**Part 1: - Foundations of Data Systems**

**Chapter 1: - Reliable, Scalable, and Maintainable Applications**

**Thinking About Data Systems**

**Reliability**

* **Hardware Faults**
* **Software Errors**
* **Human Errors**
* **How Important is Reliability**

**Scalability**

* **Describing Load**
* **Describing performance**
* **Approaches for coping with Load**

**Maintainability**

* **Operability: Make life easy for operations**
* **Simplicity: Making Complexity**
* **Evolvability: Making Change Easy**

**Chapter 2: - Data Models and Query Languages**

**Relational Model Versus Document Model 2**

* **The Birth of NoSQL**
* **The Object-Relational Mismatch**
* **Many-to-One and Many-to-Many Relationships**
* **Are Document Databases Repeating History**
* **Relational Versus Document Databases Today**

**Query Languages for Data**

* **Declarative Queries on the Web**
* **MapReduce Querying**

**Graph-Like Data Models**

* **Property Graphs**
* **The Cypher Query Language**
* **Graph Queries in SQL**
* **Triple-Stores and SPARQL**
* **The Foundation: Datalog**

**Chapter 3: - Storage and Retrieval**

**Data Structures That Power Your Database**

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* **Hash Indexes**
* **SSTables and LSM-Trees**
* **B-Trees**
* **Comparing B-Trees and LSM-Trees**
* **Other Indexing Structures**

**Transaction Processing or Analytics**

* **Data Warehousing**
* **Stars and Snowflakes: Schemas for Analytics**

**Column-Oriented Storage**

* **Column Compression**
* **Sort Order in Column storage**
* **Writing to Column-Oriented Storage**
* **Aggregation: Data Cubes and Materialized Views**

**Chapter 4: - Encoding and Evolution**

**Formats for encoding data**

* **Language Specific Formats**
* **JSON, XML, and Binary Variants**
* **Thrift and Protocol Buffers**
* **Avro**
* **The Merits of Schemas**

**Modes Of DataFlow**

* **DataFlow Through Database**
* **DataFlow Through Service: REST and RPC**
* **Message Passing Dataflow**