VCS – Assignment

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Assignment – Unit IV

Course: Version Control Systems (UQ24CA221A)
Unit: IV – AI Integration, Automation, and Responsible Coding Practices
Instructions: Answer all questions as per the given difficulty levels. Use your GitHub account with Copilot enabled wherever possible. Ensure that AI-assisted code is reviewed and validated before submission. Submissions must be made via GitHub Classroom with individual repositories.

Topic: AI in Software Development and GitHub Copilot

Easy (Banana)

1. Install GitHub Copilot in VS Code and take a screenshot showing it enabled under Extensions. Generate a simple Python function using a natural-language comment (e.g., "Generate a function to calculate factorial").
2. Demonstrate Copilot suggestions for two different prompts performing similar logic. Explain how phrasing affects AI responses.

Medium (Orange)

3. Compare manual coding vs. Copilot-assisted coding for a simple algorithm (e.g., Fibonacci or Palindrome). Measure time saved and discuss the accuracy and code quality.

Topic: Context-Aware Suggestions and Integration with Workflows

Easy (Banana)

4. Create a repository named `copilot-demo`. Write a function and let Copilot suggest related helper functions. Record the suggestions and your acceptance choices.

Medium (Orange)

5. Integrate Copilot into a workflow that includes automated testing. Use a GitHub Actions YAML file that runs your Python test script on every push. Submit both the workflow file and the test output.

Topic: AI Debugging and Refactoring

Easy (Banana)

6. Introduce a logical error in your code and observe Copilot's correction suggestion. Document the prompt, AI fix, and your final working code.

7. Use Copilot to refactor repetitive code into a separate function or class. Show the before and after code snippets.

Medium (Orange)

8. Analyse an example where Copilot's suggestion introduces a subtle bug. Identify the cause and demonstrate the corrected implementation with justification.

Topic: AI-Powered Documentation and GitHub Pages

Easy (Banana)

9. Generate docstrings for all functions in a sample script using Copilot. Export the resulting file and verify Markdown rendering in GitHub.

Medium (Orange)

10. Publish project documentation via GitHub Pages. Include a section auto-generated by Copilot (e.g., "Usage" or "API Overview"). Provide the live link and explain how AI-assisted docs reduce manual effort.

Topic: Ethics and Responsible AI Coding

Easy (Banana)

11. List three ethical concerns of using AI-assisted tools like Copilot. Explain with short examples how you would address them in real-world scenarios.

Medium (Orange)

12. Review Copilot's code suggestion for a public API integration. Identify any potential security or licensing risks. Suggest one mitigation strategy for each risk.

Hard (Jackfruit)

13. Create a policy checklist titled `Responsible-AI-Guidelines.md`. Include points on:

    - Reviewing and validating AI-generated code.
    - Handling sensitive data securely.
    - Acknowledging AI contributions ethically.

    Commit this file to your repository and explain how such policies ensure responsible automation.

Comprehensive Project Exercise

14. Comprehensive Project:

    - Create a repository titled `unit4-ai-assignment`.
    - Enable GitHub Copilot and record 2–3 examples of AI-generated code, documentation, or test scripts.
    - Integrate at least one GitHub Actions workflow that automates testing or builds.
    - Refactor one module using Copilot's suggestions and validate correctness with tests.
    - Publish project documentation using GitHub Pages.
    - Add a `Responsible-AI-Guidelines.md` file summarising ethical and safe use of AI.
    - Capture screenshots of Copilot interactions, workflows, and live documentation.

    Submit the final repository link, GitHub Pages URL, and screenshots as a single PDF report.