NPTEL : Natural Language Processing (Computer Science and Engineering)

Co-ordinators : Prof. Pushpak Bhattacharya

NPTEL : Design and Analysis of Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Sundar Viswanathan, Prof. Ajit A Diwan, Prof. Abhiram G Ranade

Lecture 32 - Approximation Algorithms

Lecture 33 - Approximation Algorithms

Lecture 34 - Approximation Algorithms for NP

NPTEL : Software Engineering (Computer Science and Engineering)

Co-ordinators : Prof. N.L. Sarda, Prof. Umesh Bellur, Prof. Rushikesh K Joshi

NPTEL : NOC:Software Testing (2017) (Computer Science and Engineering)

Co-ordinators : Prof. Meenakshi D'souza

Lecture 32 - Input Space Partitioning

Lecture 33 - Input Space Partitioning: Coverage Criteria

Lecture 34 - Input Space Partitioning Coverage Criteria: Example

Lecture 35 - Syntax-Based Testing

Lecture 36 - Mutatioon Testing

Lecture 37 - Mutation Testing for Programs

Lecture 38 - Mutation Testing: Mutation Operators for Source Code

Lecture 39 - Mutation Testing Vs. Graphs and Logic Based Testing

Lecture 40 - Assignment Solving for Week8

Lecture 41 - Mutation testing

Lecture 42 - Mutation Testing : Mutation for integration

Lecture 43 - Mutation testing : Grammars and inputs

Lecture 44 - Software Testing Course: Summary after Week 9

Lecture 45 - Testing of web Applications and Web Services

Lecture 46 - Testing of web Applications and Web Services

Lecture 47 - Testing of web Applications and Web Services

Lecture 48 - Testing of Object-Oriented Applications

Lecture 49 - Testing of Object-Oriented Applications

Lecture 50 - Symbolic Testing - 1

Lecture 51 - Symbolic Testing - 2

Lecture 52 - DART: Directed Automated Random Testing - 1

Lecture 53 - DART: Directed Automated Random Testing - 2

Lecture 54 - DART: Directed Automated Random Testing - 3

Lecture 55 - Testing of Object-Oriented Applications

Lecture 56 - Testing of Mobile Applications

Lecture 57 - Non-Functional System Testing

Lecture 58 - Regression Testing

Lecture 59 - Assignment: Week 11 Solving

Lecture 60 - Software Testing: Summary at the End of the Course

NPTEL : NOC:Design and Pedagogy of the Introductory Programming Course (Computer Science and Engineering)

Co-ordinators : Prof. Abhiram G Ranade

NPTEL : NOC:An Introduction to Programming through C++ (Computer Science and Engineering)

Co-ordinators : Prof. Abhiram G Ranade

NPTEL : NOC:Demystifying Networking (Computer Science and Engineering)

Co-ordinators : Prof.Sridhar Iyer

Lecture 1 - Introduction

Lecture 2 - Analogy for CEO's Problem

Lecture 3 - Discussing the CEO's Problem

Lecture 4 - From the CEO's Company to Layers in a Network

Lecture 5 - Layers in Detail

Lecture 6 - Layered Nature of a Network

Lecture 7 - Introduction to Internet Data Capturing using Wireshark

Lecture 8 - Network data captured while requesting a website

Lecture 9 - What is Cisco Packet Tracer

Lecture 10 - Modes of Cisco Packet Tracer

Lecture 11 - Getting Cisco Packet Tracer

Lecture 12 - Logical and Physical Typologies in Cisco Packet Tracer

Lecture 13 - Devices on Cisco Packet Tracer

Lecture 14 - Introduction to the Cisco Packet Tracer Activity for Week 1

Lecture 15 - Introduction to the campus network on Cisco Packet Tracer

Lecture 16 - Loading the page in Simulation Mode

Lecture 17 - Inspecting the packets in Simulation Mode

Lecture 18 - Editing the dummy website on Cisco Packet Tracer

Lecture 19 - Summary of the Cisco Packet Tracer Activity

Lecture 20 - Introduction to Anupam's Adventure

Lecture 21 - Anupam's adventure brings us to IP Addressing

Lecture 22 - Addressing at various layers

Lecture 23 - IP Addresses

Lecture 24 - Address Translation

Lecture 25 - Introduction to IP Addressing

Lecture 26 - Creating a network with Sub-net mask

Lecture 27 - Nomenclature of a sub-net mask

Lecture 28 - Network addresses and Private networks

Lecture 29 - Introduction to the Addressing Topology

Lecture 30 - Addressing a local network and DHCP

Lecture 31 - Addressing a local network manually

Lecture 32 - Addressing in Pubilc and Private Networks

Lecture 33 - Verifying Connectivity using Ping

Lecture 34 - Using network address translation to communicate on internet

Lecture 35 - Using Sub nets and Summary of addressing

Lecture 36 - Summary of the week

Lecture 37 - Analogy for the week 2

Lecture 38 - Discussion on dabbawala analogy

Lecture 39 - From dabbawalas to routers and switches

Lecture 40 - What is routing ?

Lecture 41 - Static routing in a router in CPT

Lecture 42 - How does a switch forwards packets CPT

Lecture 43 - How to add static route in a router? (CPT)

Lecture 44 - Traveler's dilemma

Lecture 45 - Duscussing the Traveler's dilemma

Lecture 46 - From Traveler's dilemma to Dynamic Routing

Lecture 47 - Dynamic Routing with Distance Vector

Lecture 48 - Distance Vector Routing in Detail

Lecture 49 - Dynamic Routing with Link State

Lecture 50 - Setting up dynamic routing in Packet Tracer

Lecture 51 - Summary of the week

Lecture 52 - Introduction to analogy for week 3

Lecture 53 - Analogy for week 3

Lecture 54 - Questions on analogy for week 3

Lecture 55 - Understanding the new order requirements

Lecture 56 - Introduction to Tranport Layer

Lecture 57 - Introduction to TCP

Lecture 58 - Introduction to UDP

Lecture 59 - Exploring UDP on Cisco Packet Tracer

Lecture 60 - TCP Connection Establishment

Lecture 61 - TCP Connection Closure

Lecture 62 - Summay of TCP and UDP on Cisco Packet Tracer

Lecture 63 - The story of the delivery fiasco

Lecture 64 - From delivery fisaco to Port Numbers

NPTEL : NOC:Learning Analytics Tools (Computer Science and Engineering)

Co-ordinators : Prof. Ramkumar Rajendran

NPTEL : NOC:Design and Engineering of Computer Systems (Computer Science and Engineering)

Co-ordinators : Prof. Mythili Vutukuru

NPTEL : NOC:Software Conceptual Design (Computer Science and Engineering)

Co-ordinators : Prof. Sridhar Iyer, Prof. Prajish Prasad, Prof. T. G. Lakshmi

NPTEL : NOC:Introduction to Game Theory and Mechanism Design (Computer Science and Engineering)

Co-ordinators : Prof. Swaprava Nath

NPTEL : NOC:Introduction to Computer and Network Performance Analysis using Queuing Systems (Computer Science and Engineering)

Co-ordinators : Prof. Varsha Apte

NPTEL : NOC:Games and Information (Computer Science and Engineering)

Co-ordinators : Prof. Ankur A. Kulkarni

NPTEL : NOC:Distributed Optimization and Machine Learning (Computer Science and Engineering)

Co-ordinators : Prof. Mayank Baranwal

Lecture 1 - Introduction to optimization

Lecture 2 - Analyzing optimization algorithms in continuous time domain

Lecture 3 - Course Outline

Lecture 4 - Basics of optimization problems

Lecture 5 - Convex sets and Convex functions

Lecture 6 - Strictly and strongly convex functions

Lecture 7 - Implications of strong convexity

Lecture 8 - Primal and dual optimization problems

Lecture 9 - Slaters condition

Lecture 10 - Analysis of gradient descent algorithm

Lecture 11 - KKT conditions

Lecture 12 - Acceleration under strong convexity

Lecture 13 - Accelerate the convergence even further

Lecture 14 - Stability theory

Lecture 15 - Connections to optimization problems

Lecture 16 - Exponential stability

Lecture 17 - Bregman Divergance

Lecture 18 - Rescaled Gradient Flow

Lecture 19 - Advanced Results on PL inequality - Part 1

Lecture 20 - Advanced Results on PL inequality - Part 2

Lecture 21 - Constrained Optimization Problem

Lecture 22 - Augmented Lagrangian

Lecture 23 - Method of Multipliers

Lecture 24 - Dual Ascent and Dual Decomposition

Lecture 25 - ADMM Algorithm

Lecture 26 - Basics of Graph Theory - 1

Lecture 27 - Basics of Graph Theory - 2

Lecture 28 - Consensus and Average Consensus - 1

Lecture 29 - Consensus and Average Consensus - 2

Lecture 30 - Consensus Algorithms

Lecture 31 - Consensus Algorithms - Fixed time

NPTEL : Computational Geometry (Computer Science and Engineering)

Co-ordinators : Prof. Sandeep Sen

Lecture 32 - Quadtrees Epsilon -WSPD

Lecture 33 - Construction of Epsilon - WSPD

Lecture 34 - Epsilon - WSPD to Geometric Spanner

Lecture 35 - Epsilon-Nets & VC Dimension

Lecture 36 - Epsilon-Nets & VC Dimension contd

Lecture 37 - Geometric Set Cover

Lecture 38 - Geometric Set Cover (with Bounded VC Dimension)

Lecture 39 - Shape Representation

Lecture 40 - Shape Comparison

NPTEL : Logic for CS (Computer Science and Engineering)

Co-ordinators : Prof. S. Arun Kumar

NPTEL : Computer Architecture (Prof. Anshul Kumar) (Computer Science and Engineering)

Co-ordinators : Prof. Anshul Kumar

NPTEL : Data Structures And Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Naveen Garg

NPTEL : Introduction to Computer Graphics (Computer Science and Engineering)

Co-ordinators : Prof. Prem K Kalra

NPTEL : Principles of Programming Languages (Computer Science and Engineering)

Co-ordinators : Prof. S. Arun Kumar

NPTEL : Parallel Computing (Computer Science and Engineering)

Co-ordinators : Dr. Subodh Kumar

NPTEL : Operating Systems (Computer Science and Engineering)

Co-ordinators : Prof. Sorav Bansal

NPTEL : NOC:Computer Architecture (2017) (Computer Science and Engineering)

Co-ordinators : Prof. Smruti R.Sarangi

NPTEL : NOC:Introduction to Parallel Programming in OpenMP (Computer Science and Engineering)

Co-ordinators : Dr. Yogish Sabharwal

Lecture 65 - Pipeline based algorithm for Broadcast

Lecture 66 - Introduction to parallel graph algorithms

Lecture 67 - Breadth First Search BFS using matrix algebra

Lecture 68 - BFS Shared memory parallelization using OpenMP

Lecture 69 - Distributed memory settings and data distribution

Lecture 70 - Distributed BFS algorithm

Lecture 71 - Performance considerations

Lecture 72 - Prims Algorithm

Lecture 73 - OpenMP based shared memory parallelization for MST

Lecture 74 - MPI based distributed memory parallelization for MST

Lecture 75 - Sequential Algorithm Adaptation from Prims

Lecture 76 - Parallelization Strategy for Prims algorithm

Lecture 77 - Dry run with the parallel strategy

Lecture 78 - Johnsons algorithm with 1D data distribution

Lecture 79 - Speedup analysis on a grid graph

Lecture 80 - Floyds algorithm for all pair shortest paths

Lecture 81 - Floyds algorithm with 2D data distribution

Lecture 82 - Adaptation to transitive closures

Lecture 83 - Parallelization strategy for connected components

Lecture 84 - Analysis for parallel connected components

NPTEL : NOC:Synthesis of Digital Systems (Computer Science and Engineering)

Co-ordinators : Prof. Preeti Ranjan Panda

NPTEL : NOC:An Introduction to Artificial Intelligence (Computer Science and Engineering)

Co-ordinators : Prof. Mausam

Lecture 32 - Adversarial Search: Analysis of Alpha Beta Pruning

Lecture 33 - Adversarial Search: Analysis of Alpha Beta Pruning (Continued...)

Lecture 34 - Adversarial Search: Horizon Effect, Game Databases and Other Ideas

Lecture 35 - Adversarial Search: Summary and Other Games

Lecture 36 - Constraint Satisfaction Problems: Representation of the atomic state

Lecture 37 - Constraint Satisfaction Problems: Map coloring and other examples of CSP

Lecture 38 - Constraint Satisfaction Problems: Backtracking Search

Lecture 39 - Constraint Satisfaction Problems: Variable and Value Ordering in Backtracking Search

Lecture 40 - Constraint Satisfaction Problems: Inference for detecting failures early

Lecture 41 - Constraint Satisfaction Problems: Exploiting problem structure

Lecture 42 - Logic in AI : Different Knowledge Representation systems - Part 1

Lecture 43 - Logic in AI : Syntax - Part 2

Lecture 44 - Logic in AI : Semantics - Part 3

Lecture 45 - Logic in AI : Forward Chaining - Part 4

Lecture 46 - Logic in AI : Resolution - Part 5

Lecture 47 - Logic in AI : Reduction to Satisfiability Problems - Part 6

Lecture 48 - Logic in AI : SAT Solvers: DPLL Algorithm - Part 7

Lecture 49 - Logic in AI : Sat Solvers: WalkSAT Algorithm - Part 8

Lecture 50 - Uncertainty in AI: Motivation

Lecture 51 - Uncertainty in AI: Basics of Probability

Lecture 52 - Uncertainty in AI: Conditional Independence and Bayes Rule

Lecture 53 - Bayesian Networks: Syntax

Lecture 54 - Bayesian Networks: Factoriziation

Lecture 55 - Bayesian Networks: Conditional Independences and d-Separation

Lecture 56 - Bayesian Networks: Inference using Variable Elimination

Lecture 57 - Bayesian Networks: Reducing 3-SAT to Bayes Net

Lecture 58 - Bayesian Networks: Rejection Sampling

Lecture 59 - Bayesian Networks: Likelihood Weighting

Lecture 60 - Bayesian Networks: MCMC with Gibbs Sampling

Lecture 61 - Bayesian Networks: Maximum Likelihood Learning

Lecture 62 - Bayesian Networks: Maximum a-Posteriori LearningÂ

Lecture 63 - Bayesian Networks: Bayesian Learning

Lecture 64 - Bayesian Networks: Structure Learning and Expectation Maximization

Lecture 65 - Introduction, Part 10: Agents and Environments

Lecture 66 - Decision Theory: Steps in Decision Theory

Lecture 67 - Decision Theory: Non Deterministic Uncertainty

Lecture 68 - Probabilistic Uncertainty and Value of perfect information

Lecture 69 - Expected Utility vs Expected Value

Lecture 70 - Markov Decision Processes: Definition

Lecture 71 - Markov Decision Processes: An example of a Policy

Lecture 72 - Markov Decision Processes: Policy Evaluation using system of linear equations

Lecture 73 - Markov Decision Processes: Iterative Policy Evaluation

Lecture 74 - Markov Decision Processes: Value Iteration

Lecture 75 - Markov Decision Processes: Policy Iteration and Applications and Extensions of MDPs

Lecture 76 - Reinforcement Learning: Background

Lecture 77 - Reinforcement Learning: Model-based Learning for policy evaluation (Passive Learning)

Lecture 78 - Reinforcement Learning: Model-free Learning for policy evaluation (Passive Learning)

Lecture 79 - Reinforcement Learning: TD Learning

Lecture 80 - Reinforcement Learning: TD Learning and Computational Neuroscience

Lecture 81 - Reinforcement Learning: Q Learning

Lecture 82 - Reinforcement Learning: Exploration vs Exploitation Tradeoff

Lecture 83 - Reinforcement Learning: Generalization in RL

Lecture 84 - Deep Learning: Perceptrons and Activation functions

Lecture 85 - Deep Learning: Example of Handwritten digit recognition

Lecture 86 - Deep Learning: Neural Layer as matrix operations

Lecture 87 - Deep Learning: Differentiable loss function

Lecture 88 - Deep Learning: Backpropagation through a computational graph

Lecture 89 - Deep Learning: Thin Deep Vs Fat Shallow Networks

Lecture 90 - Deep Learning: Convolutional Neural Networks

Lecture 91 - Deep Learning: Deep Reinforcement Learning

Lecture 92 - Ethics of AI: Humans vs Robots

Lecture 93 - Ethics of AI: Robustness and Transparency of AI systems

Lecture 94 - Ethics of AI: Data Bias and Fairness of AI systems

Lecture 95 - Ethics of AI: Accountability, privacy and Human-AI interaction

Lecture 96 - Wrapup

NPTEL : NOC:Advanced Computer Architecture (2021) (Computer Science and Engineering)

Co-ordinators : Prof. Smruti R. Sarangi

NPTEL : NOC:Advanced Distributed systems (Computer Science and Engineering)

Co-ordinators : Prof. Smruti R. Sarangi

NPTEL : Design Verification and Test of Digital VLSI Circuits (Computer Science and Engineering)

Co-ordinators : Dr. Santosh Biswas, Prof. Jatindra Kumar Deka

Lecture 1 - Introduction to Digital VLSI Design Flow

Lecture 2 - High Level Design Representation

Lecture 3 - Transformations for High Level Synthesis

Lecture 4 - Introduction to HLS: Scheduling, Allocation and Binding Problem

Lecture 5 - Scheduling Algorithms - 1

Lecture 6 - Scheduling Algorithms - 2

Lecture 7 - Binding and Allocation Algorithms

Lecture 8 - Two level Boolean Logic Synthesis - 1

Lecture 9 - Two level Boolean Logic Synthesis - 2

Lecture 10 - Two level Boolean Logic Synthesis - 3

Lecture 11 - Heuristic Minimization of Two-Level Circuits

Lecture 12 - Finite State Machine Synthesis

Lecture 13 - Multilevel Implementation

Lecture 14 - Introduction to formal methods for design verification

Lecture 15 - Temporal Logic: Introduction and Basic Operators

Lecture 16 - Syntax and Semantics of CTL

Lecture 17 - Syntax and Semantics of CTL â€“ Continued

Lecture 18 - Equivalence between CTL Formulas

Lecture 19 - Introduction to Model Checking

Lecture 20 - Model Checking Algorithms - I

Lecture 21 - Model Checking Algorithms - II

Lecture 22 - Model Checking with Fairness

Lecture 23 - Binary Decision Diagram: Introduction and construction

Lecture 24 - Ordered Binary Decision Diagram

Lecture 25 - Operation on Ordered Binary Decision Diagram

Lecture 26 - Ordered Binary Decision Diagram for State Transition Systems

Lecture 27 - Symbolic Model Checking

Lecture 28 - Introduction to Digital VLSI Testing

Lecture 29 - Functional and Structural Testing

Lecture 30 - Fault Equivalence

Lecture 31 - Fault Simulation - 1

NPTEL : NOC:Computer Organization and Architecture - A Pedagogical Aspect (Computer Science and Engineering)

Co-ordinators : Prof.Arnab sarkar, Prof.Jatindra Kumar Deka, Dr. Santosh Biswas

NPTEL : NOC:Embedded Systems-Design Verification and Test (Computer Science and Engineering)

Co-ordinators : Prof.Jatindra Kumar Deka, Dr. Santosh Biswas, Prof.Arnab Sarkar

NPTEL : NOC:Multi-Core Computer Architecture-Storage and Interconnects (Computer Science and Engineering)

Co-ordinators : Prof. John Jose

NPTEL : NOC:Multi-Core Computer Architecture (Computer Science and Engineering)

Co-ordinators : Prof. John Jose

Lecture 32 - Introduction to DRAM System

Lecture 33 - DRAM Controllers and Address Mapping

Lecture 34 - Secondary Storage Systems

Lecture 35 - Design Concepts in Storage Systems

Lecture 36 - Introduction to Tiled Chip Multicore Processors

Lecture 37 - Routing Techniques in Network On Chip

Lecture 38 - Network On Chip Router Micro-Architecture

Lecture 39 - Concepts in Network on Chip

Lecture 40 - Energy Efficient Bufferless NoC Routers

Lecture 41 - Sidebuffered Deflection Routers

Lecture 42 - Concepts in Deflection Routers [T]

Lecture 43 - QoS of NoC and Caches in TCMP Systems

Lecture 44 - Emerging Trends in Network On Chips

Lecture 45 - Domain Specific Accelarators

Lecture 46 - Introduction to VEGA Microprocessors (Case Study)

Lecture 47 - Concepts in TCMP Systems

Lecture 48 - How to Explore Computer Architecture?

NPTEL : NOC:Randomized Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Benny George K

NPTEL : NOC:Parallel Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Sajith Gopalan

NPTEL : NOC:Discrete Mathematics (Prof. Sajith Gopalan) (Computer Science and Engineering)

Co-ordinators : Prof. Benny George K

NPTEL : NOC:Advanced Computer Architecture (Computer Science and Engineering)

Co-ordinators : Prof. John Jose

NPTEL : NOC:User-centric Computing for Human-Computer Interaction (Computer Science and Engineering)

Co-ordinators : Prof. Samit Bhattacharya

Lecture 1 - Introduction to UCC and history

Lecture 2 - Issues and challenges

Lecture 3 - Latest research trends

Lecture 4 - User-Centric Design and Software Engineering

Lecture 5 - Components of SDLC - Contextual Inquiry

Lecture 6 - Components of SDLC - Design Guidelines

Lecture 7 - Components of SDLC - Prototyping

Lecture 8 - Case study (web site design)

Lecture 9 - Introduction to User-Centric Computing

Lecture 10 - The UCC framework with illustrative case study

Lecture 11 - User-centric models - introduction and descriptive models

Lecture 12 - User-centric models - predictive models and taxonomy

Lecture 13 - Introduction to GOMS family of models

Lecture 14 - Keystroke-Level Model (KLM)

Lecture 15 - (CMN)GOMS Model

Lecture 16 - The Fitts' Law

Lecture 17 - The Hick-Hyman Law

Lecture 18 - 2D and 3D pointing models

Lecture 19 - The Steering Law for constrained navigation

Lecture 20 - Model for hierarchical menu selection

Lecture 21 - Mobile typing models (single finger and two thumb typing)

Lecture 22 - Model for touch performance (FFitts' law)

Lecture 23 - Introduction to formal models in UCD

Lecture 24 - Formal modeling of user-computer dialogue

Lecture 25 - Case studies on the use of models

Lecture 26 - Introduction and research question formulation

Lecture 27 - Variables determination and experiment design

Lecture 28 - Data analysis including model building

Lecture 29 - Introduction to user-centric design evaluation and expert evaluation technique

Lecture 30 - User evaluation, empirical and model-based evaluation

Lecture 31 - Concluding remarks

NPTEL : NOC:Computer Graphics (Computer Science and Engineering)

Co-ordinators : Prof. Samit Bhattacharya

Lecture 32 - Concluding remarks

NPTEL : NOC:C-Based VLSI Design (Computer Science and Engineering)

Co-ordinators : Prof. Chandan Karfa

Lecture 1 - Introduction to C-Based VLSI Design

Lecture 2 - C-based VLSI Design: An Overview

Lecture 3 - C-based VLSI Design: Problem Formulation

Lecture 4 - C-based VLSI Design: Course Plan

Lecture 5 - Introduction to Scheduling

Lecture 6 - ILP formulation of Scheduling

Lecture 7 - ILP formulation of MRLC and MLRC Scheduling

Lecture 8 - Multiprocessor Scheduling

Lecture 9 - Huâ€™s algorithm for Multiprocessor Scheduling

Lecture 10 - List based Scheduling of MLRC

Lecture 11 - List based Scheduling of MRLC

Lecture 12 - Forced Directed Scheduling

Lecture 13 - Forced Directed MLRC and MRLC Scheduling Algorithm

Lecture 14 - Path Based Scheduling

Lecture 15 - Path Based Scheduling

Lecture 16 - Allocation and Binding Problem Formulation

Lecture 17 - Left Edge Algorithm

Lecture 18 - ILP Formulation of Allocation and Binding

Lecture 19 - Allocation and Binding for Hierarchical Graph

Lecture 20 - Register Allocation and Binding

Lecture 21 - Multi-port Binding Problem

Lecture 22 - Datapath and Controller Synthesis

Lecture 23 - HLS for Arrays

Lecture 24 - HLS for Loops

Lecture 25 - HLS for Loop - pipeline

Lecture 26 - Hardware Efficient C Coding - Part I

Lecture 27 - Hardware Efficient C Coding - Part II

Lecture 28 - Dataflow Optimization in HLS

Lecture 29 - Frontend Optimizations in C

Lecture 30 - HLS Optimizations: Case Study 1

Lecture 31 - HLS Optimizations: Case Study 1

Lecture 32 - Simulation based Verification

Lecture 33 - RTL to C Reverse Engineering

Lecture 34 - Phase-wise Verification of HLS

Lecture 35 - Equivalence between C and RTL

Lecture 36 - Introduction to Hardware Security

Lecture 37 - HLS for Security

Lecture 38 - Attacks on RTL Logic locking

Lecture 39 - Introduction to Logic Synthesis

Lecture 40 - FPGA Technology Mapping

Lecture 41 - Introduction to Physical Synthesis

Lecture 42 - Introduction to Circuit optimizations

Lecture 43 - Recent Advances in C-Based VLSI Design

NPTEL : NOC:Design and Implementation of Human-Computer Interfaces (Computer Science and Engineering)

Co-ordinators : Prof. Samit Bhattacharya

NPTEL : NOC:Digital Design with Verilog (Computer Science and Engineering)

Co-ordinators : Prof. Chandan Karfa, Prof. Aryabartta Sahu

NPTEL : NOC:Parallel Computer Architecture (Computer Science and Engineering)

Co-ordinators : Prof. Hemangee K. Kapoor

Lecture 65 - Flow Control

NPTEL : Computer Algorithms - 2 (Computer Science and Engineering)

Co-ordinators : Prof. Shashank K. Mehta

Lecture 1 - Graph_Basics

Lecture 2 - Breadth_First_Search

Lecture 3 - Dijkstra_Algo

Lecture 4 - All Pair Shortest Path

Lecture 5 - Matriods

Lecture 6 - Minimum Spanning Tree

Lecture 7 - Edmond's Matching Algo I

Lecture 8 - Edmond's Matching Algo II

Lecture 9 - Flow Networks

Lecture 10 - Ford Fulkerson Method

Lecture 11 - Edmond Karp Algo

Lecture 12 - Matrix Inversion

Lecture 13 - Matrix Decomposition

Lecture 14 - Knuth Morris Pratt Algo

Lecture 15 - Rabin Karp Algo

Lecture 16 - NFA Simulation

Lecture 17 - Integer-Polynomial Ops-I

Lecture 18 - Integer-Polynomial Ops-II

Lecture 19 - Integer-Polynomial Ops-III

Lecture 20 - Chinese Remainder-I

Lecture 21 - Chinese Remainder-II

Lecture 22 - Chinese Remainder-III

Lecture 23 - Discrete Fourier Transform-I

Lecture 24 - Discrete Fourier Transform-II

Lecture 25 - Discrete Fourier Transform-III

Lecture 26 - Schonhage Strassen Algo

Lecture 27 - Linear Programming-I

Lecture 28 - Linear Programming-II

Lecture 29 - Geometry-I

Lecture 30 - Geometry-II

Lecture 31 - Geometry-III

NPTEL : Theory of Computation (Computer Science and Engineering)

Co-ordinators : Prof. Somenath Biswas

NPTEL : Introduction to Problem Solving and Programming (Computer Science and Engineering)

Co-ordinators : Prof. D. Gupta

NPTEL : Riemann Hypothesis and its Applications (Computer Science and Engineering)

Co-ordinators : Prof. Manindra Agrawal

NPTEL : Biometrics (Computer Science and Engineering)

Co-ordinators : Prof. Phalguni Gupta

Lecture 1 - Biometrics

Lecture 2 - Biometrics

Lecture 3 - Biometrics

Lecture 4 - Biometrics

Lecture 5 - Biometrics

Lecture 6 - Biometrics

Lecture 7 - Biometrics

Lecture 8 - Biometrics

Lecture 9 - Biometrics

Lecture 10 - Biometrics

Lecture 11 - Biometrics

Lecture 12 - Biometrics

Lecture 13 - Biometrics

Lecture 14 - Biometrics

Lecture 15 - Biometrics

Lecture 16 - Biometrics

Lecture 17 - Biometrics

Lecture 18 - Biometrics

Lecture 19 - Biometrics

Lecture 20 - Biometrics

Lecture 21 - Biometrics

Lecture 22 - Biometrics

Lecture 23 - Biometrics

Lecture 24 - Biometrics

Lecture 25 - Biometrics

Lecture 26 - Biometrics

NPTEL : Parallel Algorithm (Computer Science and Engineering)

Co-ordinators : Prof. Phalguni Gupta

Lecture 1 - Parallel Algorithm

Lecture 2 - Parallel Algorithm

Lecture 3 - Parallel Algorithm

Lecture 4 - Parallel Algorithm

Lecture 5 - Parallel Algorithm

Lecture 6 - Parallel Algorithm

Lecture 7 - Parallel Algorithm

Lecture 8 - Parallel Algorithm

Lecture 9 - Parallel Algorithm

Lecture 10 - Parallel Algorithm

Lecture 11 - Parallel Algorithm

Lecture 12 - Parallel Algorithm

Lecture 13 - Parallel Algorithm

Lecture 14 - Parallel Algorithm

Lecture 15 - Parallel Algorithm

Lecture 16 - Parallel Algorithm

Lecture 17 - Parallel Algorithm

Lecture 18 - Parallel Algorithm

Lecture 19 - Parallel Algorithm

Lecture 20 - Parallel Algorithm

Lecture 21 - Parallel Algorithm

Lecture 22 - Parallel Algorithm

Lecture 23 - Parallel Algorithm

Lecture 24 - Parallel Algorithm

Lecture 25 - Parallel Algorithm

NPTEL : Computer Architecture (Dr. Mainak Chaudhuri) (Computer Science and Engineering)

Co-ordinators : Dr. Mainak Chaudhuri

NPTEL : Compiler Design (Prof. Sanjeev K Aggarwal) (Computer Science and Engineering)

Co-ordinators : Prof. Sanjeev K Aggarwal

NPTEL : NOC : Introduction to programming in C (Computer Science and Engineering)

Co-ordinators : Prof. Satyadev Nandakumar

NPTEL : NOC:Fundamentals of Database Systems (Computer Science and Engineering)

Co-ordinators : Dr. Arnab Bhattacharya

NPTEL : NOC:Theory of Computation (Computer Science and Engineering)

Co-ordinators : Prof. Raghunath Tewari

Lecture 1 - Introduction to Finite Automata

Lecture 2 - Basic Notation and Convention, DFA Edit Lesson

Lecture 3 - Example of DFAs

Lecture 4 - Computation by DFA and Regular operation

Lecture 5 - Introduction to Nondeterminism

Lecture 6 - NFA, definition and examples

Lecture 7 - Equivalence of NFA and DFA, Closure properties

Lecture 8 - Regular expressions

Lecture 9 - Algebraic properties, RE to NFA conversion

Lecture 10 - GNFA to RE conversion

Lecture 11 - More closure properties of regular languages

Lecture 12 - Non-regular languages and pumping lemma

Lecture 13 - Examples of non-regular languages

Lecture 14 - DFA minimization

Lecture 15 - Introduction to CFGs

Lecture 16 - Examples of CFGs, Reg subset of CFL

Lecture 17 - Parse tree, derivation, ambiguity

Lecture 18 - Normal forms, Chomsky normal form

Lecture 19 - Non-CFLs, pumping lemma

Lecture 20 - Examples of non- CFLs

Lecture 21 - Pushdown Automata

Lecture 22 - Pushdown Automata - Definition and Example

Lecture 23 - Pushdown Automata - Examples and Relation with CFGs

Lecture 24 - Closure Properties of CFLs

Lecture 25 - Deterministic Context Free Languages

Lecture 26 - Turing Machine

Lecture 27 - More on Turing Machine

Lecture 28 - Non deterministic Turing Machine Edit Lesson

Lecture 29 - Configuration Graphs

Lecture 30 - Closure Properties of Decidable and Turing recognizable languages

Lecture 31 - Decidability properties of Regular and Context Free Languages

NPTEL : NOC:Modern Algebra (Computer Science and Engineering)

Co-ordinators : Prof. Manindra Agrawal

NPTEL : NOC:Advanced Graph Theory (Computer Science and Engineering)

Co-ordinators : Dr.Rajiv Misra

Lecture 1 - Graph Theory: Introduction

Lecture 2 - Paths, Cycles and Trails

Lecture 3 - Eulerian Circuits, Vertex Degrees and Counting

Lecture 4 - The Chinese Postman Problem and Graphic Sequences

Lecture 5 - Trees and Distance

Lecture 6 - Spanning Trees and Enumeration

Lecture 7 - Matchings and Covers

Lecture 8 - Independent Sets, Covers and Maximum Bipartite Matching

Lecture 9 - Weighted Bipartite Matching

Lecture 10 - Stable Matchings and Faster Bipartite Matching

Lecture 11 - Factors and Perfect Matching in General Graphs

Lecture 12 - Matching in General Graphs: Edmondsâ€™ Blossom Algorithm

Lecture 13 - Connectivity and Paths: Cuts and Connectivity

Lecture 14 - k-Connected Graphs

Lecture 15 - Network Flow Problems

Lecture 16 - Vertex Coloring and Upper Bounds

Lecture 17 - Brooksâ€™ Theorem and Color-Critical Graphs

Lecture 18 - Counting Proper Colorings

Lecture 19 - Planar Graphs

Lecture 20 - Characterization of Planar Graphs

Lecture 21 - Line Graphs and Edge-coloring

Lecture 22 - Hamiltonian Graph, Traveling Salesman Problem and NP-Completeness

Lecture 23 - Connected Dominating Set and Distributed Algorithm

NPTEL : NOC:Cloud Computing and Distributed Systems (Computer Science and Engineering)

Co-ordinators : Dr.Rajiv Misra

NPTEL : NOC:Big Data Computing (Computer Science and Engineering)

Co-ordinators : Dr. Rajiv Misra

NPTEL : NOC:Introduction to Blockchain Technology and Applications (Computer Science and Engineering)

Co-ordinators : Prof. Sandeep Shukla

NPTEL : NOC:Arithmetic Circuit Complexity (Computer Science and Engineering)

Co-ordinators : Prof. Nitin Saxena

Lecture 1 - Turing Machines and Introduction to Arithmetic Circuits

Lecture 2 - Arithmetic complexity classes

Lecture 3 - Determinant is in VP

Lecture 4 - Determinant vs Arithmetic Branching Programs (ABP)

Lecture 5 - Determinant as signed sum of clow sequence

Lecture 6 - Determinant has small ABP and Strassen's homogenization

Lecture 7 - Depth reduction for arithmetic formulas

Lecture 8 - Depth reduction for arithmetic circuits

Lecture 9 - Depth 4 reduction

Lecture 10 - Depth 3 reduction

Lecture 11 - Equivalence of Formulas and Width 3 ABP

Lecture 12 - Width-2 ABP Chasm

Lecture 13 - Grigoriev-Karpinski Measure

Lecture 14 - Lower Bound of Depth-3 circuit over finite fields

Lecture 15 - Lower Bound for depth 3 Multilinear Circuits

Lecture 16 - Lower Bound for Constant depth Multilinear Circuits

Lecture 17 - Structural lemma for constant depth multilinear circuits

Lecture 18 - Extending the proof for multilinear formulas

Lecture 19 - Shifted Partial Derivative Measure

Lecture 20 - Exponential Lower Bound for General depth-4 CIrcuits

Lecture 21 - Lower Bound on Homogeneous Depth-4 circuits

Lecture 22 - Introduction to PIT

Lecture 23 - Hitting Set and Hitting Set Generator

Lecture 24 - PIT vs Lower Bounds

NPTEL : NOC:Computational Complexity Theory (Computer Science and Engineering)

Co-ordinators : Prof. Raghunath Tewari

NPTEL : NOC:Randomized Methods in Complexity (Computer Science and Engineering)

Co-ordinators : Prof. Nitin Saxena

NPTEL : NOC:Probability for Computer Science (Computer Science and Engineering)

Co-ordinators : Prof. Nitin Saxena

Lecture 1 - Introductory examples

Lecture 2 - Examples and Course outline

Lecture 3 - Probability over discrete space

Lecture 4 - Inclusion-Exclusion principle

Lecture 5 - Probability over infinite space

Lecture 6 - Conditional probability, Partition formula

Lecture 7 - Independent events, Bayes theorem

Lecture 8 - Fallacies, Random variables

Lecture 9 - Expection

Lecture 10 - Conditional Expectation

Lecture 11 - Important Random Variables

Lecture 12 - Continuous Random Variables

Lecture 13 - Equality Checking, Poisson Distribution

Lecture 14 - Concentration Inequivalities, Variance

Lecture 15 - Weak Linearity of Variance, Law of Large Numbers

Lecture 16 - Chernoff's Bound. K-wise Independence

Lecture 17 - Union and Factorial Estimates

Lecture 18 - Stochastic Process: Markov Chains

Lecture 19 - Drunkard's walk, Evolution of Markov Chains

Lecture 20 - Stationary Distribution

Lecture 21 - Perron-Frobenius Theorem, Page Rank Algorithm

Lecture 22 - Page Rank Algorithm: Ergodicity

Lecture 23 - Cell Genetics

Lecture 24 - Random Sampling

Lecture 25 - Biased Coin Tosses, Hashing

Lecture 26 - Hashing, Introduction to Probabilistic Methods

Lecture 27 - Ramsey Numbers, Large Cuts in Graphcs

Lecture 28 - Sum Free Subsets, Discrepancy

Lecture 29 - Extremal Set Families

Lecture 30 - Super Concentrators

Lecture 31 - Streaming Algorithms - I

Lecture 32 - Streaming Algorithms - II

NPTEL : NOC:Circuit Complexity Theory (Computer Science and Engineering)

Co-ordinators : Prof. Raghunath Tewari

Lecture 1 - Introduction

Lecture 2 - Standard Bounds

Lecture 3 - Shannon's Theorem

Lecture 4 - Riordon-Shannon Theorem

Lecture 5 - Khrapchenko's Theorem

Lecture 6 - Proof of Khrapchenko's Theorem

Lecture 7 - Application of Khrapchenko's Theorem

Lecture 8 - Nechiporuk's Theorem

Lecture 9 - Application of Nechiporuk's Theorem

Lecture 10 - Subbotovskaya's Theorem - I

Lecture 11 - Subbotovskaya's Theorem - II

Lecture 12 - Applications of Subbotovskaya's Theorem

Lecture 13 - Upper and Lower Bounds on the Andreev Function

Lecture 14 - Upper and Lower Bounds on the Andreev Function

Lecture 15 - Polynomial Size Monotone Formula for MAJORITY (Valiant's Theorem) - II

Lecture 16 - Circuits for Addition - Ripple Adder and Carry Lookahead Adder

Lecture 17 - Circuits for Addition - Parallel Prefix Sum Method

Lecture 18 - Circuits for Iterated Addition and Multiplication

Lecture 19 - Bounded Depth Circuit Classes

Lecture 20 - Basic Circuit for Division using Newton-Raphson Method

Lecture 21 - Division in NC1 (Beame, Cook, Hoover Theorem) - I

Lecture 22 - Division in NC1 (Beame, Cook, Hoover Theorem) - II

Lecture 23 - Division in NC1 (Beame, Cook, Hoover Theorem) - III

Lecture 24 - Division in NC1 (Beame, Cook, Hoover Theorem) - IV

Lecture 25 - Division in NC1 (Beame, Cook, Hoover Theorem) - V

Lecture 26 - Division in NC1 (Beame, Cook, Hoover Theorem) - VI

Lecture 27 - Relation between Bounded Depth Circuit Classes and Uniform Complexity Classes - I

Lecture 28 - Relation between Bounded Depth Circuit Classes and Uniform Complexity Classes - II

Lecture 29 - Reducing Circuit Depth

Lecture 30 - P is in P/poly

Lecture 31 - Discussion on Lower Circuit Bounds for Bounded Depth Circuit Classes

Lecture 32 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - I

Lecture 33 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - II

Lecture 34 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - III

Lecture 35 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - IV

Lecture 36 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - V

Lecture 37 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - VI

Lecture 38 - Circuit Lower Bound for Parity by Approximating Circuits using Polynomials (Razborov-Smolensky Theorem) - I

Lecture 39 - Circuit Lower Bound for Parity by Approximating Circuits using Polynomials (Razborov-Smolensky Theorem) - II

Lecture 40 - Circuit Lower Bound for Parity by Approximating Circuits using Polynomials (Razborov-Smolensky Theorem) - III

Lecture 41 - Circuit Lower Bound for Parity using Switching Lemma (Hastad's Theorem)

Lecture 42 - Circuit Lower Bound for Parity using Switching Lemma (Hastad's Theorem)

Lecture 43 - Circuit Lower Bound for Parity using Switching Lemma (Hastad's Theorem)

Lecture 44 - Proof of Hastad's Switching Lemma - I

Lecture 45 - Proof of Hastad's Switching Lemma - II

Lecture 46 - Communication Complexity of a Function

Lecture 47 - Relation Between Communication Complexity and Circuit Depth (Karchmer-Wigderson Theorem) - I

Lecture 48 - Relation Between Communication Complexity and Circuit Depth (Karchmer-Wigderson Theorem) - II

Lecture 49 - Bounded Width Branching Programs = NC1 (Barrington's Theorem) - I

Lecture 50 - Bounded Width Branching Programs = NC1 (Barrington's Theorem) - II

Lecture 51 - Width 3 Branching Programs = MOD3 o MOD2 Circuits (Barrington's Theorem) - I

Lecture 52 - Width 3 Branching Programs = MOD3 o MOD2 Circuits (Barrington's Theorem) - II

Lecture 53 - Uniform AC0 can be simulated by depth 3 Threshold circuits of quasipolynomial size (Allender-Hertramph Theorem) - I

Lecture 54 - Uniform AC0 can be simulated by depth 3 Threshold circuits of quasipolynomial size (Allender-Hertramph Theorem) - II

Lecture 55 - Valient-Vazirani Theorem - I

Lecture 56 - Valient-Vazirani Theorem - II

Lecture 57 - Natural Proof Barrier (Razborov-Rudich Theorem) - I

Lecture 58 - Natural Proof Barrier (Razborov-Rudich Theorem) - II

Lecture 59 - Pseudorandom Function Generator by Goldreich, Goldwasser and Micali - I

Lecture 60 - Pseudorandom Function Generator by Goldreich, Goldwasser and Micali - II

NPTEL : NOC:Foundation of Cloud IoT Edge ML (Computer Science and Engineering)

Co-ordinators : Prof. Rajiv Misra

NPTEL : NOC:Linear Programming and its Applications to Computer Science (Computer Science and Engineering)

Co-ordinators : Prof. Rajat Mittal

Lecture 32 - Nash Equilibrium

Lecture 33 - Minimax and Nash Equilibrium

Lecture 34 - Deterministic Communication Complexity

Lecture 35 - Randomized Communication Complexity

Lecture 36 - Yao's Minimax Theorem

Lecture 37 - Lower bounds using Yao's Minimax

Lecture 38 - Set Disjointness Problem

Lecture 39 - LP for mass flow problem

Lecture 40 - LP for min cut problem

Lecture 41 - Max flow = Min cut

Lecture 42 - Primal dual approach

Lecture 43 - Primal dual for max flow

Lecture 44 - Set cover problem

Lecture 45 - Rounding for set cover

Lecture 46 - Analysis of Rounding

Lecture 47 - Algorithm for Set Cover

Lecture 48 - Linear Regression through LP

Lecture 49 - Linear Classifiers through LP

NPTEL : NOC:Basics of Computational Complexity (Computer Science and Engineering)

Co-ordinators : Prof. Nitin Saxena

NPTEL : NOC:Edge Computing (Computer Science and Engineering)

Co-ordinators : Multi-Faculty

Lecture 1 - Overview of Cloud Computing

Lecture 2 - Cloud Computing and its Limitation to Support Low Latency and RTT

Lecture 3 - Introduction to Edge Computing

Lecture 4 - Edge Computing Paradigms - 004

Lecture 5 - Overview of Virtualization

Lecture 6 - Docker Containers

Lecture 7 - Kubernetes

Lecture 8 - NoSQL Databases and Key Value Stores

Lecture 9 - Edge AI Intelligence at the Edge

Lecture 10 - Edge AI Intelligence at the Edge

Lecture 11 - Mobile Edge Computing

Lecture 12 - Geo-distributed Data Centers

Lecture 13 - Time and Clock Synchronization

Lecture 14 - Edge Computing Security and Privacy

Lecture 15 - Network Virtualization

Lecture 16 - Resource Allocation in Private and Public Edge-Cloud Systems

NPTEL : NOC:Practical Cyber Security for Cyber Security Practitioners (Computer Science and Engineering)

Co-ordinators : Prof. Sandeep K. Shukla

NPTEL : NOC:Computational Arithmetic - Geometry for Algebraic Curves (Computer Science and Engineering)

Co-ordinators : Prof. Nitin Saxena

NPTEL : Cryptography and Network Security (Computer Science and Engineering)

Co-ordinators : Dr. Debdeep Mukhopadhyay

NPTEL : High Performance Computer Architecture (Computer Science and Engineering)

Co-ordinators : Prof. Ajit Pal

NPTEL : Low Power VLSI Circuits and Systems (Computer Science and Engineering)

Co-ordinators : Prof. Ajit Pal

Lecture 32 - Minimizing Leakage Power - I

Lecture 33 - Minimizing Leakage Power - II

Lecture 34 - Minimizing Leakage Power - III

Lecture 35 - Variation Tolerant Design

Lecture 36 - Adiabatic Logic Circuits

Lecture 37 - Battery-Driven System Design

Lecture 38 - CAD Tools for Low Power

Lecture 39 - Tutorial - III

Lecture 40 - Course Summary

NPTEL : Real Time Systems (Computer Science and Engineering)

Co-ordinators : Prof. Rajib Mall

NPTEL : Artificial Intelligence (Prof. Anupam Basu) (Computer Science and Engineering)

Co-ordinators : Prof. Sudeshna Sarkar, Prof. Anupam Basu

Lecture 1 - Introduction to Artificial Intelligence

Lecture 2 - Intelligent Agents

Lecture 3 - State Space Search

Lecture 4 - Uninformed Search

Lecture 5 - Informed Search

Lecture 6 - Informed Search - 2

Lecture 7 - Two Players Games - I

Lecture 8 - Two Players Games - II

Lecture 9 - Constraint Satisfaction Problems - 1

Lecture 10 - Constraint Satisfaction Problems - 2

Lecture 11 - Knowledge Representation and Logic

Lecture 12 - Interface in Propositional Logic

Lecture 13 - First Order Logic

Lecture 14 - Reasoning Using First Order Logic

Lecture 15 - Resolution in FOPL

Lecture 16 - Rule Based System

Lecture 17 - Rule Based Systems II

Lecture 18 - Semantic Net

Lecture 19 - Reasoning in Semantic Net

Lecture 20 - Frames

Lecture 21 - Planning - 1

Lecture 22 - Planning - 2

Lecture 23 - Planning - 3

Lecture 24 - Planning - 4

Lecture 25 - Rule Based Expert System

Lecture 26 - Reasoning with Uncertainty - I

Lecture 27 - Reasoning with Uncertainty - II

Lecture 28 - Reasoning with Uncertainty - III

Lecture 29 - Reasoning with Uncertainty - IV

Lecture 30 - Fuzzy Reasoning - I

Lecture 31 - Fuzzy Reasoning - II

NPTEL : Artificial Intelligence (Prof. P. Dasgupta) (Computer Science and Engineering)

Co-ordinators : Prof. P. Dasgupta

Lecture 1 - Introduction to Artificial Intelligence

Lecture 2 - Problem Solving by Search

Lecture 3 - Searching with Costs

Lecture 4 - Informed State Space Search

Lecture 5 - Heuristic Search: A* and Beyond

Lecture 6 - Problem Reduction Search: AND/OR Graphs

Lecture 7 - Searching Game Trees

Lecture 8 - Knowledge Based Systems: Logic and Deduction

Lecture 9 - First Order Logic

Lecture 10 - Inference in First Order Logic

Lecture 11 - Resolution - Refutation Proofs

Lecture 12 - Resolution Refutation Proofs

Lecture 13 - Logic Programming : Prolog

Lecture 14 - Prolog Programming

Lecture 15 - Prolog: Exercising Control

Lecture 16 - Additional Topics

Lecture 17 - Introduction to Planning

Lecture 18 - Partial Order Planning

Lecture 19 - GraphPLAN and SATPlan

Lecture 20 - SATPlan

Lecture 21 - Reasoning under uncertainty

Lecture 22 - Bayesian Networks

Lecture 23 - Reasoning with Bayes Networks

Lecture 24 - Reasoning with Bayes networks (Contd.)

Lecture 25 - Reasoning under uncertainty: Issues

Lecture 26 - Learning : Decision Trees

Lecture 27 - Learning : Neural Networks

Lecture 28 - Back Propagation Learning

NPTEL : Computer Networks (Computer Science and Engineering)

Co-ordinators : Prof. Sujoy Ghosh

NPTEL : Data Communication (Computer Science and Engineering)

Co-ordinators : Prof. Ajit Pal

NPTEL : Electronic Design Automation (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta

Lecture 1 - Introduction

Lecture 2 - Verilog : Part - I

Lecture 3 - Verilog : Part - II

Lecture 4 - Verilog : Part - III

Lecture 5 - Verilog : Part - IV

Lecture 6 - Verilog : Part - V

Lecture 7 - Verilog : Part - VI

Lecture 8 - Synthesis : Part - I

Lecture 9 - Synthesis : Part - II

Lecture 10 - Synthesis : Part - III

Lecture 11 - Synthesis : Part - IV

Lecture 12 - Synthesis : Part - V

Lecture 13 - Synthesis : Part - VI

Lecture 14 - Synthesis : Part - VII

Lecture 15 - Backend Design : Part - I

Lecture 16 - Backend Design : Part - II

Lecture 17 - Backend Design : Part - III

Lecture 18 - Backend Design : Part - IV

Lecture 19 - Backend Design : Part - V

Lecture 20 - Backend Design : Part - VI

Lecture 21 - Backend Design : Part - VII

Lecture 22 - Backend Design : Part - VIII

Lecture 23 - Backend Design : Part - IX

Lecture 24 - Backend Design : Part - X

Lecture 25 - Backend Design : Part - XI

Lecture 26 - Backend Design : Part - XII

Lecture 27 - Backend Design : Part - XIII

Lecture 28 - Backend Design : Part - XIV

Lecture 29 - Backend Design : Part - XV

Lecture 30 - Testing Part - I

Lecture 31 - Testing Part - II

NPTEL : Internet Technology (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta

Lecture 32 - Basic Cryptographic Concepts Part - I

Lecture 33 - Basic Cryptographic Concepts Part - II

Lecture 34 - Basic Cryptographic Concepts Part - III

Lecture 35 - Electronic Commerce

Lecture 36 - Streaming Multimedia Applications

Lecture 37 - Internet Telephony

Lecture 38 - Search Engine And Web Crawlers : Part-I

Lecture 39 - Search Engine And Web Crawlers : Part-II

Lecture 40 - Course Summary And Conclusion

NPTEL : Programming and Data Structure (Computer Science and Engineering)

Co-ordinators : Dr. P.P. Chakraborty

Lecture 32 - Conclusions

NPTEL : NOC:Software Testing (Computer Science and Engineering)

Co-ordinators : Prof. Rajib Mall

NPTEL : NOC:Programming in C++ (Computer Science and Engineering)

Co-ordinators : Prof. Partha Pratim Das

NPTEL : NOC:Introduction to Machine Learning (Computer Science and Engineering)

Co-ordinators : Prof. S. Sarkar

NPTEL : NOC:Object-Oriented Analysis and Design (Computer Science and Engineering)

Co-ordinators : Prof. Partha Pratim Das

Lecture 32 - Identification of Classes, Objects and Relationship in LMS (Continued...)

Lecture 33 - Overview of UML

Lecture 34 - SDLC Phases and UML Diagrams

Lecture 35 - Use-Case Diagrams - Part I

Lecture 36 - Use-Case Diagrams - Part II

Lecture 37 - Use-Case Diagrams - Part III

Lecture 38 - Class Diagrams - Part 1 (Class, Property and Operation)

Lecture 39 - Class Diagrams - Part 2 (Association, Weak and Strong Aggregation)

Lecture 40 - Class Diagrams - Part 3 (Generalization, Dependency and Constraints)

Lecture 41 - Sequence Diagrams - Part 1

Lecture 42 - Sequence Diagrams - Part 2

Lecture 43 - Communication Diagram

Lecture 44 - Activity Diagrams - Part II

Lecture 45 - Activity Diagrams - Part II

Lecture 46 - Activity Diagrams - Part III

Lecture 47 - Interaction Overview Diagram

Lecture 48 - State Machine Diagrams - Part I

Lecture 49 - State Machine Diagrams - Part II

Lecture 50 - State Machine Diagrams - Part III

Lecture 51 - Various UML Diagrams

Lecture 52 - Closing Comments

NPTEL : NOC:Complex Network : Theory and Application (Computer Science and Engineering)

Co-ordinators : Prof. Animesh Mukherjee

NPTEL : Fundamental Algorithms:Design and Analysis (Computer Science and Engineering)

Co-ordinators : Prof.Sourav Mukhopadhyay

NPTEL : NOC:Natural Language Processing (Computer Science and Engineering)

Co-ordinators : Prof. Pawan Goyal

Lecture 32 - Distributional Semantics - Introduction

Lecture 33 - Distributional Models of Semantics

Lecture 34 - Distributional Semantics : Applications, Structured Models

Lecture 35 - Word Embeddings - Part I

Lecture 36 - Word Embeddings - Part II

Lecture 37 - Lexical Semantics

Lecture 38 - Lexical Semantics - Wordnet

Lecture 39 - Word Sense Disambiguation - I

Lecture 40 - Word Sense Disambiguation - II

Lecture 41 - Novel Word Sense detection

Lecture 42 - Topic Models : Introduction

Lecture 43 - Latent Dirichlet Allocation : Formulation

Lecture 44 - Gibbs Sampling for LDA, Applications

Lecture 45 - LDA Variants and Applications - I

Lecture 46 - LDA Variants and Applications - II

Lecture 47 - Entity Linking - I

Lecture 48 - Entity Linking - II

Lecture 49 - Information Extraction - Introduction

Lecture 50 - Relation Extraction

Lecture 51 - Distant Supervision

Lecture 52 - Text Summarization - LEXRANK

Lecture 53 - Optimization based Approaches for Summarization

Lecture 54 - Summarization Evaluation

Lecture 55 - Text Classification - I

Lecture 56 - Text Classification - II

Lecture 57 - Tutorial II

Lecture 58 - Tutorial III

Lecture 59 - Tutorial IV

Lecture 60 - Tutorial V

Lecture 61 - Sentiment Analysis - Introduction

Lecture 62 - Sentiment Analysis - Affective Lexicons

Lecture 63 - Learning Affective Lexicons

Lecture 64 - Computing with Affective Lexicons

Lecture 65 - Aspect - Based Sentiment Analysis

NPTEL : NOC:Embedded Systems Design (Computer Science and Engineering)

Co-ordinators : Prof. Anupam Basu

Lecture 1 - Introduction

Lecture 2 - Processors

Lecture 3 - General Purpose and ASIPs Processor

Lecture 4 - Designing a Single Purpose Processor

Lecture 5 - Optimization Issues

Lecture 6 - Introduction to FPFA

Lecture 7 - FPGA (Continued...)

Lecture 8 - Behaviour Synthesis on FPGA using VHDL

Lecture 9 - Tutorial - I

Lecture 10 - Tutorial - II

Lecture 11 - Tutorial - III

Lecture 12 - Tutorial - IV

Lecture 13 - Sensors and Signals

Lecture 14 - Discretization of Signals and A/D Converter

Lecture 15 - Quantization Noise, SNR and D/A Converter

Lecture 16 - Arduino Uno

Lecture 17 - Arduino Uno (Continued...), Serial Communication and Timer

Lecture 18 - Controller Design using Arduino

Lecture 19 - Tutorial - V

Lecture 20 - Power Aware Embedded System - I

Lecture 21 - Power Aware Embedded System - II

Lecture 22 - SD and DD Algorithm

Lecture 23 - Parallel Operations and VLIW

Lecture 24 - Code Efficiency

Lecture 25 - DSP Application and Address Generation Unit

Lecture 26 - Real Time O.S - I

Lecture 27 - Real Time O.S - II

Lecture 28 - RMS Algorithm

Lecture 29 - EDF Algorithm and Resource Constraint Issue

Lecture 30 - Priority Inversion and Priority Inheritance Protocol

Lecture 31 - Modeling and Specification - I

NPTEL : NOC:Wireless Ad Hoc and Sensor Networks (Computer Science and Engineering)

Co-ordinators : Prof. Sudip Misra

Lecture 1 - Introduction: Wireless Ad Hoc Networks - Part-I

Lecture 2 - Introduction: Wireless Ad Hoc Networks - Part-II

Lecture 3 - Self-organizing Behaviour of Wireless Ad Hoc Networks

Lecture 4 - Cooperation in Mobile Ad Hoc Networks - Part-I

Lecture 5 - Cooperation in Mobile Ad Hoc Networks - Part-II

Lecture 6 - MAC Protocols in MANETs - Part-I

Lecture 7 - MAC Protocols in MANETs - Part-II

Lecture 8 - Routing in MANETs - Part-I

Lecture 9 - Routing in MANETs - Part-II

Lecture 10 - Routing in MANETs - Part-III

Lecture 11 - Multicasting in MANETs

Lecture 12 - Mobility Models for MANETs

Lecture 13 - Transport Protocols for MANETs - Part-I

Lecture 14 - Transport Protocols for MANETs - Part-II

Lecture 15 - Opportunistic Mobile Networks - Part-I

Lecture 16 - Opportunistic Mobile Networks - Part-II

Lecture 17 - Opportunistic Mobile Networks - Part-III

Lecture 18 - UAV Networks - Part-I

Lecture 19 - UAV Networks - Part-II

Lecture 20 - UAV Networks - Part-III

Lecture 21 - Introduction: Wireless Sensor Networks - Part-I

Lecture 22 - Introduction: Wireless Sensor Networks - Part-II

Lecture 23 - WSN Coverage and Placement - Part-I

Lecture 24 - Topology Mangement in Wireless Sensor Network

Lecture 25 - Mobile Wireless Sensor Networks

Lecture 26 - Mobile Wireless Sensor Networks

Lecture 27 - Medium Access Control in Wireless Networks - Part-I

Lecture 28 - Medium Access Control in Wireless Networks - Part-II

Lecture 29 - Routing in Wireless Sensor Networks - Part-I

Lecture 30 - Routing in Wireless Sensor Networks - Part-II

Lecture 31 - Congestion and Flow Control - Part-I

NPTEL : NOC:VLSI Physical Design (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta

NPTEL : NOC:Cryptography And Network Security (Computer Science and Engineering)

Co-ordinators : Prof. Sourav Mukhopadhyay

NPTEL : NOC:Computer Architecture and Organization (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta, Prof. Kamalika Datta

NPTEL : NOC:Introduction to Algorithms and Analysis (Computer Science and Engineering)

Co-ordinators : Prof. Sourav Mukhopadhyay

Lecture 1 - Insertion sort

Lecture 2 - Analysis of Insertion Sort

Lecture 3 - Asymptotic Analysis

Lecture 4 - Recurrence of Merge Sort

Lecture 5 - Substitution Method

Lecture 6 - The Master Method

Lecture 7 - Divide-and-Conquer

Lecture 8 - Divide-and-Conquer (Continued...)

Lecture 9 - Straseen's Algorithms

Lecture 10 - QuickSort

Lecture 11 - Analysis of Quicksort

Lecture 12 - Randomized Quicksort

Lecture 13 - Heap

Lecture 14 - Heap Sort

Lecture 15 - Decision Tree

Lecture 16 - Linear time Sorting

Lecture 17 - Radix Sort and Bucket Sort

Lecture 18 - Order Statistics

Lecture 19 - Randomised Order Statistics

Lecture 20 - Worst case linear time order statistics

Lecture 21 - Hash Function

Lecture 22 - Open Addressing

Lecture 23 - Universal Hashing

Lecture 24 - Perfect Hashing

Lecture 25 - Binary Search Tree (BST) Sort

Lecture 26 - Randomly build BST

Lecture 27 - Red Black Tree

Lecture 28 - Red Black Tree (Continued...)

Lecture 29 - Augmentation of data structure

Lecture 30 - Interval trees

Lecture 31 - Fixed universe successor

NPTEL : NOC:Hardware Modeling using Verilog (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta

Lecture 32 - Basic Pipelining Concepts

Lecture 33 - Pipeline Modeling - Part 1

Lecture 34 - Pipeline Modeling - Part 2

Lecture 35 - Switch Level Modeling - Part 1

Lecture 36 - Switch Level Modeling - Part 2

Lecture 37 - Pipeline Implementation Of A Processor - Part 1

Lecture 38 - Pipeline Implementation Of A Processor - Part 2

Lecture 39 - Pipeline Implementation Of A Processor - Part 3

Lecture 40 - Verilog Modeling Of The Processor - Part 1

Lecture 41 - Verilog Modeling Of The Processor - Part 2

NPTEL : NOC:Introduction to Internet of Things (Computer Science and Engineering)

Co-ordinators : Prof. Sudip Misra

NPTEL : NOC:Cloud Computing (Computer Science and Engineering)

Co-ordinators : Prof. Soumya Kanti Ghosh

Lecture 32 - Mobile Cloud Computing - II

Lecture 33 - Fog Computing - I

Lecture 34 - Fog Computing - II

Lecture 35 - Use Case-Geo-spatial Cloud

Lecture 36 - Introduction to DOCKER Container

Lecture 37 - Green Cloud

Lecture 38 - Sensor Cloud Computing

Lecture 39 - IoT Cloud

Lecture 40 - Course Summary and Research Areas

Lecture 41 - Cloud-Fog Computing - Overview

Lecture 42 - Resource Management - I

Lecture 43 - Resource Management - II

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NPTEL : NOC:Problem Solving through Programming in C (Computer Science and Engineering)

Co-ordinators : Prof.Arnab sarkar, Prof.Jatindra Kumar Deka, Dr. Santosh Biswas

NPTEL : NOC:Real Time Operating System (Computer Science and Engineering)

Co-ordinators : Prof. Rajib Mall

NPTEL : NOC:Introduction to Soft Computing (Computer Science and Engineering)

Co-ordinators : Prof. Debasis Samanta

Lecture 32 - Pareto-based approach to solve MOOPs (Continued...)

Lecture 33 - Pareto-based approach to solve MOOPs (Continued...)

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Lecture 38 - Training ANNs (Continued....)

Lecture 39 - Training ANNs (Continued....)

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NPTEL : NOC:Data Mining (Computer Science and Engineering)

Co-ordinators : Prof. Pabitra Mitra

NPTEL : NOC:Data Base Management System (Computer Science and Engineering)

Co-ordinators : Prof. Partha Pratim Das

NPTEL : NOC:Software Engineering (Computer Science and Engineering)

Co-ordinators : Prof. Rajib Mall

Lecture 1 - Introduction - I

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Lecture 7 - Life Cycle Model

Lecture 8 - Waterfall Model

Lecture 9 - Waterfall Derivatives

Lecture 10 - Incremental Model

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Lecture 16 - Requirement gathering and analysis

Lecture 17 - Functional requirements

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NPTEL : NOC:Computer Networks and Internet Protocol (Computer Science and Engineering)

Co-ordinators : Prof. Sandip Chakraborty, Prof. Soumya Kanti Ghosh

NPTEL : NOC:Blockchain Architecture Design and Use Cases (Computer Science and Engineering)

Co-ordinators : Praveen Jayachandran, Prof. Sandip Chakraborty

NPTEL : NOC:Switching Circuits and Logic Design (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta

NPTEL : NOC:Scalable Data Science (Computer Science and Engineering)

Co-ordinators : Prof. Sourangshu Bhattacharya, Prof. Anirban Dasgupta

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Lecture 35 - SGD+Proof (Continued...)

Lecture 36 - Distributed Machine Learning and Optimization:ADMM + applications

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Lecture 38 - Clustering

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NPTEL : NOC:Compiler Design (Computer Science and Engineering)

Co-ordinators : Prof. Santanu Chattopadhyay

NPTEL : NOC:Programming in Java (Computer Science and Engineering)

Co-ordinators : Prof. Debasis Samanta

NPTEL : NOC:Discrete Structures (Computer Science and Engineering)

Co-ordinators : Prof. Dipanwita Roychowdhury

NPTEL : NOC:Embedded System Design with ARM (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta, Prof. Kamalika Datta

Lecture 1 - Introduction To Embedded Systems

Lecture 2 - Design Considerations of Embedded Systems

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NPTEL : NOC:Hardware Security (Computer Science and Engineering)

Co-ordinators : Dr. Debdeep Mukhopadhyay

NPTEL : NOC:Introduction to Industry 4.0 and Industrial Internet of Things (Computer Science and Engineering)

Co-ordinators : Prof. Sudip Misra

Lecture 65 - Steel Technology Lab

NPTEL : NOC:Introduction to Automata, Languages and Computation (Computer Science and Engineering)

Co-ordinators : Prof. Sourav Mukhopadhyay

NPTEL : NOC:Operating System Fundamentals (Computer Science and Engineering)

Co-ordinators : Prof. Santanu Chattopadhyay

NPTEL : NOC:Deep Learning (Prof. P.K. Biswas) (Computer Science and Engineering)

Co-ordinators : Prof. P.K. Biswas

NPTEL : NOC:Computer Vision (Computer Science and Engineering)

Co-ordinators : Prof. Jayanta Mukhopadhyay

Lecture 1 - Fundamentals of Image Processing - Part I

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NPTEL : NOC:Ethical Hacking (Computer Science and Engineering)

Co-ordinators : Prof. Indranil Sengupta

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NPTEL : NOC:Software Project Management (Computer Science and Engineering)

Co-ordinators : Prof. Durga Prasad Mohapatra

NPTEL : NOC:Spatial Informatics (Computer Science and Engineering)

Co-ordinators : Prof. Soumya Kanti Ghosh

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NPTEL : NOC:GPU Architectures and Programming (Computer Science and Engineering)

Co-ordinators : Prof. Soumyajit Dey

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Lecture 33 - Optimizing Reduction Kernels (Continued...)

Lecture 34 - Optimizing Reduction Kernels (Continued...)

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Lecture 51 - OpenCL - Heterogeneous Computing (Continued...)

Lecture 52 - OpenCL - Heterogeneous Computing (Continued...)

Lecture 53 - OpenCL - Heterogeneous Computing (Continued...)

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Lecture 55 - Efficient Neural Network Training/Inferencing (Continued...)

Lecture 56 - Efficient Neural Network Training/Inferencing (Continued...)

Lecture 57 - Efficient Neural Network Training/Inferencing (Continued...)

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Lecture 59 - Efficient Neural Network Training/Inferencing (Continued...)

Lecture 60 - Efficient Neural Network Training/Inferencing (Continued...)

Lecture 61 - Efficient Neural Network Training/Inferencing (Continued...)

Lecture 62 - Efficient Neural Network Training/Inferencing (Continued...)

Lecture 63 - Efficient Neural Network Training/Inferencing (Continued...)

NPTEL : NOC:Google Cloud Computing Foundation Course (Computer Science and Engineering)

Co-ordinators : Prof. Soumya Kanti Ghosh

NPTEL : NOC:Object Oriented System Development using UML, Java and Patterns (Computer Science and Engineering)

Co-ordinators : Prof. Rajib Mall

NPTEL : NOC:Data Structure and Algorithms using Java (Computer Science and Engineering)

Co-ordinators : Prof. Debasis Samanta

Lecture 1 - Introduction and Course Plan

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Lecture 3 - Basics of Generic Class

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Lecture 22 - Programming for Stack

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Lecture 27 - Understanding Tree Data Structures

Lecture 28 - Operations on Binary Tree Data Structures

Lecture 29 - Binary Search Tree

Lecture 30 - Programming for Binary Search Tree

Lecture 31 - Height Balanced Binary Search Tree

NPTEL : NOC:Real-Time Systems (Computer Science and Engineering)

Co-ordinators : Prof. Rajib Mall

NPTEL : NOC:Algorithms for Protein Modelling and Engineering (Computer Science and Engineering)

Co-ordinators : Prof. Pralay Mitra

NPTEL : NOC:Programming in Modern C++ (Computer Science and Engineering)

Co-ordinators : Prof. Partha Pratim Das

Lecture 32 - Inheritance: Part 5: private and protected Inheritance

Lecture 33 - Tutorial 5: Mixing C and C++ Code: Part 1: Issues and Resolutions

Lecture 34 - Polymorphism: Part 1: Type Casting

Lecture 35 - Polymorphism: Part 2: Static and Dynamic Binding

Lecture 36 - Polymorphism: Part 3: Abstract Base Class

Lecture 37 - Polymorphism: Part 4: Staff Salary Processing using C

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Lecture 44 - Multiple Inheritance

Lecture 45 - Tutorial 7: How to design a UDT like built-in types?: Part 1: Fraction UDT

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Lecture 47 - Exceptions (Error handling in C++): Part 2

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Lecture 51 - Tutorial 8: How to design a UDT like built-in types?: Part 2: Int and Poly UDT

Lecture 52 - Input-Output: File Handling in C

Lecture 53 - Input-Output: Streams in C++

Lecture 54 - C++ Standard Library: Part 1 (Generic Programming)

Lecture 55 - C++ Standard Library: Part 2 (STL)

Lecture 56 - C++ Standard Library: Part 3 (STL)

Lecture 57 - Tutorial 9: How to design a UDT like built-in types?: Part 3: Updates and Mixes of UDTs

Lecture 58 - C++11 and beyond: General Features: Part 1

Lecture 59 - C++11 and beyond: General Features: Part 2

Lecture 60 - C++11 and beyond: General Features: Part 3

Lecture 61 - C++11 and beyond: General Features: Part 4: Rvalue and Move/1

Lecture 62 - C++11 and beyond: General Features: Part 5: Rvalue and Move/2

Lecture 63 - Tutorial 10: How to optimize C++11 programs using Rvalue and Move Semantics?

Lecture 64 - C++11 and beyond: General Features: Part 6: Rvalue and Perfect Forwarding

NPTEL : NOC:Blockchain and its Applications (Computer Science and Engineering)

Co-ordinators : Prof. Sandip Chakraborty, Prof. Shamik Sural

Lecture 32 - Safety and Liveness of PBFT

Lecture 33 - Enterprise Blockchains

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Lecture 35 - Hyperledger Fabric 2

Lecture 36 - Hyperledger Fabric 3

Lecture 37 - Hyperledger Fabric 4

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Lecture 39 - Bitcoin-NG

Lecture 40 - Collective Signing (CoSi)

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Lecture 45 - Identity Management - III

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Lecture 48 - Blockchain Interoperability - III

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Lecture 56 - A Potential Use Case From a Critics Perspective

Lecture 57 - Blockchain in Financial Services

Lecture 58 - Public Sector Use Cases

Lecture 59 - Blockchain for Decentralized Marketplace - Part 1

Lecture 60 - Blockchain for Decentralized Marketplace - Part 2

NPTEL : NOC:Algorithmic Game Theory (Computer Science and Engineering)

Co-ordinators : Prof. Palash Dey

NPTEL : NOC:Machine Learning for Earth System Sciences (Computer Science and Engineering)

Co-ordinators : Prof. Adway Mitra

NPTEL : NOC:Statistical Learning for Reliability Analysis (Computer Science and Engineering)

Co-ordinators : Prof. Monalisa Sarma

Lecture 32 - ANOVA - I

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Lecture 59 - Support Vector Machine - Part VI

Lecture 60 - Tutorial on SVM

NPTEL : NOC:Foundations of Cyber Physical Systems (Computer Science and Engineering)

Co-ordinators : Prof. Soumyajit Dey

NPTEL : NOC:Selected Topics in Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Palash Dey

NPTEL : NOC:Foundations and Applications of Machine Learning (Bengali) (Computer Science and Engineering)

Co-ordinators : Prof. Adway Mitra

NPTEL : NOC:Artificial Intelligence for Economics (Computer Science and Engineering)

Co-ordinators : Prof. Dripto Bakshi, Prof. Adway Mitra, Prof. Palash Dey

Lecture 32 - Single Parameter Domain and Myerson Lemma

Lecture 33 - Sponsored Search Auction

Lecture 34 - Single Peaked Domain and Median Voting

Lecture 35 - Dimensionality Reduction (Principal Component Analysis) â€“ The Math Prerequisites

Lecture 36 - Dimensionality Reduction (Principal Component Analysis) â€“ The Technique

Lecture 37 - Agent-based Modeling for Economics

Lecture 38 - Computer Vision for Economics

Lecture 39 - Text Mining and NLP for Economics

Lecture 40 - Bias, Fairness, Ethics and Interpretability in AI

NPTEL : NOC:Approximation Algorithm (Computer Science and Engineering)

Co-ordinators : Prof. Palash Dey

Lecture 1 - Overview of NP-completeness and How to Tackle It

Lecture 2 - Deterministic Rounding of Linear Program: An Approximation Algorithm for Weighted

Lecture 3 - Overview of LP Duality and Complementary Slackness

Lecture 4 - Dual Rounding: An Approximation Algorithm for Weighted Set Cover

Lecture 5 - Primal dual method for Weighted Set Cover

Lecture 6 - Greedy algorithm for Weighted Set Cover

Lecture 7 - Dual Fitting Analysis of Greedy Set Cover

Lecture 8 - Randomized Rounding Algorithm for Weighted Set Cover

Lecture 9 - Scheduling Jobs with Deadlines and Release Dates on a Single Machine

Lecture 10 - The k-Center Problem

Lecture 11 - Local Search Algorithm for Scheduling Jobs on Multiple Identical Machines

Lecture 12 - Greedy Algorithm for Scheduling Jobs on Multiple Identical Machines

Lecture 13 - Inapproximability of the Traveling Salesman problem

Lecture 14 - 2-Approximation Algorithm for Metric TSP

Lecture 15 - 1.5-Approximation Algorithm for Metric TSP

Lecture 16 - Edge Coloring

Lecture 17 - Pseudo Polynomial Time Algorithm for Knapsack

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Lecture 20 - PTAS for Minimizing Makespan for Scheduling Jobs on Parallel Identical Machines

Lecture 21 - PTAS for Minimizing Makespan for Scheduling Jobs on Parallel Identical Machines (Continued...)

Lecture 22 - An APTAS for Bin Packing

Lecture 23 - An APTAS for Bin Packing (Continued...)

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Lecture 25 - 3 Factor Approximation Algorithm for Scheduling Weighted Jobs on a Single Machine

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Lecture 31 - A 4 Factor Approximation Algorithm for Uncapacitated Facility Location Problem (Continued...)

NPTEL : Pattern Recognition (Computer Science and Engineering)

Co-ordinators : Prof. Sukhendu Das, Prof. C.A. Murthy

NPTEL : Performance Evaluation of Computer Systems (Computer Science and Engineering)

Co-ordinators : Prof. Krishna Moorthy Sivalingam

NPTEL : Theory of Automata, Formal Languages and Computation (Computer Science and Engineering)

Co-ordinators : Prof. Kamala Krithivasan

NPTEL : Computer Graphics (Computer Science and Engineering)

Co-ordinators : Prof. Sukhendu Das

Lecture 32 - Visible Surface Detection (Continued...)

Lecture 33 - Illumination And Shading

Lecture 34 - Illumination And Shading (Continued...)

Lecture 35 - Illumination And Shading (Continued...)

Lecture 36 - Curve Representation

Lecture 37 - Curve Representation (Continued...)

Lecture 38 - Curves And Surface Representation

Lecture 39 - Graphics Programming Using Open GL

Lecture 40 - Graphics Programming Using Open GL (Continued...)

Lecture 41 - Advanced Topics: Anti Aliasing,Color,Soft Objects,Animation,Visual Effects,System Architectures

Lecture 42 - Digital Image Processing Image Compression-Jpeg-Enhancements

Lecture 43 - Digital Image Processing (Continued...)

NPTEL : Computer Organization (Computer Science and Engineering)

Co-ordinators : Prof. S. Raman

NPTEL : Database Design (Computer Science and Engineering)

Co-ordinators : Dr. S. Srikanth, Prof. D. Janaki Ram

NPTEL : Discrete Mathematical Structures (Computer Science and Engineering)

Co-ordinators : Prof. Kamala Krithivasan

NPTEL : Artificial Intelligence (Prof. Deepak Khemani) (Computer Science and Engineering)

Co-ordinators : Prof. Deepak Khemani

Lecture 32 - Rete Algorithm

Lecture 33 - Planning

Lecture 34 - Planning FSSP, BSSP

Lecture 35 - Goal Stack Planning. Sussman's Anomaly

Lecture 36 - Non-linear planning

Lecture 37 - Plan Space Planning

Lecture 38 - GraphPlan

Lecture 39 - Constraint Satisfaction Problems

Lecture 40 - CSP continued

Lecture 41 - Knowledge-based systems

Lecture 42 - Knowledge-based Systems, PL

Lecture 43 - Propositional Logic

Lecture 44 - Resolution Refutation for PL

Lecture 45 - First-order Logic (FOL)

Lecture 46 - Reasoning in FOL

Lecture 47 - Backward chaining

Lecture 48 - Resolution for FOL

NPTEL : NOC:Programming, Data Structures and Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Hema A Murthy, Prof. Shankar Balachandran, Dr. N.S. Narayanaswamy

NPTEL : NOC:Introduction to Information Security I (Computer Science and Engineering)

Co-ordinators : Prof. V. Kamakoti

Lecture 32 - Module 3 - Part 1

Lecture 33 - Module 3 - Part 2

Lecture 34 - Module 3 - Part 3

Lecture 35 - Module 3 - Part 4

Lecture 36 - Module 3 - Part 5

Lecture 37 - Module 3 - Part 6

Lecture 38 - Module 3 - Part 7

Lecture 39 - Module 3 - Part 8

Lecture 40 - Module 3 - Part 9

Lecture 41 - Module 4 - Part 1

Lecture 42 - module 4 - Part 2

Lecture 43 - Module 4 - Part 3

Lecture 44 - Module 4 - Part 4

Lecture 45 - Module 4 - Part 5

Lecture 46 - Module 4 - Part 6

Lecture 47 - Module 4 - Part 7

Lecture 48 - Module 4 - Part 8

Lecture 49 - Module 4 - Part 9

Lecture 50 - Module 4 - Part 10

Lecture 51 - Module 5 - Part 1

Lecture 52 - Module 5 - Part 2

Lecture 53 - Module 5 - Part 3

Lecture 54 - Module 5 - Part 4

Lecture 55 - Module 5 - Part 5

Lecture 56 - Module 5 - Part 6

Lecture 57 - Module 5 - Part 7

Lecture 58 - Module 6 - Part 1

Lecture 59 - Module 6 - Part 2

Lecture 60 - Module 6 - Part 3

Lecture 61 - Module 6 - Part 4

Lecture 62 - Module 6 - Part 5

Lecture 63 - Module 6 - Part 6

Lecture 64 - Module 6 - Part 7

Lecture 65 - Module 6 - Part 8

NPTEL : NOC:Programming and Data structures (PDS) (Computer Science and Engineering)

Co-ordinators : Dr. N S. Narayanaswamy

NPTEL : NOC:Design and Analysis of Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Madhavan Mukund

Lecture 1 - Course Outline

Lecture 2 - Example: Air Travel

Lecture 3 - Example: Xerox shop

Lecture 4 - Example: Document similarity

Lecture 5 - Introduction and motivation

Lecture 6 - Input size, worst case, average case

Lecture 7 - Quantifying efficiency: O( ), Omega( ), Theta( )

Lecture 8 - Examples: Analysis of iterative and recursive algorithms

Lecture 9 - Arrays and lists

Lecture 10 - Searching in an array

Lecture 11 - Selection Sort

Lecture 12 - Insertion sort

Lecture 13 - Merge sort

Lecture 14 - Merge sort - analysis

Lecture 15 - Quicksort

Lecture 16 - Quicksort - analysis

Lecture 17 - Sorting - Concluding remarks

Lecture 18 - Introduction to graphs

Lecture 19 - Representing graphs

Lecture 20 - Breadth first search (BFS)

Lecture 21 - Depth first search (DFS)

Lecture 22 - Applications of BFS and DFS

Lecture 23 - Directed acylic graphs: topological sort

Lecture 24 - Directed acylic graphs: longest paths

Lecture 25 - Single source shortest paths: Dijkstras algorithm

Lecture 26 - Dijkstras algorithm: analysis

Lecture 27 - Negative edge weights: Bellman-Ford algorithm

Lecture 28 - All pairs shortest paths

Lecture 29 - Minimum Cost Spanning Trees

Lecture 30 - Prims Algorithm

Lecture 31 - Kruskals algorithm

NPTEL : NOC:Programming, Data Structures and Algorithms (Aricent) (Computer Science and Engineering)

Co-ordinators : Dr. N S. Narayanaswamy, Prof. Shankar Balachandran, Prof. Hema A Murthy

NPTEL : NOC:Computer Architecture (Computer Science and Engineering)

Co-ordinators : Prof.Madhu Mutyam

NPTEL : NOC:Model Checking (Computer Science and Engineering)

Co-ordinators : Prof. B. Srivathsan

Lecture 32 - Summary.....

Lecture 33 - Module 1 - Introduction to LTL

Lecture 34 - Module 2 - Semantics of LTL

Lecture 35 - Module 3 - A puzzle

Lecture 36 - Summary.

Lecture 37 - Module 1 - Automata based LTL model-checking

Lecture 38 - Module 2 - LTL to NBA

Lecture 39 - Module 3 - Automaton construction

Lecture 40 - Summary..

Lecture 41 - Module 1 - Tree view of a transition system

Lecture 42 - Module 2 - CTL*

Lecture 43 - Module 3 - CTL

Lecture 44 - summary...

Lecture 45 - Module 1 - Adequate CTL formulae

Lecture 46 - Module 2 - EX, EU, EG

Lecture 47 - Module 3 - Final algorithm

Lecture 48 - Module 4 - State-space explosion

Lecture 49 - Summary....

Lecture 50 - Module 1 - Introduction to BDDs

Lecture 51 - Module 2 - Ordered BDDs

Lecture 52 - Module 3 - Representing transition systems as OBDDs

Lecture 53 - Summary.....

Lecture 54 - Timed transition systems

Lecture 55 - Concluding remarks

NPTEL : NOC:Functional Programming in Haskell (Computer Science and Engineering)

Co-ordinators : Prof. Madhavan Mukund, Prof. S P Suresh

Lecture 1 - Functions

Lecture 2 - Types

Lecture 3 - Haskell

Lecture 4 - Running Haskell programs

Lecture 5 - Currying

Lecture 6 - Examples

Lecture 7 - Lists

Lecture 8 - Functions on lists

Lecture 9 - Characters and strings

Lecture 10 - Tuples

Lecture 11 - Computation as rewriting

Lecture 12 - Polymorphism and higher-order functions

Lecture 13 - Map and filter

Lecture 14 - List comprehension

Lecture 15 - Folding through a list

Lecture 16 - Measuring efficiency

Lecture 17 - Sorting

Lecture 18 - Using infinite lists

Lecture 19 - Conditional polymorphism

Lecture 20 - Defining functions in ghci

Lecture 21 - User-defined datatypes

Lecture 22 - Abstract datatypes

Lecture 23 - Modules

Lecture 24 - Recursive data types

Lecture 25 - Binary search trees

Lecture 26 - Balanced search trees

Lecture 27 - Arrays

Lecture 28 - Input/Output

NPTEL : Virtual Reality ()

Lecture 1 - Course mechanics

Lecture 2 - Goals and VR definitions

Lecture 3 - Historical perspective

Lecture 4 - Birds-eye view (general)

Lecture 5 - Birds-eye view (general) (Continued...)

Lecture 6 - Birds-eye view (hardware)

Lecture 7 - Birds-eye view (software)

Lecture 8 - Birds-eye view (sensation and perception)

Lecture 9 - Geometric modeling

Lecture 10 - Transforming models

Lecture 11 - Matrix algebra and 2D rotations

Lecture 12 - 3D rotations and yaw, pitch, and roll

Lecture 13 - 3D rotations and yaw, pitch, and roll (Continued...)

Lecture 14 - Axis-angle representations

Lecture 15 - Quaternions

Lecture 16 - Converting and multiplying rotations

Lecture 17 - Converting and multiplying rotations (Continued...)

Lecture 18 - Homogeneous transforms

Lecture 19 - The chain of viewing transforms

Lecture 20 - Eye transforms

Lecture 21 - Eye transforms (Continued...)

Lecture 22 - Canonical view transform

Lecture 23 - Viewport transform

Lecture 24 - Viewport transform (Continued...)

Lecture 25 - Three interpretations of light

Lecture 26 - Refraction

Lecture 27 - Simple lenses

Lecture 28 - Diopters

Lecture 29 - Imaging properties of lenses

Lecture 30 - Lens aberrations

Lecture 31 - Optical system of eyes

Lecture 32 - Photoreceptors

NPTEL : NOC:Introduction to Machine Learning (Sponsored by Arihant) (Computer Science and Engineering)

Co-ordinators : Dr. Balaraman Ravindran

Lecture 1 - A brief introduction to machine learning

Lecture 2 - Supervised Learning

Lecture 3 - Unsupervised Learning

Lecture 4 - Reinforcement Learning

Lecture 5 - Probability Basics - 1

Lecture 6 - Probability Basics - 2

Lecture 7 - Linear Algebra - 1

Lecture 8 - Linear Algebra - 2

Lecture 9 - Statistical Decision Theory - Regression

Lecture 10 - Statistical Decision Theory - Classification

Lecture 11 - Bias-Variance

Lecture 12 - Linear Regression

Lecture 13 - Multivariate Regression

Lecture 14 - Subset Selection 1

Lecture 15 - Subset Selection 2

Lecture 16 - Shrinkage Methods

Lecture 17 - Principal Components Regression

Lecture 18 - Partial Least Squares

Lecture 19 - Linear Classification

Lecture 20 - Logistic Regression

Lecture 21 - Linear Discriminant Analysis 1

Lecture 22 - Linear Discriminant Analysis 2

Lecture 23 - Linear Discriminant Analysis 3

Lecture 24 - Optimization

Lecture 25 - Perceptron Learning

Lecture 26 - SVM - Formulation

Lecture 27 - SVM - Interpretation & Analysis

Lecture 28 - SVMs for Linearly Non Separable Data

Lecture 29 - SVM Kernels

Lecture 30 - SVM - Hinge Loss Formulation

Lecture 31 - Weka Tutorial

Lecture 32 - Early Models

Lecture 33 - Backpropogation - I

Lecture 34 - Backpropogation - II

Lecture 35 - Initialization, Training and Validation

Lecture 36 - Maximum Likelihood Estimate

Lecture 37 - Priors and MAP Estimate

Lecture 38 - Bayesian Parameter Estimation

Lecture 39 - Introduction

Lecture 40 - Regression Trees

Lecture 41 - Stopping Criteria and Pruning

Lecture 42 - Loss Functions for Classification

Lecture 43 - Categorical Attributes

Lecture 44 - Multiway Splits

Lecture 45 - Missing Values, Imputation and Surrogate Splits

Lecture 46 - Instability, Smoothness and Repeated Subtrees

Lecture 47 - Tutorial

Lecture 48 - Evaluation Measures I

Lecture 49 - Bootstrapping and Cross Validation

Lecture 50 - 2 Class Evaluation Measures

Lecture 51 - The ROC Curve

Lecture 52 - Minimum Description Length and Exploratory Analysis

Lecture 53 - Introduction to Hypothesis Testing

Lecture 54 - Basic Concepts

Lecture 55 - Sampling Distributions and the Z Test

Lecture 56 - Student's t-test

Lecture 57 - The Two Sample and Paired Sample t-tests

Lecture 58 - Confidence Intervals

Lecture 59 - Bagging, Committee Machines and Stacking

Lecture 60 - Boosting

Lecture 61 - Gradient Boosting

Lecture 62 - Random Forest

Lecture 63 - Naive Bayes

Lecture 64 - Bayesian Networks

NPTEL : NOC:Artificial Intelligence: Knowledge Representation and Reasoning (Computer Science and Engineering)

Co-ordinators : Prof. Deepak Khemani

Lecture 32 - Skolemization

Lecture 33 - Expert Systems

Lecture 34 - Backward Chaining Systems

Lecture 35 - Deductive Retrieval

Lecture 36 - The Resolution Refutation Method

Lecture 37 - Clause Form in FOL

Lecture 38 - Resolution Refutation in FOL

Lecture 39 - First Order Logic with Equality

Lecture 40 - Who was the surgeon?

Lecture 41 - Consistency vs. Completeness

Lecture 42 - Logic Programming

Lecture 43 - Arithmetic

Lecture 44 - Horn Clauses and Prolog

Lecture 45 - SLD Derivation = Backward Chaining

Lecture 46 - Programming in Logic

Lecture 47 - Prolog: Programming in Logic

Lecture 48 - Prolog: Procedural Interpretation

Lecture 49 - Prolog: Query Evaluation

Lecture 50 - Prolog: Unifying Terms

Lecture 51 - Prolog: Goal Order

Lecture 52 - Prolog: Tabling

Lecture 53 - Prolog: Negation by Failure

Lecture 54 - Prolog: The Cut Operator

Lecture 55 - Rule Based Expert Systems

Lecture 56 - The OPS5 Language

Lecture 57 - Match, Resolve, Execute

Lecture 58 - Conflict Resolution Strategies

Lecture 59 - The Rete Algorithm

Lecture 60 - The Rete Net

Lecture 61 - The Rete Net : Examples

Lecture 62 - Knowledge Representation

Lecture 63 - Synonyms, Antonyms, Hyponyms, Meronyms

Lecture 64 - Binary Relations

NPTEL : NOC:Information Security - II (Computer Science and Engineering)

Co-ordinators : Prof. V. Kamakoti

Lecture 1 - Experimental Setup: Video Tutorial

Lecture 2 - Need for Secure Systems

Lecture 3 - Ignorance of A is Sin of B

Lecture 4 - Function calls and Stacks

Lecture 5 - Stack Smashing

Lecture 6 - Virtual Machine Based Rootkits

Lecture 7 - Security and Architecture: Introduction

Lecture 8 - Structured Computer Organization Completed

Lecture 9 - X86 ISA - Part1

Lecture 10 - X86 ISA - Part 2

Lecture 11 - X86 Protected Mode

Lecture 12 - X86 Memory Segmentation

Lecture 13 - Process Isolation using Segmentation

Lecture 14 - Paging and Virtual Memory

Lecture 15 - Task Switching and Interrupt Service

Lecture 16 - Memory Segmentation Deep dive - Part 1

Lecture 17 - Memory Segmentation Deep dive - Part 2

Lecture 18 - Memory Segmentation Deep dive - Part 3

Lecture 19 - Memory Segmentation Deep dive - Part 4

Lecture 20 - Segmentation Recap

Lecture 21 - Lab 1 - Part 1

Lecture 22 - Lab 1 - Part 2

Lecture 23 - Lab 1 - Part 3

Lecture 24 - ISR Recap

Lecture 25 - Lab 2 - Part 1

Lecture 26 - Lab 2 - Part 2

Lecture 27 - Memory Management Recap

Lecture 28 - Lab 3 - Part 1

Lecture 29 - Lab 3 - Part 2

Lecture 30 - Task Switch recap

Lecture 31 - Lab 4 - Part 1

NPTEL : NOC:Algorithms for Big Data (Computer Science and Engineering)

Co-ordinators : Prof. John Augustine

Lecture 1 - Basic definitions

Lecture 2 - Conditional probability

Lecture 3 - Example problems

Lecture 4 - Karger's mincut algorithm

Lecture 5 - Analysis of Karger's mincut algorithm

Lecture 6 - Random variables

Lecture 7 - Randomized quicksort

Lecture 8 - Problem solving video - The rich get richer

Lecture 9 - Problem solving video - Monty Hall problem

Lecture 10 - Bernoulli, Binomial and Geometric distributions

Lecture 11 - Tail Bounds

Lecture 12 - Application of Chernoff bound

Lecture 13 - Application of Chebyshev's inequality

Lecture 14 - Intro to Big Data Algorithms

Lecture 15 - SAT Problem

Lecture 16 - Classification of States

Lecture 17 - Stationary Distribution of a Markov Chain

Lecture 18 - Celebrities Case Study

Lecture 19 - Random Walks on Undirected Graphs

Lecture 20 - Intro to Streaming, Morris Algorithm

Lecture 21 - Reservoir Sampling

Lecture 22 - Approximate Median

Lecture 23 - Overview

Lecture 24 - Balls, bins, hashing

Lecture 25 - Chain hashing, SUHA, Power of Two choices

Lecture 26 - Bloom filter

Lecture 27 - Pairwise independence

Lecture 28 - Estimating expectation of continuous function

Lecture 29 - Universal hash functions

Lecture 30 - Perfect hashing

Lecture 31 - Count-min filter for heavy hitters in data streams

NPTEL : NOC:Reinforcement Learning (Computer Science and Engineering)

Co-ordinators : Dr. B. Ravindran

Lecture 32 - Control in Monte Carlo

Lecture 33 - Off Policy MC

Lecture 34 - UCT

Lecture 35 - TD(0)

Lecture 36 - TD(0) Control

Lecture 37 - Q-Learning

Lecture 38 - Afterstate

Lecture 39 - Eligibility Traces

Lecture 40 - Backward View of Eligibility Traces

Lecture 41 - Eligibility Trace Control

Lecture 42 - Thompson Sampling Recap

Lecture 43 - Function Approximation

Lecture 44 - Linear Parameterization

Lecture 45 - State Aggregation Methods

Lecture 46 - Function Approximation and Eligibility Traces

Lecture 47 - LSTD and LSTDQ

Lecture 48 - LSPI and Fitted Q

Lecture 49 - DQN and Fitted Q-Iteration

Lecture 50 - Policy Gradient Approach

Lecture 51 - Actor Critic and REINFORCE

Lecture 52 - REINFORCE (cont'd)

Lecture 53 - Policy Gradient with Function Approximation

Lecture 54 - Hierarchical Reinforcement Learning

Lecture 55 - Types of Optimality

Lecture 56 - Semi Markov Decision Processes

Lecture 57 - Options

Lecture 58 - Learning with Options

Lecture 59 - Hierarchical Abstract Machines

Lecture 60 - MAXQ

Lecture 61 - MAXQ Value Function Decomposition

Lecture 62 - Option Discovery

Lecture 63 - POMDP Introduction

Lecture 64 - Solving POMDP

NPTEL : NOC:Introduction to Operating Systems (Computer Science and Engineering)

Co-ordinators : Prof. Chester Rebeiro

NPTEL : NOC:Programming, Data Structures and Algorithms in Python (Computer Science and Engineering)

Co-ordinators : Prof. Madhavan Mukund

Lecture 32 - Lecture 1 - Backtracking, N queens

Lecture 33 - Lecture 2 - Global scope, nested functions

Lecture 34 - Lecture 3 - Generating permutations

Lecture 35 - Lecture 4 - Sets, stacks, queues

Lecture 36 - Lecture 5 - Priority queues and heaps

Lecture 37 - Lecture 1 - Abstract datatypes, classes and objects

Lecture 38 - Lecture 2 - Classes and objects in Python

Lecture 39 - Lecture 3 - User defined lists

Lecture 40 - Lecture 4 - Search trees

Lecture 41 - Lecture 1 - Memoization and dynamic programming

Lecture 42 - Lecture 2 - Grid paths

Lecture 43 - Lecture 3 - Longest common subsequence

Lecture 44 - Lecture 4 - Matrix multiplication

Lecture 45 - Lecture 5 - Wrap-up, Python vs other languages

NPTEL : NOC:Privacy and Security in Online Social Networks (Computer Science and Engineering)

Co-ordinators : Prof. Ponnurangam Kumaraguru

NPTEL : NOC:Mobile Computing (Computer Science and Engineering)

Co-ordinators : Prof. Pushpendra Singh

NPTEL : NOC:Introduction to Modern Application Development (Computer Science and Engineering)

Co-ordinators : Tanmai Gopal, Prof. Gaurav Raina

Lecture 1 - Introduction to the course

Lecture 2 - Introduction to a web-app

Lecture 3 - Building a web-app

Lecture 4 - Networks

Lecture 5 - Practical - Running your own web-server

Lecture 6 - Protocols

Lecture 7 - Practical - SSH + Network experiments

Lecture 8 - Practical - Building a webapp with nodejs and using git. Introduction to reverse proxies.

Lecture 9 - Practical - Introduciton to server-side javascript and HTML/CSS

Lecture 10 - Introduction to client-side Javascript

Lecture 11 - Practical - APIs and mobile apps use web-servers

Lecture 12 - Introduction to databases

Lecture 13 - Data modelling and constraints

Lecture 14 - Interacting with a DBMS

Lecture 15 - Practical - Deeper exploration of a DBMS (column types and more)

Lecture 16 - Introduction to SQL

Lecture 17 - Understanding database performance

Lecture 18 - Transactions and ACID properties

Lecture 19 - Database security, backup and recovery

Lecture 20 - Analytics and Views

Lecture 21 - Scaling a database

Lecture 22 - Connecting your webapp to your database and SQL Injection

Lecture 23 - SQL and NoSQL systems

Lecture 24 - Authentication with HTTP

Lecture 25 - Understanding security, and some best practices for webapps

Lecture 26 - Introduction to authentication, hashing, curl and sessions

Lecture 27 - Introduction to mobile apps

Lecture 28 - Introduction to Mobile Application Development Part 2

Lecture 29 - Introduction to Android

Lecture 30 - Getting started with Android Application Development

Lecture 31 - Building Custom UI using XML and Logs

NPTEL : NOC:Information Security-3 (Computer Science and Engineering)

Co-ordinators : Prof. V. Kamakoti

Lecture 1 - Operating System Introduction

Lecture 2 - Storage Hierarchy, Exceptions, Interrupts and traps

Lecture 3 - OS Management Services

Lecture 4 - OS Security Issues

Lecture 5 - Process and Threads

Lecture 6 - Process Scheduling

Lecture 7 - Scheduling Algorithm

Lecture 8 - Process Synchronization

Lecture 9 - Memory Management - 1

Lecture 10 - Memory Management - 2

Lecture 11 - File Systems - 1

Lecture 12 - File Systems - 2

Lecture 13 - Unix Filesystem

Lecture 14 - Unix Filesystem (Continued...)

Lecture 15 - Linux: Basic Commands

Lecture 16 - Linux: Basic Commands (Continued...)

Lecture 17 - Linux: Users and Permissions

Lecture 18 - Linux: I/O Redirection and Pipes

Lecture 19 - Linux: Task Control

Lecture 20 - Linux: Shell Environment

Lecture 21 - Linux: Text Editors

Lecture 22 - Linux: Compression / Archiving

Lecture 23 - Linux: Print and Sync Commands

Lecture 24 - Linux: File Comparison

Lecture 25 - Basic Networking Administration

Lecture 26 - Filesystems and Devices

Lecture 27 - Shell Introduction

Lecture 28 - Shell Comments and Variables

Lecture 29 - Shell Variables

Lecture 30 - Shell Arrays and Arithmetic

Lecture 31 - Shell Condition and Relation

Lecture 32 - Shell Examples

Lecture 33 - Shell Functions

Lecture 34 - Shell File Test

Lecture 35 - Shell Loop Control

Lecture 36 - Shell Script Variations

Lecture 37 - Shell Pattern Matching

Lecture 38 - Shell Case Statements

Lecture 39 - Shell Co-routines

Lecture 40 - Shell Signals and Traps

Lecture 41 - Shell Subshell

Lecture 42 - Shell Declarations

Lecture 43 - Shell Examples 2

Lecture 44 - Shell Review

Lecture 45 - An Introduction

Lecture 46 - Structure of a Network

Lecture 47 - Network Core - Definition

Lecture 48 - Network Access and Physical Media

Lecture 49 - Structure of ISP and Packet Delays

Lecture 50 - Network Protocol Layers

Lecture 51 - Network Devices

Lecture 52 - Network Security - An Introduction

Lecture 53 - Public Key Cryptography

Lecture 54 - Digital Signatures

Lecture 55 - Security in Practise

Lecture 56 - Security in Practise (Continued...)

Lecture 57 - Wireshark

Lecture 58 - Snort

Lecture 59 - Review I

Lecture 60 - Review II

NPTEL : NOC:AI:Constraint Satisfaction (Computer Science and Engineering)

Co-ordinators : Prof. Deepak Khemani

NPTEL : NOC:Computer Organization (Computer Science and Engineering)

Co-ordinators : Prof. V. Kamakoti

NPTEL : NOC:Introduction to Wireless and Cellular Communications (Computer Science and Engineering)

Co-ordinators : Prof. David Kovil Pillai

Lecture 1 - Overview of Cellular Systems - Part 1

Lecture 2 - Overview of Cellular Systems - Part 2

Lecture 3 - Overview of Cellular Systems - Part 3

Lecture 4 - 5G and other Wireless Technologies

Lecture 5 - Basic Cellular Terminology

Lecture 6 - Introduction to Antennas and Propagation Models

Lecture 7 - Link budget, Fading margin, Outage

Lecture 8 - Cellular Concept

Lecture 9 - Cellular system design and analysis

Lecture 10 - Cellular Geometry and System Design

Lecture 11 - Cellular System Capacity, Trunking

Lecture 12 - Handoff and Mobility

Lecture 13 - Handoff Part 2, Classification of Signal Variation

Lecture 14 - Shadowing, Outage, Multipath

Lecture 15 - Rayleigh Fading and Statistical Characterization

Lecture 16 - Properties of Rayleigh Distribution

Lecture 17 - BER in Fading, Narrowband vs Wideband Channels

Lecture 18 - Characterization of Multipath Fading Channels

Lecture 19 - Choice of Modulation

Lecture 20 - Coherent versus Differential Detection

Lecture 21 - Review of Lecture 1-19

Lecture 22 - Coherent vs Differential Detection - Part II and BER in Fading

Lecture 23 - BER in Fading - Part II, Ricean Fading

Lecture 24 - Ricean and Nakagami Fading, Moment Generating Function (MGF)

Lecture 25 - MGF Part II, WSSUS Model

Lecture 26 - WSSUS Part II, Coherence Time, Doppler Spectrum

Lecture 27 - Doppler, Temporal Characteristics of Fading Channels

Lecture 28 - WSSUS-Characterization of Time Dispersive Fading Channels

Lecture 29 - WSSUS-Classification of Fading Channels

Lecture 30 - Practical Channel Models (ITU, COST), Computer generation of Rayleigh fading

Lecture 31 - Rayleigh Fading simulation - Clark and Gans Method, Jakesâ€™ Method

NPTEL : NOC:Distributed Systems (Computer Science and Engineering)

Co-ordinators : Dr. Rajiv Misra

Lecture 1 - Introduction to Distributed Systems

Lecture 2 - Basic Algorithms in Message Passing System

Lecture 3 - Leader Election in Rings

Lecture 4 - Distributed Models of Computation, Causality and Logical Time

Lecture 5 - Size of Vector Clock, Matrix Clocks, Virtual Time and Physical Clock Synchronization

Lecture 6 - Global State and Snapshot Recording Algorithms

Lecture 7 - Distributed Mutual Exclusion and Non-Token based Approaches

Lecture 8 - Quorum Based Distributed Mutual Exclusion Approaches

Lecture 9 - Token Based Distributed Mutual Exclusion Approaches

Lecture 10 - Consensus and Agreement Algorithms

Lecture 11 - Checkpointing and Rollback Recovery

Lecture 12 - Deadlock Detection in Distributed Systems

Lecture 13 - Distributed Shared Memory

Lecture 14 - Distributed Minimum Spanning Tree

Lecture 15 - Termination Detection in Distributed System

Lecture 16 - Message Ordering and Group Communication

Lecture 17 - Self-Stabilization

Lecture 18 - Case Study 1 - Distributed Randomized Algorithms

Lecture 19 - Case Study 2 - Peer-to-Peer Computing and Structured Overlay Network

Lecture 20 - Case Study 3 - The Google File System (GFS)

Lecture 21 - Case Study 4 - MapReduce

Lecture 22 - Case Study 5 - HDFS

Lecture 23 - Case Study 6 - Spark

Lecture 24 - Case Study 7 - Distributed Algorithms for Sensor Networks

Lecture 25 - Case Study 8 - Authentication in Distributed Systems

Lecture 26 - Case Study 9 - Bitcoin: A Peer-to-Peer Electronic Cash System

Lecture 27 - Case Study 10 - BlockChain Technology

NPTEL : NOC:Social Networks (Computer Science and Engineering)

Co-ordinators : Prof. Sudarshan Iyengar

Lecture 1 - Introduction

Lecture 2 - Answer to the puzzle

Lecture 3 - Introduction to Python - 1

Lecture 4 - Introduction to Python - 2

Lecture 5 - Introduction to Networkx - 1

Lecture 6 - Introduction to Networkx - 2

Lecture 7 - Social Networks: The Challenge

Lecture 8 - Google Page Rank

Lecture 9 - Searching in a Network

Lecture 10 - Link Prediction

Lecture 11 - The Contagions

Lecture 12 - Importance of Acquaintances

Lecture 13 - Marketing on Social Networks

Lecture 14 - Introduction to Datasets

Lecture 15 - Ingredients Network

Lecture 16 - Synonymy Network

Lecture 17 - Web Graph

Lecture 18 - Social Network Datasets

Lecture 19 - Datasets : Different Formats

Lecture 20 - Datasets : How to Download?

Lecture 21 - Datasets : Analysing Using Networkx

Lecture 22 - Datasets : Analysing Using Gephi

Lecture 23 - Introduction : Emergence of Connectedness

Lecture 24 - Advanced Material : Emergence of Connectedness

Lecture 25 - Programming Illustration : Emergence of Connectedness

Lecture 26 - Summary to Datasets

Lecture 27 - Introduction

Lecture 28 - Granovetter's Strength of weak ties

Lecture 29 - Triads, clustering coefficient and neighborhood overlap

Lecture 30 - Structure of weak ties, bridges, and local bridges

Lecture 31 - Validation of Granovetter's experiment using cell phone data

Lecture 65 - Characterizing the Structure of Balanced Networks

Lecture 66 - Balance Theorem

Lecture 67 - Proof of Balance Theorem

Lecture 68 - Introduction to positive and negative edges

Lecture 69 - Outline of implemantation

Lecture 70 - Creating graph, displaying it and counting unstable triangles

Lecture 71 - Moving a network from an unstable to stable state

Lecture 72 - Forming two coalitions

Lecture 73 - Forming two coalitions (Continued...)

Lecture 74 - Visualizing coalitions and the evolution

Lecture 75 - The Web Graph

Lecture 76 - Collecting the Web Graph

Lecture 77 - Equal Coin Distribution

Lecture 78 - Random Coin Dropping

Lecture 79 - Google Page Ranking Using Web Graph

Lecture 80 - Implementing PageRank Using Points Distribution Method - 1

Lecture 81 - Implementing PageRank Using Points Distribution Method - 2

Lecture 82 - Implementing PageRank Using Points Distribution Method - 3

Lecture 83 - Implementing PageRank Using Points Distribution Method - 4

Lecture 84 - Implementing PageRank Using Random Walk Method - 1

Lecture 85 - Implementing PageRank Using Random Walk Method - 2

Lecture 86 - DegreeRank versus PageRank

Lecture 87 - We Follow

Lecture 88 - Why do we Follow?

Lecture 89 - Diffusion in Networks

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NPTEL : NOC:An Introduction to Probability in Computing (Computer Science and Engineering)

Co-ordinators : Prof. John Augustine

NPTEL : NOC:Introduction to Human Computer Interaction (Computer Science and Engineering)

Co-ordinators : Prof. Ponnurangam Kumaraguru

NPTEL : NOC:Information Security-IV (Computer Science and Engineering)

Co-ordinators : Prof.M J Shankar Raman, Prof. V. Kamakoti, Prof.Vasan

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NPTEL : NOC:Data Science for Engineers (Computer Science and Engineering)

Co-ordinators : Prof. Shankar Narasimhan, Prof. Ragunathan Rengasamy

NPTEL : NOC:The Joy of Computing using Python (Computer Science and Engineering)

Co-ordinators : Prof. Sudarshan Iyengar

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NPTEL : NOC:Discrete Mathematics (Computer Science and Engineering)

Co-ordinators : Prof. Sudarshan Iyengar

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Lecture 388 - Example 6 : Integers not divisible by 5, 7 or 11

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Lecture 409 - Rook Polynomial

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Lecture 418 - Example - n-bit string

Lecture 419 - Example - n-bit string without consecutive zero

Lecture 420 - Solving Linear Recurrence Relations - A theorem

Lecture 421 - A note on the proof

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Lecture 428 - Intuition for 'complexity'

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Lecture 431 - Reccurence relation of Tower of Hanoi

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Lecture 442 - Introduction to Chromatic polynomial

Lecture 443 - Chromatic polynomial of complete graphs

Lecture 444 - Chromatic polynomial of cycle on 4 vertices - Part 1

Lecture 445 - Chromatic polynomial of cycle on 4 vertices - Part 2

Lecture 446 - Correspondence between partition and generating functions

Lecture 447 - Correspondence between partition and generating functions: In general

Lecture 448 - Distinct partitions and odd partitions

Lecture 449 - Distinct partitions and generating functions

Lecture 450 - Odd partitions and generating functions

Lecture 451 - Distinct partitions equals odd partitions: Observation

Lecture 452 - Distinct partitions equals odd partitions: Proof

Lecture 453 - Why 'partitions' to 'polynomial'?

Lecture 454 - Example: Picking 4 letters from the word 'INDIAN'

Lecture 455 - Motivation for exponential generating function

Lecture 456 - Recurrrence relation: The theorem and its proof

Lecture 457 - Introduction to Group Theory

Lecture 458 - Uniqueness of the identity element

Lecture 459 - Formal definition of a Group

Lecture 460 - Groups: Examples and non-examples

NPTEL : NOC:Deep Learning (Computer Science and Engineering)

Co-ordinators : Prof.Mitesh Khapra

Lecture 32 - Information content, Entropy and cross entropy

Lecture 33 - Recap: Learning Parameters: Guess Work, Gradient Descent

Lecture 34 - Contours Maps

Lecture 35 - Momentum based Gradient Descent

Lecture 36 - Nesterov Accelerated Gradient Descent

Lecture 37 - Stochastic And Mini-Batch Gradient Descent

Lecture 38 - Tips for Adjusting Learning Rate and Momentum

Lecture 39 - Line Search

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Lecture 41 - Bias Correction in Adam

Lecture 42 - Eigenvalues and Eigenvectors

Lecture 43 - Linear Algebra : Basic Definitions

Lecture 44 - Eigenvalue Decompositon

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Lecture 46 - PCA: Interpretation 2

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Lecture 48 - PCA: Interpretation 3 (Continued...)

Lecture 49 - PCA: Practical Example

Lecture 50 - Singular Value Decomposition

Lecture 51 - Introduction to Autoncoders

Lecture 52 - Link between PCA and Autoencoders

Lecture 53 - Regularization in autoencoders (Motivation)

Lecture 54 - Denoising Autoencoders

Lecture 55 - Sparse Autoencoders

Lecture 56 - Contractive Autoencoders

Lecture 57 - Bias and Variance

Lecture 58 - Train error vs Test error

Lecture 59 - Train error vs Test error (Recap)

Lecture 60 - True error and Model complexity

Lecture 61 - L2 regularization

Lecture 62 - Dataset augmentation

Lecture 63 - Parameter sharing and tying

Lecture 64 - Adding Noise to the inputs

NPTEL : NOC:Foundations to Computer Systems Design (Computer Science and Engineering)

Co-ordinators : Prof. V. Kamakoti

Lecture 1 - Introduction to the Course

Lecture 2 - CMOS Transistors and Gates

Lecture 3 - Basic Gates

Lecture 4 - Building Gates Using Simulator

Lecture 5 - Hierarchical Design and Verification

Lecture 6 - Building Blocks of a Digital Computer

Lecture 7 - Binary Number Systems

Lecture 8 - Signed Number Systems

Lecture 9 - Twos Complement Number System

Lecture 10 - Binary Adder Circuits

Lecture 11 - Building the ALU of HACK

Lecture 12 - HACK ALU Functionality

Lecture 13 - Tips for Project P1

Lecture 14 - Sequential Logic Design

Lecture 15 - Latches and Flipflops

Lecture 16 - The Memory Hierarchy

Lecture 17 - Design of Program Counter

Lecture 18 - Introduction to Computer Organization: The HACK Instruction Set Architecture (ISA)

Lecture 19 - Memory Mapped I/O

Lecture 20 - Tips for Projects P2 and P3

Lecture 21 - Tips for Project 4

Lecture 22 - Tips for Project 4

Lecture 23 - Introduction to Computer Architecture

Lecture 24 - The HACK Microarchitecture

Lecture 25 - The HACK CPU - A Deep Dive - Part 1

Lecture 26 - The HACK CPU - A Deep Dive - Part 2

Lecture 27 - The Data Memory

Lecture 28 - The HACK Computer

Lecture 29 - The Assembler Construction

Lecture 30 - Understanding the Working of Assembler

Lecture 31 - Assembler : Symbol Table Construction

Lecture 32 - Assembler : Pass 1

Lecture 33 - Assembler : Pass 2

Lecture 34 - Project 6 : Demonstration

Lecture 35 - Virtual Machines - What and Why?

Lecture 36 - The VM Instruction Set Architecture

Lecture 37 - The execution of a VM Program

Lecture 38 - How powerful is the VM?

Lecture 39 - Project 7 : VM ISA to HACK Mnemonic Translation

Lecture 40 - Project 7 : Demo

Lecture 41 - Deep Understanding of VM ISA using VM Emulator

Lecture 42 - Virtual Machine II - Program flow commands and Introduction to Function Calls

Lecture 43 - Implementation of Function Call

Lecture 44 - Working of the Virtual Machine

Lecture 45 - Project 8 : Translation of Program Flow and Function Call to HACK Mnemonic

Lecture 46 - Handling Static Variables

Lecture 47 - Project 8 : Implementation tips in a Nut Shell

Lecture 48 - Introduction to The JACK Programming Language

Lecture 49 - Project 9 : Basic Steps

Lecture 50 - Understanding Syntax of JACK using Examples

Lecture 51 - Project 9 : More Examples

Lecture 52 - The JACK Syntax - Language Specification

Lecture 53 - Application Development using JACK

Lecture 54 - JACK Compiler: Lexical Analysis - Tokenization

Lecture 55 - Project 10 : Compiler for JACK - Part-1 Demo

Lecture 56 - The JACK Grammar

Lecture 57 - Compiler for JACK: Parsing the JACK Program

Lecture 58 - The Token Analyzer

Lecture 59 - Testing the Correctness

Lecture 60 - The Jack Compiler - Back-end Introduction

Lecture 61 - The Jack Compiler - Handling Variables

Lecture 62 - The Jack Compiler - Handling Expressions

Lecture 63 - The Jack Compiler - Handling Flow of Control

Lecture 64 - The Jack Compiler - Handling Objects

NPTEL : NOC:Machine Learning for Engineering and Science Applications (Computer Science and Engineering)

Co-ordinators : Prof. Ganapathy, Prof. Balaji Srinivasan

Lecture 32 - Logistic Regression

Lecture 33 - Binary Entropy cost function

Lecture 34 - OR Gate Via Classification

Lecture 35 - NOR, AND, NAND Gates

Lecture 36 - XOR Gate

Lecture 37 - Differentiating the sigmoid

Lecture 38 - Gradient of logistic regression

Lecture 39 - Code for Logistic Regression

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Lecture 41 - Multinomial Classification - One Hot Vector

Lecture 42 - Multinomial Classification - Softmax

Lecture 43 - Schematic of multinomial logistic regression

Lecture 44 - Biological neuron

Lecture 45 - Structure of an Artificial Neuron

Lecture 46 - Feedforward Neural Network

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Lecture 48 - Summary of Week 05

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Lecture 50 - Types of convolution

Lecture 51 - CNN Architecture Part 1 (LeNet and Alex Net)

Lecture 52 - CNN Architecture Part 2 (VGG Net)

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Lecture 54 - CNN Architecture Part 4 (ResNet)

Lecture 55 - CNN Architecture Part 5 (DenseNet)

Lecture 56 - Train Network for Image Classification

Lecture 57 - Semantic Segmentation

Lecture 58 - Hyperparameter optimization

Lecture 59 - Transfer Learning

Lecture 60 - Segmentation of Brain Tumors from MRI using Deep Learning

Lecture 61 - Activation Functions

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Lecture 64 - Batch Norm

Lecture 65 - Introduction to RNNs

Lecture 66 - Example - Sequence Classification

Lecture 67 - Training RNNs - Loss and BPTT

Lecture 68 - Vanishing Gradients and TBPTT

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Lecture 70 - LSTM

Lecture 71 - Why LSTM Works

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Lecture 73 - Summary of RNNs

Lecture 74 - Introduction.

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Lecture 76 - Binary decision trees

Lecture 77 - Binary regression trees

Lecture 78 - Bagging

Lecture 79 - Random Forest

Lecture 80 - Boosting

Lecture 81 - Gradient boosting

Lecture 82 - Unsupervised learning and Kmeans

Lecture 83 - Agglomerative clustering

Lecture 84 - Probability Distributions- Gaussian, Bernoulli

Lecture 85 - Covariance Matrix of Gaussian Distribution

Lecture 86 - Central Limit Theorem

Lecture 87 - NaÃƒÂ¯ve Bayes

Lecture 88 - MLE Intro

Lecture 89 - PCA - Part 1

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Lecture 91 - Support Vector Machines

Lecture 92 - MLE, MAP and Bayesian Regression

Lecture 93 - Introduction to Generative model

Lecture 94 - Generative Adversarial Networks (GAN)

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Lecture 96 - Applications: Cardiac MRI - Segmentation and Diagnosis

Lecture 97 - Applications: Cardiac MRI Analysis - Tensorflow code walkthrough

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Lecture 99 - Application 1 description - Fin Heat Transfer

Lecture 100 - Application 1 solution

Lecture 101 - Application 2 description - Computational Fluid Dynamics

Lecture 102 - Application 2 solution

Lecture 103 - Application 3 description - Topology Optimization

Lecture 104 - Application 3 solution

Lecture 105 - Application 4 Solution of PDE/ODE using Neural Networks

Lecture 106 - Summary and road ahead

NPTEL : NOC:Information Security 5 - Secure Systems Engineering (Computer Science and Engineering)

Co-ordinators : Prof. Chester Rebeiro

NPTEL : NOC:Multimodal Interaction (Computer Science and Engineering)

Co-ordinators : Dr. Stefan Hillmann, Prof. Dr. Sebastian Moller

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Lecture 2 - Medium vs. Modality

Lecture 3 - Multimedia and Multimodality

Lecture 4 - Modality Relations

Lecture 5 - Characteristics of Multimodal Systems

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Lecture 7 - Speech Production

Lecture 8 - Hearing - Ear

Lecture 9 - Hearing - Perception

Lecture 10 - Introduction

Lecture 11 - The Human Eye

Lecture 12 - Gestlat Perception

Lecture 13 - Resolution and Sensitivity

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Lecture 19 - Taste

Lecture 20 - Memory

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Lecture 23 - Processing Multiple Signals

Lecture 24 - Multimodal Dual-Tasks

Lecture 25 - Effects of Discongurent Signals

Lecture 26 - Relevance

Lecture 27 - Introduction 1

Lecture 28 - Introduction 2

Lecture 29 - Gesture to Space

Lecture 30 - Turn Taking

Lecture 31 - Conclusion

NPTEL : NOC:Deep Learning - Part 2 (Computer Science and Engineering)

Co-ordinators : Prof.Mitesh Khapra

Lecture 1 - Recap of Probability Theory

Lecture 2 - Why are we interested in Joint Distributions

Lecture 3 - How do we represent a joint distribution

Lecture 4 - Can we represent the joint distribution more compactly

Lecture 5 - Can we use a graph to represent a joint distribution

Lecture 6 - Different types of reasoning encoded in a Bayesian Network

Lecture 7 - Independencies encoded by a Bayesian Network (Case 1: Node and it's parents)

Lecture 8 - Independencies encoded by a Bayesian Network (Case 2: Node and it's non-parents)

Lecture 9 - Independencies encoded by a Bayesian Network (Case 3: Node and it's descendants)

Lecture 10 - Bayesian Networks : Formal Semantics

Lecture 11 - I-Maps

Lecture 12 - Markov Networks: Motivation

Lecture 13 - Factors in Markov Network

Lecture 14 - Local Independencies in a Markov Network

Lecture 15 - Joint Distributions

Lecture 16 - The concept of a latent variable

Lecture 17 - Restricted Boltzmann Machines

Lecture 18 - RBMs as Stochastic Neural Networks

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Lecture 20 - Computing the gradient of the log likelihood

Lecture 21 - Motivation for Sampling

Lecture 22 - Motivation for Sampling - Part 2

Lecture 23 - Markov Chains

Lecture 24 - Why de we care about Markov Chains ?

Lecture 25 - Setting up a Markov Chain for RBMs

Lecture 26 - Training RBMs Using Gibbs Sampling

Lecture 27 - Training RBMS Using Contrastive Divergence

Lecture 28 - Revisiting Autoencoders

Lecture 29 - Variational Autoencoders: The Neural Network Perspective

Lecture 30 - Variational Autoencoders: The Graphical model perspective

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NPTEL : NOC:Machine Learning (Computer Science and Engineering)

Co-ordinators : Prof. Henrik Bostrom, Prof. Fredrik Kilander, Prof. Carl Gustaf Jansson

NPTEL : NOC:C Programming and Assembly Language (Computer Science and Engineering)

Co-ordinators : Prof. Janakiraman Viraraghavan

NPTEL : NOC:Applied Natural Language Processing (Computer Science and Engineering)

Co-ordinators : Prof. Ramaseshan R

Lecture 1 - Introduction

Lecture 2 - Operations on a Corpus

Lecture 3 - Probability and NLP

Lecture 4 - Vector Space models

Lecture 5 - Sequence Learning

Lecture 6 - Machine Translation

Lecture 7 - Preprocessing

Lecture 8 - Statistical Properties of Words - Part 1

Lecture 9 - Statistical Properties of Words - Part 2

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Lecture 13 - Vector Representation of words

Lecture 14 - Contextual understanding of text

Lecture 15 - Co-occurence matrix, n-grams

Lecture 16 - Collocations, Dense word Vectors

Lecture 17 - SVD, Dimensionality reduction, Demo

Lecture 18 - Query Processing

Lecture 19 - Topic Modeling

Lecture 20 - Examples for word prediction

Lecture 21 - Introduction to Probability in the context of NLP

Lecture 22 - Joint and conditional probabilities, independence with examples

Lecture 23 - The definition of probabilistic language model

Lecture 24 - Chain rule and Markov assumption

Lecture 25 - Generative Models

Lecture 26 - Bigram and Trigram Language models - peeking indide the model building

Lecture 27 - Out of vocabulary words and curse of dimensionality

Lecture 28 - Exercise

Lecture 29 - Naive-Bayes, classification

Lecture 30 - Machine learning, perceptron, linearly separable

Lecture 31 - Linear Models for Claassification

Lecture 32 - Biological Neural Network

Lecture 33 - Perceptron

Lecture 34 - Perceptron Learning

Lecture 35 - Logical XOR

Lecture 36 - Activation Functions

Lecture 37 - Gradient Descent

Lecture 38 - Feedforward and Backpropagation Neural Network

Lecture 39 - Why Word2Vec?

Lecture 40 - What are CBOW and Skip-Gram Models?

Lecture 41 - One word learning architecture

Lecture 42 - Forward pass for Word2Vec

Lecture 43 - Matrix Operations Explained

Lecture 44 - CBOW and Skip Gram Models

Lecture 45 - Building Skip-gram model using Python

Lecture 46 - Reduction of complexity - sub-sampling, negative sampling

Lecture 47 - Binay tree, Hierarchical softmax

Lecture 48 - Mapping the output layer to Softmax

Lecture 49 - Updating the weights using hierarchical softmax

Lecture 50 - Discussion on the results obtained from word2vec

Lecture 51 - Recap and Introduction

Lecture 52 - ANN as a LM and its limitations

Lecture 53 - Sequence Learning and its applications

Lecture 54 - Introuduction to Recurrent Neural Network

Lecture 55 - Unrolled RNN

Lecture 56 - RNN - Based Language Model

Lecture 57 - BPTT - Forward Pass

Lecture 58 - BPTT - Derivatives for W,V and U

Lecture 59 - BPTT - Exploding and vanishing gradient

Lecture 60 - LSTM

Lecture 61 - Truncated BPTT

Lecture 62 - GRU

Lecture 63 - Introduction and Historical Approaches to Machine Translation

Lecture 64 - What is SMT?

Lecture 65 - Noisy Channel Model, Bayes Rule, Language Model

Lecture 66 - Translation Model, Alignment Variables

Lecture 67 - Alignments again!

Lecture 68 - IBM Model 1

Lecture 69 - IBM Model 2

Lecture 70 - Introduction to Phrase-based translation

Lecture 71 - Symmetrization of alignments

Lecture 72 - Extraction of Phrases

Lecture 73 - Learning/estimating the phrase probabilities using another Symmetrization example

Lecture 74 - Introduction to evaluation of Machine Translation

Lecture 75 - BLEU - A short Discussion of the seminal paper

Lecture 76 - BLEU Demo using NLTK and other Metrics

Lecture 77 - Encoder-Decoder model for Neural Machine Translation

Lecture 78 - RNN Based Machine Translation

Lecture 79 - Recap and Connecting Bloom Taxonomy with Machine Learning

Lecture 80 - Introduction to Attention based Translation

Lecture 81 - Research Paper discussion on Neural machine translation by jointly learning to align and translate

Lecture 82 - Typical NMT architecture architecture and models for multi-language translation

Lecture 83 - Beam Search, Stochatic Gradient Descend, Mini Batch, Batch

Lecture 84 - Beam Search, Stochatic Gradient Descend, Mini Batch, Batch

Lecture 85 - Introduction to Conversation Modeling

Lecture 86 - A few examples in Conversation Modeling

Lecture 87 - Some ideas to Implement IR-based Conversation Modeling

Lecture 88 - Discussion of some ideas in Question Answering

Lecture 89 - Hyperspace Analogue to Language - HAL

Lecture 90 - Correlated Occurence Analogue to Lexical Semantic - COALS

Lecture 91 - Global Vectors - Glove

Lecture 92 - Evaluation of Word vectors

NPTEL : NOC:Python for Data Science (Computer Science and Engineering)

Co-ordinators : Prof. Ragunathan Rengasamy

NPTEL : NOC:Practical Machine Learning with Tensorflow (Computer Science and Engineering)

Co-ordinators : Dr. B. Ravindran

NPTEL : NOC:Introduction to Database Systems (Computer Science and Engineering)

Co-ordinators : Prof. P.Sreenivasa Kumar

NPTEL : NOC:Foundations of Cryptography (Computer Science and Engineering)

Co-ordinators : Prof. Ashish Choudhury

NPTEL : NOC:Modern Application Development (Computer Science and Engineering)

Co-ordinators : Prof. Madhavan Mukund, Prof. Abhijat Vichare, Prof. Aamod Sane

NPTEL : NOC:Deep Learning for Computer Vision (Computer Science and Engineering)

Co-ordinators : Prof. Vineeth N Balasubramanian

NPTEL : NOC:Artificial Intelligence Search Methods For Problem Solving (Computer Science and Engineering)

Co-ordinators : Prof. Deepak Khemani

Lecture 32 - Emergent Systems

Lecture 33 - Ant Colony Optimization

Lecture 34 - Finding Optimal Paths

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Lecture 36 - Algorithm A*

Lecture 37 - A*: An illustrated example

Lecture 38 - Is A* Admissible?

Lecture 39 - Admissibility of A*

Lecture 40 - Higher, Faster ...

Lecture 41 - B&B - A* - wA* - Best First

Lecture 42 - A*: Leaner Admissible Variations

Lecture 43 - The Monotone Condition

Lecture 44 - DNA Sequence Alignment

Lecture 45 - Divide and Conquer Frontier Search.

Lecture 46 - Smart Memory Graph Search

Lecture 47 - Variations on A*: The story so far

Lecture 48 - Breadth First Heuristic Search

Lecture 49 - Beam Stack Search

Lecture 50 - Game Theory

Lecture 51 - Popular Recreational Games

Lecture 52 - Board Games and Game Trees

Lecture 53 - The Evaluation Function in Board Games

Lecture 54 - Algorithm Minimax and Alpha-Beta Pruning

Lecture 55 - A Cluster of Strategies

Lecture 56 - SSS*: A Best First Algorithm

Lecture 57 - SSS*: A Detailed Example

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Lecture 59 - The Blocks World Domain

Lecture 60 - State Space Planning: Forward and Backward

Lecture 61 - Goal Stack Planning (GSP)

Lecture 62 - GSP: A Detailed Example

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Lecture 64 - PSP: A Tiny Example

Lecture 65 - Multi-Armed Robots

Lecture 66 - Means-Ends Analysis

Lecture 67 - The Planning Graph

Lecture 68 - Algorithm Graphplan

Lecture 69 - Problem Decomposition.

Lecture 70 - Algorithm AO*

Lecture 71 - AO*: An Illustration

Lecture 72 - Rule Based Expert Systems

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Lecture 74 - The OPS5 Language

Lecture 75 - Conflict Resolution

Lecture 76 - Business Rule Management Systems

Lecture 77 - The Rete Net

Lecture 78 - Rete Algorithm: Optimizing the Match

Lecture 79 - Rete Algorithm: Conflict Resolution

Lecture 80 - Reasoning in Logic

Lecture 81 - Rules of Inference

Lecture 82 - Forward Reasoning

Lecture 83 - First Order Logic

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Lecture 87 - Incompleteness...

Lecture 88 - Constraint Satisfaction Problems

Lecture 89 - Binary Constraint Networks

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Lecture 91 - Model Based Diagnosis

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Lecture 93 - Arc Consistency

Lecture 94 - Propagation = Reasoning

Lecture 95 - Lookahead Search

NPTEL : NOC:Computational Complexity (Computer Science and Engineering)

Co-ordinators : Prof. Subrahmanyam Kalyanasundaram

NPTEL : NOC:Parameterized Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. Neeldhara Misra

Lecture 1 - Invitation to FPT

Lecture 2 - Formalizing FPT

Lecture 3 - Kernelization: High Degree Rule

Lecture 4 - Kernelization: d-Hitting Set

Lecture 5 - Kernelization: Crown Reduciton

Lecture 6 - Kernelization: Nemhauser-Trotter and Expansion Lemma

Lecture 7 - Introduction to Branching

Lecture 8 - Analyzing Recurrences

Lecture 9 - High-Degree Branching for FVS

Lecture 10 - Vertex Cover above LP

Lecture 11 - Applications of Vertex Cover above Matching

Lecture 12 - Iterative Compression I: Setting Up the Method

Lecture 13 - Iterative Compression II: Vertex Cover and Tournament Feedback Vertex Set

Lecture 14 - Iterative Compression III: Feedback Vertex Set and 3-Hitting Set

Lecture 15 - Iterative Compression IV: Odd Cycle Transversal

Lecture 16 - Introduction to Randomized Algorithms via a Simple Randomized FPT Algorithm for FVS

Lecture 17 - Color Coding for Longest Path

Lecture 18 - Chromatic Coding for Feedback Arc Set on Tournaments

Lecture 19 - Random Separation and Subgraph Isomorphism

Lecture 20 - Derandomization

Lecture 21 - Divide and Conquer and Separator

Lecture 22 - Towards Defining Treewidth

Lecture 23 - Treewidth and Constructing Treedecomposition of Few Graph Classes

Lecture 24 - Structural Properties of Treedecomposition and Win-Win

Lecture 25 - Nice Tree Decomposition and Algorithm for Max Weight Independent Set

Lecture 26 - Dynamic Programming Algorithm over graphs of Bounded Treewidth

Lecture 27 - FPT Appproximation Algorithm for Computing Tree Decomposition - Part 1

Lecture 28 - FPT Appproximation Algorithm for Computing Tree Decomposition - Part 2

Lecture 29 - FPT Appproximation Algorithm for Computing Tree Decomposition and Applications - Part 1

Lecture 30 - FPT Appproximation Algorithm for Computing Tree Decomposition and Applications - Part 2

Lecture 31 - Dynamic Programming Over Subsets for Set Cover

NPTEL : NOC:Getting Started with Competitive Programming (Computer Science and Engineering)

Co-ordinators : Prof. Neeldhara Misra

NPTEL : NOC:Introduction to Quantum Computing: Quantum Algorithms and Qiskit (Computer Science and Engineering)

Co-ordinators : Prof. Prabha Mandayam

NPTEL : NOC:Systems and Usable Security (Computer Science and Engineering)

Co-ordinators : Prof. Neminath Hubballi

NPTEL : NOC:Online Privacy (Computer Science and Engineering)

Co-ordinators : Prof. Ponnurangam Kumaraguru

NPTEL : NOC:Introduction to Machine Learning (Tamil) (Computer Science and Engineering)

Co-ordinators : Prof. Arun Rajkumar

Lecture 1 - Paradigms of Machine Learning

Lecture 2 - Few more examples

Lecture 3 - Types of Learning

Lecture 4 - Types of supervised learning

Lecture 5 - Mathematical tools

Lecture 6 - Three Fundamental spaces

Lecture 7 - Conditional Probability

Lecture 8 - Bayes Theorem

Lecture 9 - Continuous Probability

Lecture 10 - Introduction to vectors

Lecture 11 - Span of vectors

Lecture 12 - Linear Independence

Lecture 13 - Basis of vector space

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Lecture 15 - Introduction to Regression

Lecture 16 - Linear regression

Lecture 17 - Geometrical Interpretation

Lecture 18 - Visual Guide to Orthogonal Projection

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Lecture 20 - Gradient Descent

Lecture 21 - Choosing Step size

Lecture 22 - Taylor Series

Lecture 23 - Stochastic Gradient Descent and basis functions

Lecture 24 - Regularization Techniques

Lecture 25 - Binary Classification

Lecture 26 - K-Nearest Neighbour Classification

Lecture 27 - Distance metric and Cross-Validation

Lecture 28 - Computational efficiency of KNN

Lecture 29 - Introduction to Decision Trees

Lecture 30 - Level splitting

Lecture 31 - Measure of Impurity

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Lecture 34 - Naive Bayes classifier

Lecture 35 - Conditional Independence

Lecture 36 - Classifying the test point and summary

Lecture 37 - Discriminative models

Lecture 38 - Logistic Regression

Lecture 39 - Summary and big picture

Lecture 40 - Maximum likelihood estimation

Lecture 41 - Linear separability

Lecture 42 - Perceptron and its learning algorithm

Lecture 43 - Perceptron : A thing of past

Lecture 44 - Support Vector Machine

Lecture 45 - Optimizing weights

Lecture 46 - Handling Outliers

Lecture 47 - Dual Formulation

Lecture 48 - Kernel formulation

Lecture 49 - Introduction to Ensemble methods

Lecture 50 - Bagging

Lecture 51 - Bootstrapping

Lecture 52 - Limitations of bagging

Lecture 53 - Introduction to boosting

Lecture 54 - Ada boost

Lecture 55 - Unsupervised learning

Lecture 56 - K-means Clustering

Lecture 57 - LLyod's Algorithms

Lecture 58 - Convergence and Initialization

Lecture 59 - Representation Learning

Lecture 60 - Orthogonal Projection

Lecture 61 - Covariance Matrix and Eigen direction

Lecture 62 - PCA and mean centering

NPTEL : Compiler Design (Prof. Rupesh Nasre) (Computer Science and Engineering)

Co-ordinators : Prof. Rupesh Nasre

Lecture 1 - Introduction - Part 1, Programming languages and compilers

Lecture 2 - Introduction - Part 2, Language translators

Lecture 3 - Introduction - Part 3, Phases of a compiler

Lecture 4 - Introduction - Part 4, Static vs Dynamic contexts,Parameter passing

Lecture 5 - Lexing - Part 1, Terminology, Regex, flex tool- Part 1

Lecture 6 - Lexing - Part 2, Lexical errors, Input buffering

Lecture 7 - flex tool- Part 2

Lecture 8 - Lexing - Part 3, Lookahead, KMP string matching

Lecture 9 - Lexing - Part 4, Regex to DFA conversion - Part 1

Lecture 10 - Lexing - Part 5, Regex to DFA conversion - Part 2, Prasing - Part 1

Lecture 11 - Parsing - Part 2, CFG, Parse tree, Precedence, Ambiguity

Lecture 12 - flex tool - Part 3

Lecture 13 - Parsing - Part 3, Sentinel forms, Error recovery, if-else ambiguity

Lecture 14 - Parsing - Part 4, Left recursion, Recursive descent parsing

Lecture 15 - Parsing - Part 5, First and Follow, Predicitive parsing table

Lecture 16 - Parsing - Part 6, Predictive parsing table, LL(1) grammars

Lecture 17 - Discussions and doubts clarification - Part 1

Lecture 18 - Parsing - Part 6, Bottom-up, Shift-reduce parsing, SLR parsing

Lecture 19 - Parsing - Part 6, LR(0) automaton, SLR parsing using automaton

Lecture 20 - Parsing - Part 7, SLR(1) parsing table, SLR(1) parsing algorithm

Lecture 21 - Parsing - Part 8, Viable prefixes, LR(1) parsing, LR(1) automaton

Lecture 22 - Parsing - Part 9, LALR parsing, SDT- Part 1, attributes

Lecture 23 - Syntax Directed Translation - Part 2, S- and L-attributed SDD

Lecture 24 - Syntax Directed Translation - Part 3, L-attributed SDD, Applications

Lecture 25 - Syntax Directed Translation - Part 4, Actions within productions

Lecture 26 - Discussions and doubts clarification - Part 2

Lecture 27 - Quiz-1 discussion, SDT - Part 5, Code generation for while loop

Lecture 28 - Intermdiate Code Generation - Part 1, Syntax trees and DAGs

Lecture 29 - Intermdiate Code Generation - Part 2, Three-address code

Lecture 30 - Discussions and doubts clarification Part 3

Lecture 31 - Intermdiate Code Generation - Part 3, Static single assignment

Lecture 32 - Intermdiate Code Generation - Part 4, IR for type expressions

Lecture 33 - Intermdiate Code Generation - Part 4, IR for array expressions

Lecture 34 - Intermdiate Code Generation - Part 4, IR for boolean expressions

Lecture 35 - Intermdiate Code Generation - Part 4, IR for break, continue, switch

Lecture 36 - Code Generator - Part 1, Introduction, IR and target code

Lecture 37 - Code Generator - Part 2, Instruction selection, ordering

Lecture 38 - Code Generator - Part 2, Basic blocks and CFG

Lecture 39 - x86 assembly code

Lecture 40 - Code optimizer - Part 1, Local optimizations within a basic block

Lecture 41 - Code optimizer - Part 2, Array references, Peephole optimization

Lecture 42 - Discussions and doubts clarification - Part 4

Lecture 43 - Code optimizer - Part 3, Register allocation, Liveness

Lecture 44 - Code optimizer - Part 4, Register allocation as graph coloring

Lecture 45 - Discussions and doubts clarification - Part 5

Lecture 46 - Code optimizer - Part 5, Data flow analysis, Reaching definitions

Lecture 47 - Discussions and doubts clarification - Part 6

Lecture 48 - Code optimizer - Part 6, DFA for reaching definitions,Live variables

NPTEL : NOC:Applied Accelerated Artificial Intelligence (Computer Science and Engineering)

Co-ordinators : Prof. Satyadhyan Chickerur, Prof. Bharatkumar Sharma, Prof. Adesuyi Tosin, Prof. Satyajit Das

Lecture 32 - Optimizing Deep learning Training: Transfer Learning - Part 1

Lecture 33 - Optimizing Deep learning Training: Transfer Learning - Part 2

Lecture 34 - Fundamentals of Distributed AI Computing Session 1 - Part 1

Lecture 35 - Fundamentals of Distributed AI Computing Session 1 - Part 2

Lecture 36 - Fundamentals of Distributed AI Computing Session 2 - Part 1

Lecture 37 - Fundamentals of Distributed AI Computing Session 2 - Part 2

Lecture 38 - Distributed Deep Learning using Tensorflow and Horovod

Lecture 39 - Challenges with Distributed Deep Learning Training Convergence

Lecture 40 - Fundamentals of Accelerating Deployment - Part 1

Lecture 41 - Fundamentals of Accelerating Deployment - Part 2

Lecture 42 - Accelerating neural network inference in PyTorch and TensorFlow - Part 1

Lecture 43 - Accelerating neural network inference in PyTorch and TensorFlow - Part 2

Lecture 44 - Accelerated Data Analytics - Part 1

Lecture 45 - Accelerated Data Analytics - Part 2

Lecture 46 - Accelerated Data Analytics - Part 3

Lecture 47 - Accelerated Data Analytics - Part 4

Lecture 48 - Accelerated Machine Learning

Lecture 49 - Scale Out with DASK

Lecture 50 - Web visualizations to GPU accelerated crossfiltering - Part 1

Lecture 51 - Web visualizations to GPU accelerated crossfiltering - Part 2

Lecture 52 - Accelerated ETL Pipeline with SPARK - Part 1

Lecture 53 - Accelerated ETL Pipeline with SPARK - Part 2

Lecture 54 - Applied AI: Smart City (Intelligent Video Analytics) Session 1 - Part 1

Lecture 55 - Applied AI: Smart City (Intelligent Video Analytics) Session 1 - Part 2

Lecture 56 - Applied AI: Smart City (Intelligent Video Analytics) Session 2 Deepstream - Part 1

Lecture 57 - Applied AI: Smart City (Intelligent Video Analytics) Session 2 Deepstream - Part 2

Lecture 58 - Applied AI: Health care Session I - Part 1

Lecture 59 - Applied AI: Health care Session I - Part 2

Lecture 60 - Applied AI: Health care Session II - Part 1

Lecture 61 - Applied AI: Health care Session II - Part 2

NPTEL : NOC:Social Network Analysis (Computer Science and Engineering)

Co-ordinators : Prof. Tanmoy Chakraborty

Lecture 1 - Chapter 1 Lectuer 1

Lecture 2 - Chapter 1 Lectuer 2

Lecture 3 - Chapter 1 Lectuer 3

Lecture 4 - Tutorial 1: Introduction to Python/Colab

Lecture 5 - Tutorial 2: Introduction to NetworkX - Part I

Lecture 6 - Chapter 2 Lectuer 1

Lecture 7 - Chapter 2 Lectuer 2

Lecture 8 - Chapter 2 Lectuer 3

Lecture 9 - Chapter 2 Lectuer 4

Lecture 10 - Chapter 2 Lectuer 5

Lecture 11 - Chapter 2 Lectuer 6

Lecture 12 - Tutorial 3: Introduction to NetworkX - Part II

Lecture 13 - Chapter 3 Lectuer 1

Lecture 14 - Chapter 3 Lectuer 2

Lecture 15 - Chapter 3 Lectuer 3

Lecture 16 - Chapter 3 Lectuer 4

Lecture 17 - Chapter 3 Lectuer 5

Lecture 18 - Chapter 3 Lectuer 6

Lecture 19 - Chapter 3 Lectuer 7

Lecture 20 - Chapter 4 Lectuer 1

Lecture 21 - Chapter 4 Lectuer 2

Lecture 22 - Chapter 4 Lectuer 3

Lecture 23 - Chapter 4 Lectuer 4

Lecture 24 - Chapter 4 Lectuer 5

Lecture 25 - Chapter 4 Lectuer 6

Lecture 26 - Tutorial 4

Lecture 27 - Chapter 5 Lectuer 1

Lecture 28 - Chapter 5 Lectuer 2

Lecture 29 - Chapter 5 Lectuer 3

Lecture 30 - Chapter 5 Lectuer 4

Lecture 31 - Chapter 5 Lectuer 5

Lecture 32 - Chapter 5 Lectuer 6

Lecture 33 - Chapter 5 Lectuer 7

Lecture 34 - Chapter 5 Lectuer 8

Lecture 35 - Chapter 5 Lectuer 9

Lecture 36 - Chapter 5 Lectuer 10

Lecture 37 - Chapter 6 Lectuer 1

Lecture 38 - Chapter 6 Lectuer 2

Lecture 39 - Chapter 6 Lectuer 3

Lecture 40 - Chapter 6 Lectuer 4

Lecture 41 - Chapter 6 Lectuer 5

Lecture 42 - Chapter 7 Lectuer 1

Lecture 43 - Chapter 7 Lectuer 2

Lecture 44 - Chapter 7 Lectuer 3

Lecture 45 - Chapter 7 Lectuer 4

Lecture 46 - Chapter 7 Lectuer 5

Lecture 47 - Chapter 7 Lectuer 6

Lecture 48 - Chapter 7 Lectuer 7

Lecture 49 - Chapter 7 Lectuer 8

Lecture 50 - chapter 8 Lectuer 1

Lecture 51 - chapter 8 Lectuer 2

Lecture 52 - Chapter 8 Lectuer 3

Lecture 53 - Chapter 8 Lectuer 4

Lecture 54 - Chapter 8 Lectuer 5

Lecture 55 - Chapter 8 Lectuer 6

Lecture 56 - Chapter 9 Lectuer 1

Lecture 57 - Chapter 9 Lectuer 2

Lecture 58 - Chapter 9 Lectuer 3

Lecture 59 - Chapter 9 Lectuer 4

Lecture 60 - Chapter 9 Lectuer 5

Lecture 61 - Chapter 9 Lectuer 6

Lecture 62 - Chapter 9 Lectuer 7

Lecture 63 - Chapter 9 Lectuer 8

Lecture 64 - Chapter 9 Lectuer 9

NPTEL : NOC:Quantum Algorithms and Cryptography (Computer Science and Engineering)

Co-ordinators : Prof. Shweta Agrawal

Lecture 32 - Simon's Algorithm over Z_n - Part 1

Lecture 33 - Simon's Algorithm over Z_n - Part 2

Lecture 34 - Simon's Algorithm over Z_n - Part 3

Lecture 35 - Simon's Algorithm over Z_n - Part 4

Lecture 36 - Simon's Algorithm over Z_n - Part 5

Lecture 37 - Simon's Algorithm over Z_n - Part 6

Lecture 38 - Shor's Algorithm - Part 1

Lecture 39 - Shor's Algorithm - Part 2

Lecture 40 - Hidden Subgroup Problem - Part 1

Lecture 41 - Hidden Subgroup Problem - Part 2

Lecture 42 - Introduction to Lattices - Part 1

Lecture 43 - Introduction to Lattices - Part 2

Lecture 44 - Public Key Encryption from LWE - Part 1

Lecture 45 - Public Key Encryption from LWE - Part 2

Lecture 46 - Public Key Encryption from LWE - Part 3

Lecture 47 - Fully Homomorphic Encryption - Part 1

Lecture 48 - Fully Homomorphic Encryption - Part 2

Lecture 49 - Fully Homomorphic Encryption - Part 3

Lecture 50 - Quantum Cryptography - Part 1

Lecture 51 - Quantum Cryptography - Part 2

Lecture 52 - Quantum Cryptography - Part 3

Lecture 53 - Quantum Cryptography - Part 4

Lecture 54 - Quantum Cryptography - Part 5

Lecture 55 - Quantum PKE and FHE - Part 1

Lecture 56 - Quantum PKE and FHE - Part 2

Lecture 57 - Quantum PKE and FHE - Part 3

Lecture 58 - Quantum PKE and FHE - Part 4

Lecture 59 - Quantum PKE and FHE - Part 5

NPTEL : NOC:Theory of Computation (2023) (Computer Science and Engineering)

Co-ordinators : Prof. Subrahmanyam Kalyanasundaram

NPTEL : NOC:Advanced Computer Networks (Computer Science and Engineering)

Co-ordinators : Prof. Neminath Hubballi, Prof. Sameer Kulkarni

Lecture 32 - Software Defined Networking - I

Lecture 33 - Software Defined Networking - II

Lecture 34 - Software Defined Networking - III

Lecture 35 - OpenFlow

Lecture 36 - SND Prospects and Challenges

Lecture 37 - Introduction to Network Function Virtualization - I

Lecture 38 - Introduction to Network Function Virtualization - II

Lecture 39 - Network Function Virtualization - Concepts, Framework and Architecture - I

Lecture 40 - Network Function Virtualization - Concepts, Framework and Architecture - II

Lecture 41 - Network Function Virtualization - Road ahead and Key challenges

Lecture 42 - High Performance Network Packet Processing

Lecture 43 - Summary and Comparision of NFV and SDN

Lecture 44 - Programmable Networks - Data Plane Programmability - Overview I

Lecture 45 - Programmable Networks - Data Plane Programmability - Overview II

Lecture 46 - Reconfigurable Match Action Tables

Lecture 47 - P4 Programming

Lecture 48 - Data Center Networking - Introduction - Part 1

Lecture 49 - Data Center Networking - Introduction - Part 2

Lecture 50 - Data Center Networking - Characteristics and Challenges

Lecture 51 - Data Center Networking - Topologies and Architecture - Part 1

Lecture 52 - Data Center Networking - Topologies and Architecture - Part 2

Lecture 53 - Data Center Networking - Protocol Innovations - Part 1

Lecture 54 - Data Center Networking - Protocol Innovations - Part 2

Lecture 55 - Network Telemetry

Lecture 56 - Serverless Computing - Part 1

Lecture 57 - Serverless Computing - Part 2

Lecture 58 - SmartNICs and In-band Network Telemetry, Future of Network Softwarization, SDN 3.0

Lecture 59 - QUIC

Lecture 60 - Green and Sustainable Data Centers

Lecture 61 - Content Distribution in IP Networks - Part 1

Lecture 62 - Content Distribution in IP Networks - Part 2

Lecture 63 - Information Centric Networking - Part 1

Lecture 64 - Information Centric Networking - Part 2

NPTEL : NOC:Affective Computing (Computer Science and Engineering)

Co-ordinators : Prof. Jainendra Shukla, Prof. Abhinav Dhal

NPTEL : NOC:Optimisation for Machine Learning: Theory and Implementation (Hindi) (Computer Science and Engineering)

Co-ordinators : Prof. Pravesh Biyani

NPTEL : ACM India - RBCDSAI Summer School on DS-AI-ML (Computer Science and Engineering)

Co-ordinators : Multi-Faculty

Lecture 32 - Classification Naive Bayes, Logistic Regression, K-NN - Part 1

Lecture 33 - Classification Naive Bayes, Logistic Regression, K-NN - Part 2

Lecture 34 - Classification Naive Bayes, Logistic Regression, K-NN - Part 3

Lecture 35 - Classification Naive Bayes, Logistic Regression, K-NN - Part 4

Lecture 36 - Classification - Part 1

Lecture 37 - Classification - Part 2

Lecture 38 - Classification - Part 3

Lecture 39 - Linear Models for Classification - Part 1

Lecture 40 - Linear Models for Classification - Part 2

Lecture 41 - Kernel Machines

Lecture 42 - Solving Langrange Dual in SVM

Lecture 43 - Classification and SVM - Part 1

Lecture 44 - Classification and SVM - Part 2

Lecture 45 - Tree - Based methods, Boosting bagging - Part 1

Lecture 46 - Tree - Based methods, Boosting bagging - Part 2

Lecture 47 - Tree - Based methods, Boosting bagging - Part 3

Lecture 48 - Tree - Based methods, Boosting bagging - Part 4

Lecture 49 - Tree-based approaches for regression and classification - Part 1

Lecture 50 - Tree-based approaches for regression and classification - Part 2

Lecture 51 - Supervised Learning Using K Nearest Neighbors - Part 1

Lecture 52 - Supervised Learning Using K Nearest Neighbors - Part 2

Lecture 53 - Supervised Learning Using K Nearest Neighbors - Part 3

Lecture 54 - Supervised Learning Using K Nearest Neighbors - Part 4

Lecture 55 - Clustering methods - Part 1

Lecture 56 - Clustering methods - Part 2

Lecture 57 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks - Part 1

Lecture 58 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks - Part 2

Lecture 59 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks - Part 3

Lecture 60 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks - Part 4

Lecture 61 - Neural Networks and Feedforward NN - Part 1

Lecture 62 - Neural Networks and Feedforward NN - Part 2

Lecture 63 - Neural Networks and Feedforward NN - Part 3

Lecture 64 - Backpropagation (Intuition)

Lecture 65 - Backpropagation: Computing Cradients w.r.t the Output Units

Lecture 66 - Learning Parameters: Gradient Descent

Lecture 67 - Contours

Lecture 68 - Nesterov Accelerated Gradient Descent

Lecture 69 - Stochastic and Mini-Batch Gradient Descent

Lecture 70 - Tips for Adjusting learning Rate and Momentum

Lecture 71 - Line Search

Lecture 72 - The convolution operation

Lecture 73 - Convolutional Neural Networks

Lecture 74 - CNN and DL models - Part 1

Lecture 75 - CNN and DL models - Part 2

Lecture 76 - CNN and DL models - Part 3

Lecture 77 - CNN and DL models - Part 4

Lecture 78 - AI/ML/DS Industry Use Cases - Part 1

Lecture 79 - AI/ML/DS Industry Use Cases - Part 2

Lecture 80 - AI/ML - Case Studies in Industry - Part 1

Lecture 81 - AI/ML - Case Studies in Industry - Part 2

Lecture 82 - Q and A on career in research a woman faculty representative from PSGTech and RBCDSAI

NPTEL : NOC:Machine Learning (ML) in Hindi (Computer Science and Engineering)

Co-ordinators : Prof. Anubha Gupta

NPTEL : NOC:Cyber Security and Privacy (Computer Science and Engineering)

Co-ordinators : Prof. Saji K Mathew

NPTEL : NOC:Business Intelligence and Analytics (Computer Science and Engineering)

Co-ordinators : Prof. Saji K Mathew

Lecture 1 - Introduction to Business Intelligence and Analytics

Lecture 2 - Patterns in Data

Lecture 3 - Vocabulary of Business Analytics

Lecture 4 - Course Overview

Lecture 5 - Case: Bizocity Scoring at AT&T

Lecture 6 - Business Intelligence Architecture

Lecture 7 - Data Management

Lecture 8 - Online Transaction Processing

Lecture 9 - Introduction To SQL

Lecture 10 - Normalisation

Lecture 11 - Shopsense Case in MySQL Workbench

Lecture 12 - Online Analytical Processing

Lecture 13 - Descriptive Data Analytics

Lecture 14 - Churn Analysis

Lecture 15 - Customer Lifetime Value

Lecture 16 - NPV-CLV Spreadsheet Analysis

Lecture 17 - Analytics Process

Lecture 18 - Introduction to Statistical Learning and Data Pre-Processing

Lecture 19 - Data Mining Process

Lecture 20 - Overview of Data Mining Techniques

Lecture 21 - Analytics Process Case

Lecture 22 - Introduction to Classification

Lecture 23 - Scoring Models

Lecture 24 - Classifier Performance

Lecture 25 - Decision Trees

Lecture 26 - Attribute Selection

Lecture 27 - Growing a Decision Tree

Lecture 28 - Decision Tree Application - Part 1

Lecture 29 - Decision Tree Application - Part 2

Lecture 30 - Classification Demo - 1

Lecture 31 - Classification Demo - 2

NPTEL : NOC:Responsible and Safe AI Systems (Computer Science and Engineering)

Co-ordinators : Prof. Ponnurangam Kumaraguru, Prof. Balaraman Ravindran, Prof. Arun Rajkumar

NPTEL : NOC:Introduction to Cryptology (Computer Science and Engineering)

Co-ordinators : Dr. Sugata Gangopadhyay

NPTEL : NOC:Data Analytics with Python (Computer Science and Engineering)

Co-ordinators : Prof. A. Ramesh

Lecture 1 - Introduction to data analytics

Lecture 2 - Python Fundamentals - I

Lecture 3 - Python Fundamentals - II

Lecture 4 - Central Tendency and Dispersion - I

Lecture 5 - Central Tendency and Dispersion - II

Lecture 6 - Introduction to Probability - I

Lecture 7 - Introduction to Probability - II

Lecture 8 - Probability Distributions - I

Lecture 9 - Probability Distributions - II

Lecture 10 - Probability Distributions - III

Lecture 11 - Python Demo for Distributions

Lecture 12 - Sampling and Sampling Distribution

Lecture 13 - Distribution of Sample Means, population, and variance

Lecture 14 - Confidence interval estimation: Single population - I

Lecture 15 - Confidence interval estimation: Single population - II

Lecture 16 - Hypothesis Testing - I

Lecture 17 - Hypothesis Testing - II

Lecture 18 - Hypothesis Testing - III

Lecture 19 - Errors in Hypothesis Testing

Lecture 20 - Hypothesis Testing: Two sample test - I

Lecture 21 - Hypothesis Testing: Two sample test - II

Lecture 22 - Hypothesis Testing: Two sample test - III

Lecture 23 - ANOVA - I

Lecture 24 - ANOVA - II

Lecture 25 - Post Hoc Analysis (Tukeyâ€™s test)

Lecture 26 - Randomize block design (RBD)

Lecture 27 - Two Way ANOVA

Lecture 28 - Linear Regression - I

Lecture 29 - Linear Regression - II

Lecture 30 - Linear Regression - III

Lecture 31 - Estimation, Prediction of Regression Model Residual Analysis - I

Lecture 32 - Estimation, Prediction of Regression Model Residual Analysis - II

Lecture 33 - Multiple Regression Model - I

Lecture 34 - Multiple Regression Model - II

Lecture 35 - Categorical variable regression

Lecture 36 - Maximum Likelihood Estimation - I

Lecture 37 - Maximum Likelihood Estimation - II

Lecture 38 - Logistic Regression - I

Lecture 39 - Logistic Regression - II

Lecture 40 - Linear Regression Model Vs Logistic Regression Model

Lecture 41 - Confusion matrix and ROC - I

Lecture 42 - Confusion Matrix and ROC - II

Lecture 43 - Performance of Logistic Model - III

Lecture 44 - Regression Analysis Model Building - I

Lecture 45 - Regression Analysis Model Building (Interaction) - II

Lecture 46 - Chi - Square Test of Independence - I

Lecture 47 - Chi-Square Test of Independence - II

Lecture 48 - Chi-Square Goodness of Fit Test

Lecture 49 - Cluster analysis: Introduction - Part I

Lecture 50 - Clustering analysis - Part II

Lecture 51 - Clustering analysis - Part III

Lecture 52 - Cluster analysis - Part IV

Lecture 53 - Cluster analysis - Part V

Lecture 54 - K- Means Clustering

Lecture 55 - Hierarchical method of clustering - I

Lecture 56 - Hierarchical method of clustering - II

Lecture 57 - Classification and Regression Trees (CART) - I

Lecture 58 - Measures of attribute selection

Lecture 59 - Attribute selection Measures in (CART) - II

Lecture 60 - Classification and Regression Trees (CART) - III

NPTEL : Combinatorics (Computer Science and Engineering)

Co-ordinators : Dr. L. Sunil Chandran

Lecture 1 - Pigeon hole principle - (Part 1)

Lecture 2 - Pigeon hole principle - (Part 2)

Lecture 3 - Pigeon hole principle - (Part 3)

Lecture 4 - Pigeon hole principle - (Part 4)

Lecture 5 - Elementary concepts and basic counting principles

Lecture 6 - Elementary concepts; Binomial theorem; Bijective proofs - Part (1)

Lecture 7 - Bijective proofs â€“ Part (2)

Lecture 8 - Bijective proofs - Part (3); Properties of binomial coefficients; Combinatorial identities - Part (1)

Lecture 9 - Combinatorial identities - Part (2); Permutations of multisets â€“ Part (1)

Lecture 10 - Permutations of multisets â€“ Part (2)

Lecture 11 - Multinomial Theorem, Combinations of Multisets â€“ Part (1)

Lecture 12 - Combinations of Multisets - Part (2)

Lecture 13 - Combinations of Multisets â€“ Part (3), Bounds for binomial coefficients

Lecture 14 - Sterlingâ€™s Formula, Generalization of Binomial coefficients - Part (1)

Lecture 15 - Generalization of Binomial coefficients - Part (2)

Lecture 16 - Generalization of Binomial coefficients - Part (3); Double counting - Part (1)

Lecture 17 - Double counting - Part (2)

Lecture 18 - Hallâ€™s Theorem for regular bipartite graphs; Inclusion exclusion principle - Part (1)

Lecture 19 - Inclusion exclusion principle - Part (2)

Lecture 20 - Inclusion exclusion principle - Part (3)

Lecture 21 - Inclusion exclusion principle - Part (4)

Lecture 22 - Inclusion exclusion principle - Part (5)

Lecture 23 - Recurrence Relations - Part (1)

Lecture 24 - Recurrence Relations - Part (2)

Lecture 25 - Recurrence Relations - Part (3)

Lecture 26 - Recurrence Relations - Part (4)

Lecture 27 - Recurrence Relations - Part (5)

Lecture 28 - Generating functions - Part (1)

Lecture 29 - Generating functions - Part (2)

Lecture 30 - Solving recurrence relations using generating functions - Part (1)

Lecture 31 - Solving recurrence relations using generating functions - Part (2)

NPTEL : Compiler Design (Prof. Y.N. Srikanth) (Computer Science and Engineering)

Co-ordinators : Prof. Y.N. Srikanth

Lecture 1 - An Overview of a Compiler - Part 1

Lecture 2 - An Overview of a Compiler - Part 2 and Run-Time Environments - Part 1

Lecture 3 - An Overview of a Compiler - Part 2 and Run-Time Environments - Part 1

Lecture 4 - Run-Time Environments - Part 2

Lecture 5 - Run-Time Environments - Part 3 and Local Optimizations - Part 1

Lecture 6 - Run-Time Environments - Part 3 and Local Optimizations - Part 1

Lecture 7 - Local Optimizations - Part 2 and Code Generation - Part 1

Lecture 8 - Local Optimizations - Part 2 and Code Generation - Part 1

Lecture 9 - Code Generation - Part 1

Lecture 10 - Code Generation - Part 2

Lecture 11 - Code Generation - Part 3 and Global Register Allocation - Part 1

Lecture 12 - Code Generation - Part 3 and Global Register Allocation - Part 1

Lecture 13 - Global Register Allocation - Part 2

Lecture 14 - Global Register Allocation - Part 3 and Implementing Object-Oriented Languages - Part 1

Lecture 15 - Global Register Allocation - Part 3 and Implementing Object-Oriented Languages - Part 1

Lecture 16 - Implementing Object-Oriented Languages - Part 2 and Introduction to Machine-Independent Optimizations - Part 1

Lecture 17 - Implementing Object-Oriented Languages - Part 2 and Introduction to Machine-Independent Optimizations - Part 1

Lecture 18 - Introduction to Machine-Independent Optimizations - Part 2 and Data-Flow Analysis - Part 1

Lecture 19 - Introduction to Machine-Independent Optimizations - Part 2 and Data-Flow Analysis - Part 1

Lecture 20 - Data-Flow Analysis - Part 2

Lecture 21 - Data-Flow Analysis - Part 3 and Control-Flow Analysis - Part 1

Lecture 22 - Data-Flow Analysis - Part 3 and Control-Flow Analysis - Part 1

Lecture 23 - Control-Flow Analysis - Part 2

Lecture 24 - Machine-Independent Optimizations - Part 1

Lecture 25 - Machine-Independent Optimizations - Part 2

Lecture 26 - Machine-Independent Optimizations - Part 3 and Data-Flow Analysis: Theoretical Foundation - Part 1

Lecture 27 - Machine-Independent Optimizations - Part 3 and Data-Flow Analysis: Theoretical Foundation - Part 1

Lecture 28 - Data-Flow Analysis: Theoretical Foundation - Part 2 and Partial Redundancy Elimination - Part 1

Lecture 29 - Data-Flow Analysis: Theoretical Foundation - Part 2 and Partial Redundancy Elimination - Part 1

Lecture 30 - Partial Redundancy Elimination - Part 2

Lecture 31 - The Static Single Assignment Form: Construction and Application to Program Optimizations - Part 1

NPTEL : Graph Theory (Computer Science and Engineering)

Co-ordinators : Dr. L. Sunil Chandran

Lecture 1 - Introduction: Vertex cover and independent set

Lecture 2 - Matchings: Konigâ€™s theorem and Hallâ€™s theorem

Lecture 3 - More on Hallâ€™s theorem and some applications

Lecture 4 - Tutteâ€™s theorem on existence of a perfect matching

Lecture 5 - More on Tutteâ€™s theorem

Lecture 6 - More on Matchings

Lecture 7 - Dominating set, path cover

Lecture 8 - Gallai â€“ Millgram theorem, Dilworthâ€™s theorem

Lecture 9 - Connectivity: 2-connected and 3-connected graphs

Lecture 10 - Mengerâ€™s theorem

Lecture 11 - More on connectivity: k- linkedness

Lecture 12 - Minors, topological minors and more on k- linkedness

Lecture 13 - Vertex coloring: Brooks theorem

Lecture 14 - More on vertex coloring

Lecture 15 - Edge coloring: Vizingâ€™s theorem

Lecture 16 - Proof of Vizingâ€™s theorem, Introduction to planarity

Lecture 17 - 5- coloring planar graphs, Kuratowskyâ€™s theorem

Lecture 18 - Proof of Kuratowskyâ€™s theorem, List coloring

Lecture 19 - List chromatic index

Lecture 20 - Adjacency polynomial of a graph and combinatorial Nullstellensatz

Lecture 21 - Chromatic polynomial, k - critical graphs

Lecture 22 - Gallai-Roy theorem, Acyclic coloring, Hadwigerâ€™s conjecture

Lecture 23 - Perfect graphs: Examples

Lecture 24 - Interval graphs, chordal graphs

Lecture 25 - Proof of weak perfect graph theorem (WPGT)

Lecture 26 - Second proof of WPGT, Some non-perfect graph classes

Lecture 27 - More special classes of graphs

Lecture 28 - Boxicity,Sphericity, Hamiltonian circuits

Lecture 29 - More on Hamiltonicity: Chvatalâ€™s theorem

Lecture 30 - Chvatalâ€™s theorem, toughness, Hamiltonicity and 4-color conjecture

Lecture 31 - Network flows: Max flow mincut theorem

NPTEL : High Performance Computing (Computer Science and Engineering)

Co-ordinators : Prof. Mathew Jacob

NPTEL : Numerical Optimization (Computer Science and Engineering)

Co-ordinators : Dr. Shirish K. Shevade

NPTEL : Storage Systems (Computer Science and Engineering)

Co-ordinators : Dr. K. Gopinath

NPTEL : System Analysis and Design (Computer Science and Engineering)

Co-ordinators : Prof. V. Rajaraman

NPTEL : Principles of Compiler Design (Computer Science and Engineering)

Co-ordinators : Prof. Y.N. Srikanth

Lecture 1 - An Overview of a Compiler

Lecture 2 - Lexical Analysis - Part 1

Lecture 3 - Lexical Analysis - Part 2

Lecture 4 - Lexical Analysis - Part 3

Lecture 5 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 1

Lecture 6 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 2

Lecture 7 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 3

Lecture 8 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 4

Lecture 9 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 5

Lecture 10 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 6

Lecture 11 - Syntax Analysis: Context-free Grammars, Pushdown Automata and Parsing Part - 7

Lecture 12 - Semantic Analysis with Attribute Grammars Part - 1

Lecture 13 - Semantic Analysis with Attribute Grammars Part - 2

Lecture 14 - Semantic Analysis with Attribute Grammars Part - 3

Lecture 15 - Semantic Analysis with Attribute Grammars Part - 4

Lecture 16 - Semantic Analysis with Attribute Grammars Part - 5

Lecture 17 - Intermediate code generation Part - 1

Lecture 18 - Intermediate code generation Part - 2

Lecture 19 - Intermediate code generation Part - 3

Lecture 20 - Intermediate code generation Part - 4 (first half of lecture)

Lecture 21 - Run-time environments - 1 (second half of lecture)

Lecture 22 - Run-time environments - 2

Lecture 23 - Run-time environments - 3

Lecture 24 - Run-time environments - 4 (first half of lecture)

Lecture 25 - Control-Flow Graph and Local Optimizations - Part 1 (second half of lecture)

Lecture 26 - Control-Flow Graph and Local Optimizations - Part 2 (first half of lecture)

Lecture 27 - Machine code generation - 1 (second half of lecture)

Lecture 28 - Machine code generation - 2

Lecture 29 - Machine code generation - 3

Lecture 30 - Machine code generation - 4 (first half of lecture), Implementing object-oriented languages 1 (second half of lecture)

Lecture 31 - Implementing object-oriented languages 2 (first half of lecture)

NPTEL : NOC:Discrete Mathematics (IIITB) (Computer Science and Engineering)

Co-ordinators : Prof. Ashish Choudhury

Lecture 32 - Basic Rules of Counting

Lecture 33 - Permutation and Combination

Lecture 34 - Counting Using Recurrence Equations

Lecture 35 - Solving Linear Homogeneous Recurrence Equations - Part I

Lecture 36 - Solving Linear Homogeneous Recurrence Equations - Part II

Lecture 37 - Tutorial 6 - Part I

Lecture 38 - Tutorial 6 - Part II

Lecture 39 - Solving Linear Non-Homogeneous Recurrence Equations

Lecture 40 - Catalan Numbers

Lecture 41 - Catalan Numbers - Derivation of Closed Form Formula

Lecture 42 - Counting Using Principle of Inclusion-Exclusion

Lecture 43 - Tutorial - 7

Lecture 44 - Graph Theory Basics

Lecture 45 - Matching

Lecture 46 - Proof of Hallâ€™s Marriage Theorem

Lecture 47 - Various Operations on Graphs

Lecture 48 - Vertex and Edge Connectivity

Lecture 49 - Tutorial - 8

Lecture 50 - Euler Path and Euler Circuit

Lecture 51 - Hamiltonian Circuit

Lecture 52 - Vertex and Edge Coloring

Lecture 53 - Tutorial 9 - Part I

Lecture 54 - Tutorial 9 - Part II

Lecture 55 - Modular Arithmetic

Lecture 56 - Prime Numbers and GCD

Lecture 57 - Properties of GCD and BÃ©zoutâ€™s Theorem

Lecture 58 - Linear Congruence Equations and Chinese Remainder Theorem

Lecture 59 - Uniqueness Proof of the CRT

Lecture 60 - Fermatâ€™s Little Theorem, Primality Testing and Carmichael Numbers

Lecture 61 - Group Theory

Lecture 62 - Cyclic Groups

Lecture 63 - Subgroups

Lecture 64 - Discrete Logarithm and Cryptographic Applications

NPTEL : NOC:Secure Computation: Part I (Computer Science and Engineering)

Co-ordinators : Prof. Ashish Choudhury

NPTEL : NOC:Secure Computation - Part II (Computer Science and Engineering)

Co-ordinators : Prof. Ashish Choudhury

NPTEL : NOC:Introduction to Graph Algorithms (Computer Science and Engineering)

Co-ordinators : Prof. C. Pandu Rangan

Lecture 1 - Introduction and Principles of Algorithms - Part 1

Lecture 2 - Principles of Algorithms - Part 2

Lecture 3 - Shortest Path Algorithms

Lecture 4 - Undirected Graph

Lecture 5 - Algorithms for finding Shortest Path - Part 1

Lecture 6 - Algorithms for finding Shortest Path - Part 2

Lecture 7 - Single source shortest path problem

Lecture 8 - Properties of shortest path distances - Part 1

Lecture 9 - Properties of shortest path distances - Part 2

Lecture 10 - Belman Equation - Part 1

Lecture 11 - Belman Equation - Part 2

Lecture 12 - Belman Equation - Part 3

Lecture 13 - Belman Equation - Part 4

Lecture 14 - Bellman Ford - Part 1

Lecture 15 - Bellman Ford - Part 2

Lecture 16 - Dijkstra Algorithm - Part 1

Lecture 17 - Dijkstra Algorithm - Part 2

Lecture 18 - Dijkstra Algorithm - Part 3

Lecture 19 - All Pair Shortest - Path 1

Lecture 20 - All Pair Shortest - Path 2

Lecture 21 - All Pair Shortest - Path 3 and 4

Lecture 22 - All Pair Shortest - Path 5

Lecture 23 - Prims Algorithm - Part 1

Lecture 24 - Prims Algorithm - Part 2

Lecture 25 - Kruskal's Algorithm - Part 1

Lecture 26 - Kruskal's Algorithm - Part 2

Lecture 27 - Kruskal's Algorithm - Part 3

Lecture 28 - DFS

Lecture 29 - DFS

Lecture 30 - Algorithm for Cut Vertex

Lecture 31 - Iterative DFS

NPTEL : NOC:Linear Algebra Through Geometry (Computer Science and Engineering)

Co-ordinators : Prof. Ashok Rao, Prof. M Krishna Kumar, Prof. Arulalan M R