Operating Systems - I

Operating Systems - I

Overview of OS Abstract view of an operating system,Fundamental principles of6
OS operations, OS interaction with the computer and user programs, Efficiency ,system performance and user service,Batch Processing System,
Multiprogramming System, The Time Sharing System, The Real Time Operating
System, Distributed operating system, Operation of OS, Operating system with
monolithic structure,Virtual machine operating system, Kernel based operating
system, Microkernel based operatingsystem

Processes, Threads and Synchronization Processes andprograms,Implementing6
processes, Threads, Process synchronization, Race condition, Critical Section,
Synchronization approaches, Classic process synchronization problems,
Semaphores, Monitors

Process Scheduling Scheduling terminology and concepts,Nonpreemptive
scheduling policies, Preemptive scheduling policies, Long, Medium and short
term scheduling

Deadlock What is deadlock, Deadlock in resourceallocation,Handling
Deadlocks : Deadlock Detection and Resolution, Deadlock prevention, Deadlock

avoidance

Memory Management Managing the memory hierarchy, Static and Dynamic
Memory Allocation, Heap Management, Contiguous Memory Allocation and
Non Contiguous Allocation, Segmentation and Segmentation with paging,
Virtual memory basics, Demand paging, Page replacementpolicies

File systems and I/O systems Overview of file processing, Filesandfile
operations, Fundamental file organizations and access methods, Layers of the
Input Output control system, Overview of I/O system

Automata Theory

Automata Theory

Regular Languages and Finite Automata

Proofs,RecursiveDefinitions,Regularexpressionsandregularlanguages,F
Automata,unions,intersection&complementsofregularlanguages,Applic
of FA

Nondeterminism and Kleene's Theorem
Nondeterministic finite automata, NFA with null transition, Equivalence of FA's,
Kleene's Theorem (Part I & Part II), Minimal Finite Automata

Context free Grammars
Definition, Union, Concatenation and Kleene *'s of CFLs, Derivation trees and
ambiguity, Simplified forms and normal forms

Parsing andPushdownAutomata
Definition of Pushdown Automata, Deterministic PDA, Equivalence of CFG's&
PDA's, Top down parsing, bottom up parsing.

Context free languages
CFL's and non CFL's, Pumping Lemma, intersections and complementsof CFLs

Turing Machines
Definition,TMaslanguageacceptors,combiningTuringMachines,Computi
partial function with a TM, Multi-tape TMs, and Universal TM

Software Engineering

Software Engineering

The software Problem Cost, Schedule & Quality, Scale and Change, Software

Processes: Process & Project, Component Software Processes, Software
Development process Models, Project Management Process.

Software Requirements Analysis & specification Value of Good SRS,
Requirement Process, Requirements Specification, Other Approaches for Analysis
,Validation

Software Planning & Scheduling Responsibilities of Software Project Manager,
Project Planning, Project Scheduling, Project Staffing, People CMM, Risk
Management

Design Design Concepts, Function Oriented Design, Object Oriented Design,
Detail Design,Verification,Metrics

Coding & Testing Coding & Code Review,Testing, UnitTesting,Black Box ,Testing,White Box Testing, Program Analysis Tools,Integration Testing,
System Testing

Software Reliability &Quality Management
Reliability,SoftwareQuality,Software Quality Management System, ISO 9000, SEI
capability Maturity Model, Six Sigma, Agile Software Development & Extreme
Programming, Agile Project Management

Computer Networks - II

Unit -1 Client-server model & socket interface:
The Socket Interface, The Client-Server model and software design, Concurrent
processing in client-server software, Algorithms, and issues in Client-Serverdesign,
Multiprotocol Servers, Multiservice Servers, Concurrency in clients, Unix Internet
Super server (inetd).

Unit-2 Next Generation IPv6 and ICMPv6:
IPV6 addresses, packet format, ICMPV6, Transaction from IPV4 to IPV6

Unit-3 BOOTP, DHCP, and Domain name system:
NameSpace, Domain Name Space, Distribution of namespace, and DNS in
internet, Resolution, DNS massages, Types of records, Compression examples, and
encapsulation.
BOOTP, DHCP

Unit-4 Remote Login: TELNET and File TransferFTP,TFTP:
Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling
the server, Out-of-band signaling, Escape charter, Mode of operation, user interface.
FTP: Connections, Communication, Command processing, File transfer, User
interface, Anonymous FTP, TFTP.
Web Applications Service Protocols:

Unit-5 HTTP: Architecture, Web Documents, HTTP Transaction, RequestandResponse,
HTTP Headers and Examples, Persistent Vs Non- Persistent HTTP, Proxy servers.
Electronic Mail: Architecture, User-agent, addresses, Delayed delivery, SMTP
commands and responses, Mail transfer phases, MIME, POP3
Multimedia On Internet:

Unit-6 Streaming stored audio/video, Streaming live audio/video, Realtimeinteractive
audio/video, Real-Time Transport Protocol (RTP), Real-Time Transport Control

Protocol (RTCP), Voice Over IP (VoIP), Session Initiation Protocol (SIP)

Computer Organization and Architecture

Unit-1 Computer Evolution and performance
Evolution of computer – Mechanical Era: Babbage's Difference Engine, Electronic Era:
First-generation, IAS Computers, Instruction Set and Instruction Execution, Second
generation, Input-Output Operation, Programming Language, Third generation and VLSI
Era – IC Circuits, Performance Consideration, and Measures, Speed up Techniques,
Difference between RICS and CISC.

Unit-2 Input and OutputOrganization
Accessing I/O devices, Direct Memory Access (DMA), Buses: SynchronousBusand
Asynchronous Bus, Interface Circuits, Standard IO Interface.

Unit-3 Arithmetic
Addition and Subtraction of Signed Numbers, Design of fast Adders, Multiplication of
Positive numbers, Signed Operand Multiplication, Fast Multiplication, Integer Division,
Floating Point Number Operations: IEEE 754 Floating Point Format, Arithmetic Operations
The Processing Unit

Unit-4 Some fundamental Concepts Execution of complete Instruction, Multiple bus
the organization, Hardwired Control, Micro programmed Control Pipelining

Unit-5 Basic Concepts: Role of Cache Memory, Pipeline Performance. DataHazards: Operand
Forwarding, Handling Data Hazards in Software and Side Effects and Instruction Hazards:
Unconditional Branches and Conditional Branches and Branch Prediction
Computer Memory System

Unit-6 Some Basic Concepts, Types of Memories: ROM and RAM,

SemiconductorRAMmemory,
Cache Memories: Mapping functions, Replacement Algorithms, Example of Mapping
Techniques

Object Oriented Programming

Unit-1 Basics of Object-Oriented Programming

The Origins of C++, Features of Object-Oriented Programming, relations
of Classes & Structures, Classes & Objects, Encapsulation, Data Abstraction, Inheritance, Inline Function, Constructor &Destructor, function overloading & Operator overloading, Static class
member, Static Member Function, Scope resolution Operator, Access members Data member & member Function, Defining member functions, Passing Object to Functions, Nested classes, local classes, Friend functions, the Friend class

Unit-2 Pointers, Arrays, Dynamic allocation Operator

Arrays Of Object, Pointers to Object, THIS pointer, type checking C++
Pointers, Pointers to Derived types, Pointers to Class members
Dynamic Allocation Pointers:-New & Delete Operator

Unit-3 Functions & Operator Overloading

Functions Overloading, Operator Overloading, Types Of Constructors, Destructors, Operator Overloading Using Friend Function, Unary & Binary Operator Overloading(Arithmetic, Comparison Operator Overloading), Assignment Operator Overloading(=,+=)

Unit-4 Inheritance & Virtual Function

Inheritance, Single Inheritance, Types of Derivations, Passing parameters to base, Multiple Inheritance, Multilevel Inheritance, Hybrid
Inheritance, Hierarchical Inheritance, Virtual function, Calling a Virtual
function through a base class reference, Virtual functions are hierarchical, Pure virtual functions, Abstract classes, Early and late binding.

Unit-5 Templates & Exception handling

Function Template, Class Template, Generic Classes, Generic Functions, Applying Generic Functions Type Name, export keyword

Power of Templates
Standard Template Library (STL):-STL Container, STL Algorithm, STL iterator.
Exception handling:-Exception handling fundamentals, Catching, Throwing,& Handling Exception, Exception handling options,

Unit-6 I/O System Basics, FileI/0
Streams ,File Pointers & Redirections Streams, C++ stream, C++ Predefined stream classes, Formatted I/O, C++ file I/O, manipulators, stream and the File classes, File operations, namespaces, std namespaces

Environmental Studies

Environmental Studies

UNIT-1 NATURAL RESOURCES AND ASSOCIATED PROBLEMS

INTRODUCTION
Types of resources
Role of an individual in conservation of natural resources

UNIT-2 ECOSYSTEMS

Concept of ecosystem
Basic Structure of an Ecosystem
Functions of an ecosystem.
Producers, Consumers, Decomposers
Energy flow in the ecosystem.
Ecological Succession
Food chains, food webs, and ecological pyramids
Types of ecosystems.

UNIT-3 BIODIVERSITY AND ITS CONSERVATION

Levels of Biodiversity
Biogeographical classification of India 3
Value of biodiversity
Global biodiversity
Biological diversity at the national level (Indian biodiversity)
Regional or local biodiversity
India as a mega-diversity nation
Hot spots of biodiversity
Threats to biodiversity

Loss of habitat
Endangered species of India
Endemic species of India
Conservation of biodiversity

UNIT-4 ENVIRONMENTAL POLLUTION

The environment
Environmental pollution.
Causes of Radioactive Pollution
Effects of Radioactive Pollution
Solid waste management
Role of an Individual in Prevention of Pollution

UNIT-5 SOCIAL ISSUES AND THE ENVIRONMENT

Disaster management: Floods, Earthquake, Cyclones, and Landslides
Urban problems related to energy
Water conservation, rainwater harvesting, watershed management
Resettlement and rehabilitation of people: its problems and concerns
Environmental ethics: issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, and the holocaust
Wasteland reclamation
Consumerism and waste products

UNIT-6 ENVIRONMENTAL PROTECTION

From unsustainable to sustainable development
The Environment (Protection) Act
The air (prevention and control of pollution) act
The Water (prevention and control of pollution) Act
The Wildlife Protection Act
Forest conservation act
Population and human health