

2022

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

"TCP/IP Protocol Suite" by Behrouze Ref1:

Artificial Intelligence Techniques

- Heuristic Search
 Knowledge representation
 Logic representation
 Production representation
 Network representation
 Function
- - Functional representation
- Expert systems

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



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Operating **S**ystem

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

<u>Ref1:</u> "Operating System Concepts"

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

Microprocessor

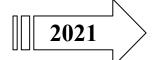
- 1- Software architecture of 8088 and 8086
- 2- Assembly language programming
- 3- Control flow instructions
- 4- The 8088 and 8086 microprocessor and their memory and input/output interfaces
- 5- Interrupt interfaces

Ref1: "The 8088 and 8086 Microprocessors, programming, interfacing, software, hardware, & application", By Trieble & singh, 4th ed., 2003

Computer **A**rchitecture

- 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

<u>Ref1:</u> "Computer organization and architecture designing for performance" By William Stallings, 8th ed., 2010



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Information Security

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

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

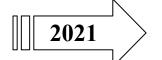
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Information **T**echnology /

Image Processing Techniques

- Introduction
- Image fundamentals
- Image transformation
- Image enhancement
- Image compression

Ref1: "Digital Image Processing" by Rafael Gonzale



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Information Technology / Data Base

- Normalization
- Data Manipulation Language and Data Definition

SQL

- Distributed Database Management System Design
- Relational Algebra for Query Optimization
- Transaction Processing Systems
- Controlling Concurrency
- Failure and Recovery

<u>Ref1:</u> "Principles of Distributed Database System"

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

Information Technology /

Object Oriented Programming

- Issues with Procedure Oriented Programming
- Basic of Object Oriented Programming (OOP)
- Procedure Oriented versus Object Oriented Programming
- Concept of Object Oriented Programming
- Object
- Class
- Abstraction
- Encapsulation
- Inheritance
- Polymorphism

Ref1: "Thinking in C# "

<u>Ref2:</u> "C#: How to Program"