**CS 499 Journal – Module Five: Emerging Trends and Artifact Progress**

### **Part One: Emerging Trends in Computer Science**

Two of the most significant emerging trends in computer science are **AI-assisted software development** and **quantum computing**. AI-assisted development tools like GitHub Copilot, ChatGPT, and Tabnine are rapidly transforming how developers write code. These tools increase productivity, reduce repetitive tasks, and accelerate debugging. As they mature, they will shift the role of a software engineer from manual implementation to high-level problem-solving and system design.

Quantum computing, while still in its early stages, promises to revolutionize computational power. It will eventually allow us to solve problems that are practically impossible for classical computers, such as simulating complex molecules or optimizing massive datasets. For consumers and workers, this means faster problem-solving in fields like finance, logistics, and healthcare.

As someone interested in building scalable software systems and possibly transitioning into systems engineering roles in the future, both trends are relevant. AI development tools are already boosting my productivity, and understanding how to prepare applications for post-quantum encryption or quantum-aware computing could be a valuable specialization in the next decade.

I have already achieved key outcomes such as:

* Designing computing solutions using algorithmic and architectural principles
* Applying professional-level tools and modern techniques in development
* Practicing secure coding and structured application design

Remaining outcomes include finalizing my ePortfolio, completing professional self-assessment content, and polishing presentation for a public-facing portfolio.

### **Part Two: Status Checkpoints for All Categories**

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| --- | --- | --- | --- |
| **Checkpoint** | **Software Design and Engineering** | **Algorithms and Data Structures** | **Databases** |
| **Name of Artifact Used** | Crypto Tracker Android App | A\* Pathfinding Kotlin Program | Bookstore Management DB + Flask API |
| **Status of Initial Enhancement** | Complete: refactored architecture, Compose UI, MVVM | Complete: implemented A\* with Manhattan heuristic | In progress: normalized schema, added SQL views |
| **Submission Status** | Submitted for Milestone Two | Submitted for Milestone Three | Pending |
| **Status of Final Enhancement** | Final polish on Compose animations and error handling | May add performance logging and benchmarking | Implementing stored procedures, REST API integration |
| **Uploaded to ePortfolio** | In progress | Not yet | Not yet |
| **Status of Finalized ePortfolio** | Early draft in progress | Awaiting code polishing before upload | Will be assembled after enhancements |