

Computer Network & Communication

- The OSI model and TCP/IP protocol suite.
- TCP / IP Network layer.
- IPv4 addressing
- Delivery and Forwarding of IP packets.
- IP v4
- Address Resolution Protocol ARP
- Internet Control Message Protocol ICMP

Ref1: "TCP/IP Protocol Suite" by Behrouze

Artificial Intelligence Techniques

- Search algorithms & methods
 - Blind Search
 - Heuristic Search
- Knowledge representation
 - Logic representation
 - Production representation
 - Network representation
 - Functional representation
- Expert systems

Ref1: "Artificial Intelligence, structures and strategies for complex problem solving", By: George Luger & William Stubblefield

2018

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Operating System

- 1- Operating system structure
- 2- Processes
- 3- Threads
- 4- Process synchronization
- 5- Cpu scheduling
- 6- Deadlocks
- 7- Memory management and virtual memory

Ref1: "Operating System Concepts"

By Abraham silberschatz, Peter bear galvin, Greg gagne. 9th ed., 2013

Computer Architecture

- 1- Top level view of computer function and interaction
- 2- Cache memory
- 3- Internal memory and external technology
- 4- Input/output
- 5- Addressing modes
- 6- Processor structure and function
- 7- Control unit
- 8- Microprogrammed control

Ref1" "Computer organization and architecture Designing for performance"

By William Stallings, 8th ed., 2010

2018

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Information Technology / Data Security

- Classical Encryption Techniques
- Modern Encryption Techniques
 - Symmetric
 - Asymmetric
- Modular Arithmetic
- Introduction to Number Theory
- Diffie-Hellman Key Exchange
- Principles of Hash Function and Digital Signature

Ref1: "Cryptography and Network Security: Principles and Practice"
(2nd Ed.), William Stallings, Prentice-Hall, Inc., 1999.

Information Technology / Data Base

- Normalization
- Data Manipulation Language and Data Definition
- Distributed Database Management System Design
- Relational Algebra for Query Optimization
- Transaction Processing Systems
- Controlling Concurrency
- Failure and Recovery

SQL

Ref1: "Principles of Distributed Database System"

By M. Tame Ozsu, 3rd ed., 2011

2018

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Data **S**tructure and **P**rogramming

- The Linked List Structure
- The Linked Stack structure
- The Linked Queue Structure
- Binary Tree Structure
- Traversing Methods (preorder, inorder, postorder)
- Binary Search Tree
 - Inserting / Deletion
- Height Balanced: AVL tree
 - Insertion / Deletion
- The Graph Data Structure:
 - Depth first traversing

Ref1: "Data Structures and Algorithms using C#" by Michael Mcmillan, Cambridge University Press, 2007.

Ref2: "Data Structures Algorithms with Object-Oriented Design Patterns in C#" by Bruno R. Preiss, 2001.

كلية علوم الحاسوب والرياضيات
College of Computer Sciences and Mathematics