## Domain pros & cons

| Domain | Pros | Cons |
|---|---|---|
| School | - Familiar CRUD operations<br>- GDPR relevance<br>- Realistic cyber threats | - Complex privacy laws<br>- Limited network complexity<br>- May lack high-stakes elements |
| Online Retailer | - Rich security requirements<br>- Frequent target for attacks<br>- Complex data | - Extensive compliance needs<br>- High scalability demands<br>- Time constraints |
| International Space Station | - High-stakes security<br>- Advanced requirements<br>- Unique challenges | - Complexity may exceed scope<br>- Hard to simulate realistic attacks<br>- Steep learning curve |

**1. School Application Domain**

**Pros:**

- Clear Scope for CRUD Operations: Schools require managing student, teacher, and staff records, which aligns well with CRUD (Create, Read, Update, Delete) functions.
- GDPR and Data Sensitivity: Schools handle sensitive data (e.g., student information) which aligns with GDPR requirements and provides a strong context for implementing data encryption and security.
- Realistic Security Threats: Schools are frequent targets for cyber attacks (e.g., ransomware), providing realistic scenarios for protecting against brute force, DoS, and injection attacks.

**Cons:**

- Privacy Concerns and Regulatory Requirements: Designing a system that fully adheres to privacy laws like GDPR for minors can be complex.
- Less Complex Network: Schools generally have simpler network setups than corporations or space stations, potentially making DoS attacks less impactful and limiting design options for certain security measures.
- Moderate Technical Challenges: The focus may lean heavily on data protection but offer less opportunity for testing advanced cybersecurity tactics like those required for high-stakes environments.

**2. Online Retailer Application Domain**

**Pros:**

- Comprehensive Security Needs: E-commerce applications demand strict security due to payment processing and sensitive customer data, making it an ideal domain for exploring advanced security measures like encryption and API protection.
- Realistic Attack Vectors: Online retailers are frequent targets for cyber-attacks, including brute force, DoS, and API injection, allowing the design to incorporate practical, real-world security defenses.

- Complex Data Structure: This domain typically has diverse data sets (e.g., customer, product, and transaction data) that align well with the requirement to use different data structures.

**Cons:**

- Extensive Security Requirements: Compliance requirements (e.g., PCI DSS for payment data) add complexity and might increase the workload for designing the system.
- Performance and Scalability Considerations: Online retailers typically require high scalability and performance efficiency, which could be challenging to implement within the project's scope.
- Time Constraints: The broad feature requirements and potential complexities could be hard to meet within the six-week project timeframe.

**3. International Space Station (ISS) Application Domain**

**Pros:**

- High-Stakes Security Environment: ISS systems require the highest level of security, giving the team a challenging and rewarding domain for implementing advanced security features, including unique responses to brute force and DoS attacks.
- Complex System Requirements: Space station systems have stringent access controls and operational monitoring, creating an opportunity to apply a sophisticated design with advanced encryption and monitoring.
- Unique Domain-Specific Challenges: The ISS offers a unique context for exploring security, especially for scenarios like off-Earth operations that require resilience against cyber threats.

**Cons:**

- Complexity Beyond Project Scope: The ISS may have extremely specialized requirements that could be challenging to replicate accurately in a classroom setting, potentially requiring resources or knowledge beyond the project's scope.
- Difficulty of Simulating Attacks: Simulating attacks like DoS on a space station system might lack realistic context without specialized network setups or access to relevant testing tools.
- High Learning Curve: Working within the space domain may require additional research, making it difficult for the team to complete the project within six weeks.