmentNumber:8.4** (Present assignment number)/**24**(Total number of assignments) | | | | | | | | | |
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|  | **Q.No.** | **Question** | | | | | | ***ExpectedTime***  ***to complete*** |  |
|  | 1 | Lab 8: Test-Driven Development with AI – Generating and Working with Test Cases  **Lab Objectives:**   * To introduce students to test-driven development (TDD) using AI code generation tools. * To enable the generation of test cases before writing code implementations. * To reinforce the importance of testing, validation, and error handling. * To encourage writing clean and reliable code based on AI-generated test expectations.     **Lab Outcomes (LOs):**  By the end of this lab, students will be able to:   * Apply TDD methodology using AI tools. * Generate test cases before writing the actual code logic. * Validate and refactor code based on test outcomes. * Use Python’s unittest or pytest libraries for test-driven development. * Develop confidence in debugging and improving code with AI guidance. | | | | | | Week 4 |  |
|  |  | **Task 1: Developing a Utility Function Using TDD**  **Scenario**  You are working on a small utility library for a larger software system. One of the required functions should calculate the square of a given number, and correctness is critical because other modules depend on it.  **Task Description**  Following the **Test Driven Development (TDD)** approach:   1. First, write unit test cases to verify that a function correctly returns the square of a number for multiple inputs. 2. After defining the test cases, use **GitHub Copilot or Cursor AI** to generate the function implementation so that all tests pass.   Ensure that the function is written **only after** the tests are created.  **Expected Outcome**   * A separate test file and implementation file * Clearly written test cases executed before implementation * AI-assisted function implementation that passes all tests * Demonstration of the TDD cycle: *test → fail → implement → pass*   **Task 2: Email Validation for a User Registration System**  **Scenario**  You are developing the backend of a user registration system. One requirement is to validate user email addresses before storing them in the database.  **Task Description**  Apply **Test Driven Development** by:   1. Writing unit test cases that define valid and invalid email formats (e.g., missing @, missing domain, incorrect structure). 2. Using **AI assistance** to implement the validate\_email() function based strictly on the behavior described by the test cases.   The implementation should be driven entirely by the test expectations.  **Expected Outcome**   * Well-defined unit tests using unittest or pytest * An AI-generated email validation function * All test cases passing successfully * Clear alignment between test cases and function behavior   **Task 3: Decision Logic Development Using TDD**  **Scenario**  In a grading or evaluation module, a function is required to determine the maximum value among three inputs. Accuracy is essential, as incorrect results could affect downstream decision logic.  **Task Description**  Using the **TDD methodology**:   1. Write test cases that describe the expected output for different combinations of three numbers. 2. Prompt **GitHub Copilot or Cursor AI** to implement the function logic based on the written tests.   Avoid writing any logic before test cases are completed.  **Expected Outcome**   * Comprehensive test cases covering normal and edge cases * AI-generated function implementation * Passing test results demonstrating correctness * Evidence that logic was derived from tests, not assumptions   **Task 4: Shopping Cart Development with AI-Assisted TDD**  **Scenario**  You are building a simple shopping cart module for an e-commerce application. The cart must support adding items, removing items, and calculating the total price accurately.  **Task Description**  Follow a **test-driven approach**:   1. Write unit tests for each required behavior:    * Adding an item    * Removing an item    * Calculating the total price 2. After defining all tests, use **AI tools** to generate the ShoppingCart class and its methods so that the tests pass.   Focus on behavior-driven testing rather than implementation details.  **Expected Outcome**   * Unit tests defining expected shopping cart behavior * AI-generated class implementation * All tests passing successfully * Clear demonstration of TDD applied to a class-based design   **Task 5: String Validation Module Using TDD**  **Scenario**  You are working on a text-processing module where a function is required to identify whether a given string is a palindrome. The function must handle different cases and inputs reliably.  **Task Description**  Using **Test Driven Development**:   1. Write test cases for a palindrome checker covering:    * Simple palindromes    * Non-palindromes    * Case variations 2. Use **GitHub Copilot or Cursor AI** to generate the is\_palindrome() function based on the test case expectations.   The function should be implemented only after tests are written.  **Expected Outcome**   * Clearly written test cases defining expected behavior * AI-assisted implementation of the palindrome checker * All test cases passing successfully * Evidence of TDD methodology applied correctly     **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** | | | | | |  |  |