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CS499 Module 6

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**Part One**

1. Identification and Description of Each Technology

The two disruptive technologies I’ve chosen to explore are Artificial Intelligence (AI) and Quantum Computing.

Artificial Intelligence has evolved from a theoretical concept into a practical and widespread technology integrated across industries. AI refers to the development of systems that can perform tasks typically requiring human intelligence, such as learning, reasoning, problem-solving, and natural language understanding. Applications range from chatbots and recommendation systems to autonomous vehicles and medical diagnosis tools (Fawley, 2025).

Quantum Computing, on the other hand, represents a different approach to computation. Unlike classical computers that use bits (0 or 1), quantum computers use quantum bits or qubits, which can represent and process multiple states simultaneously due to superposition and entanglement. Though still in early development, companies like IBM and Google have made significant breakthroughs, demonstrating quantum supremacy in controlled environments.

2. Likely Impacts on Computer Science or My Career

AI is already transforming the landscape of computer science. For someone pursuing a career in software or data engineering, AI offers numerous opportunities—from building machine learning models to developing intelligent automation tools. It emphasizes the need for new skills in data handling, ethical algorithm design, and understanding AI frameworks.

Quantum computing, while not mainstream yet, teases a future where computational tasks that are currently impossible (e.g., simulating molecular interactions or cracking modern encryption) may become feasible. As quantum systems become more accessible, they may redefine areas like cybersecurity, optimization problems, and even artificial intelligence itself. This creates a growing demand for computer scientists who understand quantum algorithms and post-quantum cryptography (Round, 2025).

3. Potential Impact on Humans, Communities, or the World

AI's potential impact is both profound and double-edged. On the positive side, AI can improve healthcare access through predictive diagnostics, increase efficiency in supply chains, and support decision-making in education and public policy. However, ethical concerns such as job displacement, algorithmic bias, and privacy violations must be addressed to ensure AI benefits all communities equitably (Fawley, 2025).

Quantum computing could revolutionize industries by solving complex problems faster than ever before. For instance, it may accelerate drug discovery, reduce energy consumption through optimized logistics, and enhance financial modeling. However, it also poses risks—particularly to current encryption systems—which could threaten data security globally if not managed responsibly (Roundy, 2025).

4. Which course outcomes have you achieved so far, and which ones remain?

One course outcome I’ve achieved so far is to “Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.” In category one of the enhancements (Software Design Engineering and Design), I’ve successfully improved my previous code using more efficient and maintainable processes, through multiple tools which all contribute to the end solution to help deliver the goal in mind. I’ve also been able to achieve the outcome such as “Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources.” By being able to improve security and allow sharing of code without hardcoded credentials, security has much improved and reduces the possibilities of vulnerability.

References

Fawley, S. (2025, March 3). *9 benefits of Artificial Intelligence (AI) in 2025*. University of

Cincinnati. https://online.uc.edu/blog/artificial-intelligence-ai-benefits/

Roundy, J. (2025, January 27). *Explore 7 future potential quantum computing uses: TechTarget*.

Search Data Center. <https://www.techtarget.com/searchdatacenter/tip/Explore-future-potential-quantum-computing-uses>

**Part Two:**

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| **Checkpoint** | **Software Design and Engineering** | **Algorithms and Data Structures** | **Databases** |
| **Name of Artifact Used** | PublicAzureBudgetLoader.py | PublicAzureBudgetLoader.py | CREATEBUDGETTACKER.sqll |
| **Status of Initial Enhancement** | Completed | Completed | Completed |
| **Submission Status** | Submitted | Submitted | Submitted |
| **Status of Final Enhancement** | Submitted | Submitted | Submitted |
| **Uploaded to ePortfolio** | Uploaded | Uploaded | Uploaded |
| **Status of Finalized ePortfolio** | Complete | Complete | Complete |

Resources:

* <https://eriksierra.github.io/>
* <https://github.com/ErikSierra/BudgetTracker>