**Chapter 1**

* Computer System and Layers of Computing System
* Abstraction

**Chapter 2**

* Decimal and Binary Number System/
* Converting decimal number to binary number
* Converting binary number to binary number
* Data compression (lossless and lossy)
* Text compression and Run-length encoding

**Chapter 3**

* Analog and Digital Data
* Data bits and information/bit measurement (Bit, Byte, Mega Byte, Giga Byte, Tera Byre, …)
* Binary Representations for numeric data, text data, audio data, images and graphics and video. （Two’s complement and IEEE 32 Single Precision scheme and IEEE 64 Double Precision scheme）
* Image、audio and video data type

**Chapter 4**

* Gates and Circuits/Integrated Circuits and CPU Chips (concepts)
* NOT/AND/OR/XOR/NAND Gates (their diagrams, and truth tables)
* Moore’s law in IT industry

**Chapter 5**

* Individual Computer Components (CPU, CPU registers, CPU cache, Memory and RAM, Input and Keyboard, Output and Screen, Bus, Hard Disk and Secondary Storage，BIOS and ROM)
* The von Neumann Architecture
* The Stored-Program and Fetch-Execute Cycle principles

**Chapter 6**

* Programming Language (Machine Language, Assembly Language, High-level Language)
* CPU instructions and Programs
* Algorithm and Expressing Algorithm using Pseudocode

**Chapter 7**

* Simple variables and Composite variables (Array and Record)
* Concepts of Sorting and Searching
* Sequential Searching and Binary Searching （Array-based and Tree-based）

**Chapter 8**

* Abstract Data Type (concepts of Stack, Queue, List, Tree and Graph)
* Linear Data Types （Stack：FILO, Queue: FIFO, List）
* Tree (Binary Searching Trees)

**Chapter 9**

* Translation Process (Complier and Interpreter)
* Programing Language Paradigms (Imperative and Declarative)

**Chapter 10**

* Roles of an Operating System (Memory, Process , CPU management and File System for Disk Management)
* Multi-programing and Timesharing
* Context Switching

**Chapter 11**

* File systems (file, Directory, and Directory Trees; Path)
* Text and Binary Files
* File Type and Extensions

**Chapter 12**

* Information Systems
* Database Management Systems
* The relational model and relationships

**Chapter 13**

* Artificial Intelligence
* Thinking machine and the Turing Test
* Knowledge representation and Search trees
* Artificial Neural Network (Concept)

**Chapter 15**

* Computer Networks and Internet
* Types of Networks and Network Topologies
* Open Systems and the layers of the OSI Reference Model
* Network protocols, and key protocols in each layer of the OSI Reference Model (Ethernet, IP, TCP, UDP, SMTP, Telnet, FTP, HTTP, etc.)
* Network Addresses (IP addresses and Domain Names) and Domain Name System

**Chapter 16**

* Internet and its key applications (Web, and Instant Messaging, etc.)
* HTML/CSS language, Web/HTML page, Link
* Static Web pages and Interactive Web pages
* JavaScript language and Java Server Pages

**Software Engineering**

* Software Engineering
* The four phases of Software Life Cycle
* The four phases of the development process
* The Development process models (Waterfall and Incremental Models)
* Modularity, Coupling and Cohesion
* Sketching the logical flow of algorithms/programs: Flowchart and Pseudocode
* Quality and Desirable Features of Software