1. Scenario:

An IS department in a major public university records the lectures for 10 of its classes for video streaming to its partner universities in India and China. Each twice-weekly lecture runs for 1.25 hours and a semester is 15 weeks long. A video streaming expert estimates that one minute of digital video requires 6.5 Mbytes using MPEG-4 and Apple's QuickTime software.

Part A:

Calculate how much storage space will be required and recommend a storage device for the department. ***Semester***

***15 weeks***

***Classes***

***10 per week***

***Lecture length***

***1.25 hours per class***

***Lectures***

***2 per class per week***

***Video storage***

***6.5 Mbytes per minute***

***Lecture hours***

***15\*10\*1.25\*2***

***Lecture minutes***

***15\*10\*1.25\*2\*60***

***Mbytes***

***15\*10\*1.25\*2\*60\*6.5***

***Gbytes***

***15\*10\*1.25\*2\*60\*6.5/1000***

***Gbytes***

***146.25***

***RAID-1 because of the likely high number of reads compared to writes once the data are loaded.***

Part B:

Describe the differences between a file manager, a disk manager, and the advantages and disadvantages of indexing. Based on the storage calculation performed in part A, in your project calculate the storage space that is required for your data housing solution, what structure and storage device is best for your application.

1. Scenario:

A university wants to teach a specialized data management topic to its students every semester. It will take about two weeks to cover the topic, and during this period students will need access to a small high performance computing cluster on which the necessary software is installed. The software is Linux-based.

Part A:

Investigate three cloud computing offerings and make a recommendation as to which one the university should use.

Part B:

Describe the high performance computing data processing architecture utilized in your project. Explain how the following in your solution:

* data architecture chosen for a given situation (your project)
* how the architecture uses a multi-tier client/ server architecture, or why it does not need to use multi-tier.
* what fundamental principles your project uses to incorporate a hybrid architecture or why your project does not need it.
* demonstrate the general principles of distributed database design that your project incorporates.

1. Scenario:

This problem refers directly to your project. Use the SQL & Java chapter to reference examples that apply.

Part A:

Provide any Java, python, C++, Perl, Javascript, PHP or any other procedural or scripting programming language used to process a parameterized SQL query in your project.

Part B:

* Explain why the programs scripts were used and for what result (output).
* Provide a screenshot of the output the script command(s) execute.

1. Scenario:

An Internet bank with more than 10 million customers has asked for your advice on developing procedures for protecting the existence of its data.

Part A:

* What would be your recommendations for the Internet bank? Creating a second site from which the bank's entire operations can run. This site should be in another region
* **Mirroring to enable fast recovery if data are lost or a disk cannot be read**
* **Establishing backup and recovery procedures that are regularly tested**
* **Developing a physical security plan to prevent unauthorized access to its data center**
* **Developing a system security plan to prevent unauthorized remote access to its servers**

Part B:

What are the three goals of maintaining organizational memory integrity? How are you assuring data integrity in your project? Please provide in your answer the following:

* the strategies for achieving each of the data integrity outcomes.
* the possible threats to your data integrity and what you did to deal with them.
* any principles of transaction management you utilized.
* how your data scheme ensures data available, while simultaneously maintaining data integrity.

1. Scenario:

This problem refers directly to your project. Use the Data Administration chapter to reference examples that apply.

Part A:

Why do organizations need to manage data? What is the importance and role of data administration?

Part B:

What system-level and/or project-level data administration functions are used to manage your database environment successfully?