COMPILER DESIGN


Unit – V: More powerful LR parses, construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Error recovery in LR Parsing.

Unit – VI: Semantic analysis, SDT, evaluation of semantic rules, symbol tables, use of symbol tables. Runtime Environment: storage organization, stack allocation, access to non-local data, heap management, parameter passing mechanisms.

Unit – VII: Intermediate code, three address code, quadruples, triples, abstract syntax trees, basic blocks, CFG. Machine independent code optimization - Common sub expression elimination, constant propagation, dead code elimination, strength reduction, loop optimization, procedure inlining.

Unit – VIII: Machine dependent code optimization: Peephole optimization, register allocation, instruction scheduling, inter procedural optimization, garbage collection via reference counting.

Text books:
3. Principles of compiler design, 2nd ed, Nandini Prasad, Elsevier

Reference books:
1. http://www.nptel.iitm.ac.in/downloads/106108052/
2. Compiler construction, Principles and Practice, Kenneth C Louden, CENGAGE
3. Implementations of Compiler, A new approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER
COMPUTER NETWORKS


The OSI models: layered architecture, peer to peer process, encapsulation, Layers in OSI model: physical layer, data link layer, Network layer, transport layer, session layer, presentation layer, application layer, TCP/IP protocol suite: physical and data link layers, network layer, transport layer, application layer, Addressing: physical address, logical address, port address, specific address.

Unit-II: Physical layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

Unit -III: Framing: fixed size framing, variable size framing, Flow control, Error control, Error detections, Error correction: block coding, linear block codes, cyclic codes: cyclic redundancy check, hard ware implementation, polynomials, cyclic code analysis, advantages, Checksum: idea, one’s complement internet check sum, services provided to Network Layer, elementary Data link Layer protocols- Unrestricted Simplex protocol, Simplex Stop-and-Wait Protocol, Simplex protocol for Noisy Channel.

Unit-IV: Sliding Window Protocol: One bit, Go back N, Selective Repeat-Stop and wait protocol, data link layer HDLC: configuration and transfer modes, frames, control field, point to point protocol(PPP): framing, transition phase, multi plexing, multi link PPP.

Unit -V: Random Access: ALOHA, career sense multiple access (CSMA), career sense multiple access with collision detection, career sense multiple access with collision avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: frequency division multiple access(FDMA), time division multiple access(TDMA), code division multiple access(CDMA).

Unit-VI: IEEE Standards: data link layer, physical layer, Manchester encoding, Standard Ethernet: MAC Sub Layer, physical layer, Fast Ethernet: MAC Sub Layer, physical layer, IEEE-802.11: Architecture, MAC sub layer, addressing mechanism, frame structure.

Unit-VIII : Data Link Layer Switching-Bridges, Local internet working Spanning tree bridges, remote bridges, switch virtual LANs.

Text Books:
1) Data communications and networking 4th edition Behrouz A Fourzan, TMH
3) Computer networks, Mayank Dave, CENGAGE

Reference Books:
1) http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Computer%20networks/New_index1.html
2) Computer networks, A system Approach, 5th ed, Larry L Peterson and Bruce S Davie, Elsevier
UNIT I: overview of microcomputer structure and operation, execution of a three instruction program, microprocessor evolution and types, the 8086 micro processor family, 8086 internal architecture, introduction to programming the 8086, 8086 family assembly language programming: Program development steps, constructing the machine codes for 8086 instructions, writing programs for use with an assembler, assembly language program development tools.

UNIT II: Implementing standard program structures in 8086 assembly language
Simple sequence programs, jumps, flags and conditional jumps, if-then, if-then-else and multiple if-then-else programs, while-do programs, repeat-until programs, instruction timing and delay loops.

UNIT III: Strings, procedures and macros
The 8086 string instructions, writing and using procedures, writing and using assembler macros.

UNIT IV: 8086 instruction descriptions and assembler directives
Instruction descriptions, assembler directives, DB, DD, DQ, DT, DW, end-program, endp, ends, equ, even-align on even memory address, extern, global, public/extern, group, include, label, length- not implemented IBM MASM, name--offset, ORG, proc, ptr, segment, short, type.

UNIT V: 8086: 8086 interrupts and interrupt applications
8086 interrupts and interrupt responses, hardware interrupt applications, Software Interrupts, priority of interrupts, software interrupt applications, programming.

UNIT VI: 8086 ASSEMBLY LANGUAGE PROGRAMMES - Bit & Logic operations, strings, procedures, Macros, Number Format, Conversions, ASCII operations, signed Numbers Arithmetic, Programming using High level language constructs.


UNIT VIII: Introduction to Pentium Processor architecture, dual Core and Core Duo –Basic characteristics, Architecture and comparison with other CPU’s.

Text Books:
1. Microprocessors and Interfacing, Douglas V Hall, Revised 2nd ed, TMH
2. The X86 Microprocessors, architecture, Programming and Interfacing(8086 to Pentium), Lyla B Das, PEA
3. The 8086 Microprocessor: Programming & Interfacing the PC, Ayala: Cengage
**Reference Books:**


4. The 8086 Microprocessor: Programming & Interfacing the PC, Kenneth J Ayala, CENGAGE

5. Microprocessors, The 8086/8088, 80186/80286, 80386/80486 and the Pentium Family, Nilesh B Bahadure, PHI

6. Microprocessors and Microcontrollers, Senthil Kumar, Saravanan, Jeevanathan, OXFORD
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OPERATING SYSTEMS

UNIT I : Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, protection and security, distributed systems, special purpose systems, operating systems structures and systems calls, operating systems generation.


UNIT III : Concurrency : Process synchronization, the critical- section problem, Peterson’s Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples

UNIT IV : Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table , segmentation

UNIT V : Virtual Memory Management:
virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

UNIT VI : Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT VII : File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.
File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management

UNIT VIII : Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management

TEXT BOOKS :

REFERENCES :
3. Operating System A Design Approach-Crowley, TMH.
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COMPUTER GRAPHICS

Output primitives: Points and lines, line drawing algorithms (Bresenham’s and DDA Line derivations and algorithms), mid-point circle and ellipse algorithms.

UNIT II : Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms. Inside and outside tests.

UNIT III : 2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. (p.nos 204-227 of text book-1).

UNIT IV : 2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland–Hodgeman polygon clipping algorithm.

UNIT V : 3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.

UNIT VI : 3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3D Viewing pipeline, clipping, projections (Parallel and Perspective).

UNIT VII : Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSPtree methods, area sub-division and octree methods.

UNIT VIII : Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS:
4. Computer Graphics, Steven Harrington, TMH

REFERENCE BOOKS:
2. Computer Graphics, Peter, Shirley, CENGAGE
5. Procedural elements for Computer Graphics, David F Rogers, 2/e, TMH
ADVANCED DATA STRUCTURES
(Note: C++ and Java implementation is not included in the syllabus)

Unit I : Dictionaries : Sets, Dictionaries, Hash Tables, Open Hashing, Closed Hashing (Rehashing Methods), Hashing Functions( Division Method, Multiplication Method, Universal Hashing), Analysis of Closed Hashing Result (Unsuccessful Search, Insertion, Successful Search, Deletion), Hash Table Restructuring, Skip Lists, Analysis of Skip Lists. (Reference 1)

Unit II : Balanced Trees : AVL Trees: Maximum Height of an AVL Tree, Insertions and Deletions. 2-3 Trees: Insertion, Deletion.


Unit IV: Graphs : Operations on Graphs: Vertex insertion, vertex deletion, find vertex, edge addition, edge deletion, Graph Traversals- Depth First Search and Breadth First Search(Non recursive) . Graph storage Representation- Adjacency matrix, adjacency lists.

Unit V : Graph algorithms : Minimum-Cost Spanning Trees- Prim's Algorithm, Kruskal's Algorithm Shortest Path Algorithms: Dijkstra's Algorithm, All Pairs Shortest Paths Problem: Floyd's Algorithm, Warshall's Algorithm,

Unit VI : Sorting Methods : Order Statistics: Lower Bound on Complexity for Sorting Methods: Lower Bound on Worst Case Complexity, Lower Bound on Average Case Complexity, Heap Sort, Quick Sort, Radix Sorting, Merge Sort.

Unit VII : Pattern matching and Tries : Pattern matching algorithms- the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm. Tries: Definitions and concepts of digital search tree, Binary trie, Patricia , Multi-way trie


Text Books :


Reference Books:

1. Web: http://lcm.csa.iisc.ernet.in/dsa/dsa.html
OPERATING SYSTEM & COMPILER DESIGN LAB

PART – A:
1. Design a Lexical analyzer for the given language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language.
4. Design LALR bottom up parser for the given language.
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.

PART- B:
1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
   a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
   a) FIFO b) LRU c) LFU Etc. …
8. Simulate Paging Technique of memory management.
ADVANCED DATA STRUCTURES Lab

1. To implement functions of Dictionary using Hashing (division method, Multiplication method, Universal hashing)
2. To perform various operations i.e., insertions and deletions on AVL trees
3. To perform various operations i.e., insertions and deletions on 2-3 trees.
4. To implement operations on binary heap.
5. To implement operations on graphs
   i) vertex insertion
   ii) Vertex deletion
   iii) finding vertex
   iv) Edge addition and deletion
6. To implement Depth First Search for a graph nonrecursively.
7. To implement Breadth First Search for a graph nonrecursively.
8. To implement Prim’s algorithm to generate a min-cost spanning tree.
9. To implement Krushkal’s algorithm to generate a min-cost spanning tree.
10. To implement Dijkstra’s algorithm to find shortest path in the graph.
11. To implement pattern matching using Boyer-Moore algorithm.
12. To implement Knuth-Morris-Pratt algorithm for pattern matching.
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