6-1 Journal Thompson  
 Takeria Thompson  
  
 Part One:

1. Identification and Description of Each Technology

Zero Trust Architecture (ZTA):

A cybersecurity concept known as "zero trust architecture" is based on the tenet "never trust, always verify." Zero-trust architecture (ZTA) demands constant user identification and device health verification, independent of device location, in contrast to standard security models that presume users or devices inside the network perimeter are trustworthy. To guarantee that only authorized users may access critical data and systems, this design makes use of cutting-edge technologies including multi-factor authentication (MFA), identity and access management (IAM), and network segmentation (Chaudhary et al., 2021). The strategy is especially important in the current environment, as cloud services and remote work have increased the attack surface for possible dangers.

Homomorphic Encryption:

With homomorphic encryption, calculations on ciphertexts—encrypted data—can be carried out without the necessity for pre-cryptographic decryption. This reduces the chance of exposure by enabling the processing and analysis of sensitive data while maintaining security. This technique is especially useful in settings like cloud computing, healthcare, and finance where protecting patient privacy is essential. Encrypted data enables enterprises to conduct machine learning and data analytics, guaranteeing the confidentiality of sensitive information even during processing (Rivest et al., 1978).

2. Likely Impacts on Computer Science or My Career

Zero Trust Architecture (ZTA):

It is anticipated that the implementation of Zero Trust Architecture would result in a substantial increase in demand for cybersecurity experts who are adept at setting up and maintaining ZTA frameworks. Understanding concepts like IAM, network segmentation, and continuous monitoring will become essential for anyone pursuing a career in cybersecurity. As breaches continue to escalate, organizations will look for expertise in ZTA to enhance their security posture, creating opportunities for professionals knowledgeable in this area. For my career, gaining skills in ZTA will position me as an asset to companies prioritizing cybersecurity.

Homomorphic Encryption:

The growing emphasis on data privacy and security will drive the demand for professionals well-versed in cryptographic techniques, particularly homomorphic encryption. Understanding how to implement and optimize this technology for practical applications will be crucial for careers in data science, cybersecurity, and cloud computing. As businesses increasingly rely on data analytics, being knowledgeable about how to process sensitive information securely will enhance my career prospects and allow me to contribute meaningfully to organizations committed to safeguarding user data.

3. Impact on Humans, Communities, or the World

Zero Trust Architecture (ZTA):

The implementation of Zero Trust Architecture can significantly enhance cybersecurity at the organizational and societal levels. By ensuring that every access request is verified, ZTA can help mitigate data breaches and cyberattacks, protecting sensitive information from malicious actors. For individuals, this means increased trust in digital services, as organizations prioritize the security of personal data. On a larger scale, adopting ZTA can foster a culture of security awareness, leading to more secure digital environments and reducing the overall risk of cybercrime.

Homomorphic Encryption:

Homomorphic encryption can transform how sensitive data is handled in various sectors, particularly in healthcare and finance. By enabling secure computations on encrypted data, it allows organizations to gain insights from data without exposing it to potential breaches. This technology can empower users to share data securely for research and analysis, promoting innovation while maintaining privacy. However, its widespread implementation could also raise questions about regulatory compliance and the balance between data accessibility and privacy.

4. Course Outcomes Achieved and Remaining:

- Gaining a foundational understanding of emerging security technologies and their implications for the future of computing.

- Analyzing the potential societal impacts of disruptive technologies, particularly in the context of data privacy and security.

Remaining outcomes include:

- Developing practical skills in implementing Zero Trust Architecture and homomorphic encryption through hands-on projects or labs.

- Deepening my understanding of the technical aspects of these technologies, including programming, encryption algorithms, and risk management.

References

Chaudhary, R., Zafar, A., & Peddinti, S. (2021). A comprehensive survey on Zero Trust Architecture: Principles, frameworks, and security challenges.

Rivest, R. L., Adida, B., & Sipser, M. (1978). [https://luca-](https://luca-giuzzi.unibs.it/corsi/Support/papers-cryptography/RAD78.pdf)giuzzi.unibs.it/corsi/Support/papers-cryptography/RAD78.pdf

Part Two:  
  
Update: Spending more time fixing the bugs and getting feedback from professor this week/ uploading to GitHub this week.

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| Category | Software Design and Engineering | Algorithms and Data Structures | Databases |
| Artifacts | 3D Modeling and Scene Design from CS 330 (Computational Graphics and Visualization) | Backend Services with Data Structures from CS 320 | Database Project from CS 340: Using MongoDB for Animal Rescue |
| Initial Enhancement | Update the visuals of the 3D scene transitioning from OpenGL to Blender a more industry standard tool. | Improvements in data structure efficiency, focusing on optimizing hash maps for quicker lookups. | Experimenting with indexing and aggregation techniques to handle larger datasets. |
| Submission Status | Final push to fix issues with animation then ready to submit | Final push to fix bugs then ready to submit | Final push to fix bugs then ready to submit |
| Final Enhancement | Working on fixing the issues with animation as this is a bit harder than first expecting | Fixing runtime errors. | Researching bug fixes |
| ePortfolio Upload | Not yet uploaded. | Not yet uploaded. | Not yet uploaded. |
| Final ePortfolio | Enhancements are finishing so the ePortfolio will be uploaded soon | Enhancements are finishing so the ePortfolio will be uploaded soon | Enhancements are finishing so the ePortfolio will be uploaded soon |