Review of CS100709

- Computer Science an Overview
- Scoring
  - Projects 40%
  - Attendance + Assignment 15%
  - Exam 45%
  - Selected creations will be made online!

Outline of Our Study

- Chapter 1: Data Storage
- Chapter 2: Data Manipulation
- Chapter 3: Operating Systems
- Chapter 4: Networking and the Internet
- Chapter 5: Algorithms
- Chapter 6: Programming Languages

Outline of Our Study (cond.)

- Chapter 8: Data Abstractions
- Chapter 12: Theory of Computation*
- Chapter 7: Software Engineering*
- Chapter 9: Database Systems*
- Chapter 10: Computer Graphics*
- Chapter 11: Artificial Intelligence*

Chapter 0

- Algorithm, Program, Programming
- Software, Hardware
- Role of Algorithms
- Abstraction, Abstraction tool

Chapter 1 Data representation

- Binary system
  - Hexadecimal notation
  - Binary and decimal representation
  - Two’s complement notation
  - Floating point notation
  - Overflow and Truncation of the limitation of numeric value representation
- ASCII, Unicode, ISO standard for representing text

Chapter 1 Data representation

- Flip-flop
- Main memory, its organization, address and capacity
- Mass Storage
- File storage and retrieval
- Parity bits
- Data compression*
- Error correcting codes

Chapter 2 Data manipulation

- Von Neumann Architecture
- Stored program concept
- Central Processing Unit (CPU)
- Program counter and Instruction register
- Machine Cycle: Fetch, Decode, Execute

Chapter 2 Data manipulation

- Machine instruction and Machine language
- Machine Instruction Types： Data Transfer, Control, Arithmetic/Logic Operations
- Op-code and Operand
- Controller, Port, Memory-mapped I/O*
- RISC vs CISC
- SISD vs SIMD vs MIMD

Chapter 3 Operating system

- Batch processing and Interactive processing
- Time-sharing and multi-tasking
- Uniprogramming and Multiprogramming
- Software classification
- Shell and kernel in OS
- Functions of OS
- Preemptive vs Cooperative Multi-tasking*

Chapter 3 Operating system

- The booting process
- Process vs Program vs Thread
- Interrupt system
- Context switching
- Scheduler and Dispatcher
- Competition for resources
- Deadlock
- Privilege level*

Chapter 4 Networking and the Internet

- Networks classifications by scope, ownership and topology
- Protocol
- CSMA/CD, CSMA/CA
- Repeater, bridge, switch, router
- Internet architecture
- Internet software layers
- Package shipping

Chapter 4 Networking and the Internet

- TCP/IP protocols
- TCP and UDP
- IP address, IPV4 and IPV6
- Domain name system
- URL
- WWW
- HTML and XML
- Encryption*

Chapter 5 Algorithm

- The concept of an algorithm
  - Algorithm and Program
- Components of algorithms
- Different ways to represent algorithms
  - Pseudocode
  - Flow chart
- Control structure of algorithms
- Iterative structure and Recursive structure

Chapter 5 Algorithm

- Search algorithm
  - Sequential search algorithm
  - Binary search algorithm
- Sort algorithm
  - Insertion sort
  - Selection sort
  - Merge sort
- Algorithm efficiency

*Chapter 12 The theory of computing

- Turing machine
- Problem classification
  - Unsolvable problem
  - P problem
  - NP problem
- The complexity of problems

Chapter 6 Programming language

- Programming paradigms
- The 4th gen programming languages
- Passing Parameters by value or reference
- Variables and data types
- Data structure, constants and literals
- Assignment, control and comments
- Procedure, parameters, function
- Translation / Parse process

Chapter 8

- Arrays, lists, trees, stacks and queues
- Static and dynamic structures, pointers
- Storing arrays, lists
- Storing stacks and queues
- Storing binary trees
- Storing, insertion, deletion
- Pointers in Machine Language*

- At the last…

CS100709

- Thanks to all of you!
- Have a fruitful new year!