**Using Gen AI Tools to Find and Fix Bugs in Code**

* Writing code helps security professionals automate repetitive tasks, reduce human error, and save time.
* Even experienced programmers create code that can contain bugs, which can be frustrating and hard to find manually.
* Gen AI tools like Gemini can:
  + Act as a code reviewer to identify bugs quickly.
  + Detect issues that might be overlooked, including edge cases.
* Example Scenario:
  + Python code is written to analyze login activity.
  + The code flags unusual login behavior if a threshold is met.
  + A potential bug: zero division error when dividing by the average number of logins if that value is zero (e.g., for new employees).
  + Gemini identifies the bug and recommends adding a conditional check to handle the zero case gracefully, preventing runtime errors.
* Importance:
  + Bugs can affect confidentiality, integrity, and availability of systems.
  + AI tools help catch common errors, vulnerabilities, and performance bottlenecks that might be missed.
* Best Practices:
  + If unsure about a bug or fix, ask the AI tool to explain its recommendations.
  + Always review, verify, and adjust suggested code changes yourself.
* Prompting Tips for Code Debugging:
  + Avoid excessive context in prompts when asking about code bugs.
  + Code requires precision; too much extraneous detail can distract the AI.
  + Provide enough information to explain the issue clearly but keep it concise.
  + This differs from other prompt types, where more context often helps improve output.
* Key takeaway: Precision and the right amount of context are essential when using gen AI tools for coding tasks.

**Using Gen AI Tools to Improve and Learn from Code**

* Gen AI tools like Gemini can identify bugs and help improve existing code, supporting better learning and skill development.
* Example Scenario:
  + You’re a new security analyst working with a colleague’s Python log analysis code.
  + You have limited Python experience and want to enhance the code.
  + Prompt example:
    - State your role and experience level.
    - Ask for comment lines explaining each code section.
    - Request suggestions to improve the code.
* What Gemini Does:
  + Adds explanatory comments across the code.
  + Highlights that original comments were missing—a common issue, even among experienced coders.
  + Provides five improvement ideas with explanations.
  + Enables you to copy and reuse the commented version easily.
* Key Takeaways:
  + Gen AI is helpful for both understanding unfamiliar code and improving your own.
  + Human review is essential—always validate the AI’s output.
  + This process reinforces a human-in-the-loop approach.
* Beyond Python:
  + Gen AI tools can assist with multiple programming languages.
  + They can support both editing existing projects and writing new code from scratch.
* Benefits for Cybersecurity Analysts:
  + Save time and increase productivity.
  + Learn and grow technical skills.
  + Become more effective at analyzing and improving code.